1

KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.

TEACHING AND EXAMINATION SCHEME FOR DIPLOMA PROGRAMME.

PROGRAMME NAME: CIVIL ENGINEERING | **PROGRAMME CODE:CE**

PATTERN: FULL TIME | **DURATION OF PROGRAMME: 3 YEARS (6 SEMESTERS)**

SEMESTER: I | **SCHEME: C-15**

Sl.No	Course Name	Teaching Department	Course/QP code	Teaching Scheme					Examination Scheme					
				Contact Hours										
				TH	TU	PR	Total	Credit	Exam Paper Duration in Hrs	End Exam		I A Marks	Total Marks	Min Marks for passing (including IA marks)
										Max Marks	Min Marks			
1	Communication Skills in English	Sc & Hum	15CE01E	4	-	-	4	4	3	100	35	25	125	45
2	Engineering Mathematics-I	Sc	15SC01M	4	-	-	4	4	3	100	35	25	125	45
3	Materials of construction	CE	15CE11T	4	-	-	4	4	3	100	35	25	125	45
4	Engineering Drawing-I	CE	15CE12D	-	2	4	6	3	4	100	35	25	125	45
5	Basic Computer Skills Lab	CE	15CE13P	-	2	4	6	3	3	50	25	25	75	35
6	Materials of construction Lab	CE	15CE14P		2	4	6	3	3	50	25	25	75	35
			Total	12	6	12	30	21		500	190	150	650	250

1 Hr Theory = 1 Credit 2Hrs Practical/Tutorial = 1 Credit.

QP Code- Question Paper code: TH-Theory Hours: TU-Tutorial: PR-Practical

2

KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.

TEACHING AND EXAMINATION SCHEME FOR DIPLOMA PROGRAMME.

PROGRAMME NAME: CIVILENGINEERING | **PROGRAMME CODE: CE**

PATTERN: FULL TIME | **DURATION OF PROGRAMME: 3 YEARS (6 SEMESTERS)**

SEMESTER: II | **SCHEME: C-15**

Sl.No	Course Name	Teaching Department	Course/QP code	Teaching Scheme					Examination Scheme					
				Contact Hours										
				TH	TU	PR	Total	Credit	Exam Paper Duration in Hrs	End Exam		I A Marks	Total Marks	Min Marks for passing (including IA marks)
										Max Marks	Min Marks			
1	Engineering Mathematics - II	Sc	15SC02M	4			4	4	3	100	35	25	125	45
2	Applied science	Sc	15SC03S	4			4	4	3	100	35	25	125	45
3	Surveying-I	CE	15CE21T	4			4	4	3	100	35	25	125	45
4	Engineering Drawing-II	CE	15CE22D	-	2	4	6	3	4	100	35	25	125	45
5	Applied Science Lab	Sc	15SC04P		2	4	6	3	3	50	25	25	75	35
6	Surveying Practice-I	CE	15CE23P		2	4	6	3	3	50	25	25	75	35
			Total	**12**	**6**	**12**	**30**	**21**		**500**	**190**	**150**	**650**	**240**

1 Hr Theory = 1 Credit 2Hrs Practical/Tutorial= 1 Credit.

QP Code- Question Paper code: TH-Theory Hours: TU-Tutorial: PR-Practical

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING (General)

THIRD SEMESTER

Scheme of Study and Examination (W.E.F. 2010 - 11)

Q P CODE	Theory Subject	Contact Hours			Exam. Duration	Scheme of Examination			Total Max. Marks	Min Marks for passing (with IA)
						End. Exam		I. A. Marks		
		Theory	Practical	Total		Max. Marks	Min. passing Marks			
9CE31	Strength of Materials	4	-	4	3	100	35	25	125	45
9CE32	Environmental Engineering-I	4	-	4	3	100	35	25	125	45
9CE33	Construction Technology	4	-	4	3	100	35	25	125	45
9CE34	Surveying- II	4	-	4	3	100	35	25	125	45
	Drawing / Practical									
9CE35D	Building Planning & Drawing	-	6	6	4	100	35	25	125	45
9CE36P	Civil Engineering Materials Testing Lab	-	6	6	3	100	50	25	125	60
9CE37P	Surveying Practice- II		6	6	3	100	50	25	125	60
	Total	**16**	**18**	**34**		**700**	**275**	**175**	**875**	**345**

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING (General)

FOURTH SEMESTER

Scheme of Study and Examination (W.E.F. 2010 - 11)

Q P CODE	Theory Subject	Contact Hours			Exam. Duration	Scheme of Examination			Total Max. Marks	Min Marks for passing (with IA)
						End. Exam		*I. A. Marks		
		Theory	Practical	Total		Max. Marks	Min. Marks for passing			
9CE41	Hydraulics	4	-	4	3	100	35	25	125	45
9CE42	Environmental Engineering-II	4	-	4	3	100	35	25	125	45
9CE43	Water Resources Engineering	4	-	4	3	100	35	25	125	45
9CE44	Surveying-III	4	-	4	3	100	35	25	125	45
	Drawing /Practical									
9CE45P	Hydraulics & Environmental Lab	-	6	6	3	100	50	25	125	60
9CE46P	Building Drawing using CAD	-	6	6	3	100	50	25	125	60
9CE47P	Surveying Practice-III	-	6	6	3	100	50	25	125	60
	Total	**16**	**18**	**34**		**700**	**290**	**175**	**875**	**360**

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING (General)

FIFTH SEMESTER

Scheme of study and Examination (W.E.F 2011-12)

Sl No.	Theory Subject	QP Code	Contact Hours			Exam. Duration	Scheme of Examination			Total Max. Marks	Min Marks for passing (with IA)
							End. Exam		I. A. Marks		
			Theory	Pract	Total		Max. Marks	Min. Marks for passing			
1	Concrete Technology & R.C.C.	9CE51	4	-	4	3	100	35	25	125	45
2	Highway, Bridge & Airport Engineering	9CE52	4	-	4	3	100	35	25	125	45
3	Estimating & Costing-I	9CE53	4	-	4	3	100	35	25	125	45
4	**Elective**(Opt any one)										
i	Town Planning.	9CE54EA									
ii	Advanced Construction Technology.	9CE54EB									
iii	Repairs & Maintenance of civil works.	9CE54EC									
iv	Geo-Technical Engineering.	9CE54ED									
v	Solid Waste Management.	9CE54EE	4	-	4	3	100	35	25	125	45
	Drawing /Practical										
5	Irrigation & Bridge Drawing	9CE55D	-	6	6	4	100	35	25	125	45
6	Computer Applications Lab	9CE56P	-	6	6	3	100	50	25	125	60
7	CASP	9CE57P	-	6	6	3	50	25	75	125	60
8	Project Work*	9CE58P	-	3	3	-	-	-	**25**	-	-
	Total		**16**	**18**	**37**		**650**		**250**	**875**	**345**

***Project Work Examination will be at the end of 6th Semester**

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING (General)

SIXTH SEMESTER

Scheme of study and Examination (W.E.F 2011-12)

Sl No.	Theory Subject	Q P Code	Contact Hours			Exam. Duration	Scheme of Examination			Total Max. Marks	Min Marks for passing (with IA)
							End. Exam		I. A. Marks		
			Theory	Pract	Total		Max. Marks	Min. Marks for passing			
1	Railway, Tunnel & Harbour Engineering	9CE61	4	-	4	3	100	35	25	125	45
2	Estimating and Costing - II	9CE62	4	-	4	3	100	35	25	125	45
3	Design of Steel & Masonry Structures	9CE63	4	-	4	3	100	35	25	125	45
4	Construction Management & Constitution of India	9CE64	4	-	4	3	100	35	25	125	45
	Drawing /Practical										
5	Construction Practice	9CE65P	-	6	6	3	100	50	25	125	60
6	Extensive Survey Project *	9CE66P	-	6	6	3	100	50	25	125	60
7	Project work**(Continuation from 5th Semester)**	9CE67P	-	3	3	3	100	50	25	125	60
	Total		**16**	**18**	**31**		**700**		**175**	**875**	**360**

* **12 Days Survey Camp outside the Campus.**

GOVERNMENT OF KARNATAKA
DEPARTMENT OF TECHNICAL EDUCATION
Board of Technical Examinations, Bengaluru

Course Title: **COMMUNICATION SKILLS IN ENGLISH**		Course Code	: **15CP01E**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme (L:T:P)	: **4:0:0** (in hours)	Credits	: **4 Credits**
Type of course	: **Theory**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**

Pre-requisites:

- Basic Knowledge of Grammar.
- Listening, Speaking, Reading and Writing Skills as acquired in Secondary Education.

Course Objectives:

1. Learn to apply the basic grammar in day to day communication in English.
2. Comprehend the given ideas in a passage and be able to effectively express the same in English in written form.
3. Enrich their vocabulary through reading.
4. Face oral examinations and interviews.
5. Express their ideas creatively through (spoken/written) exercises.
6. Create awareness about the importance of English in the Engineering and Corporate fields, to enlighten its importance in the current global scenario.

Course Content:

UNIT I: CAREER PLANNING **(09Hrs)**

Glossary; Comprehension Exercises; **Vocabulary Exercises** – Spelling; **Grammar**- Parts of Speech; **Newspaper Reading and Comprehension**; **Descriptive Writing –** Describing Objects; **Listening/ Speaking Exercise** – Self Introduction.

UNIT-II: THE GREAT INDIAN PSYCHOTHERAPY **(09Hrs)**

Glossary; Comprehension Exercises; Vocabulary Exercises – Prefixes and Suffixes; **Grammar** – Articles and Prepositions; **Descriptive Writing** – Describing People; **Listening/ Speaking Exercises** – Listening to speeches and writing gist of it in one's own words.

UNIT III: GLOBAL WARMING **(08Hrs)**

Glossary; Comprehension Exercises; Vocabulary Exercises – Synonyms and Antonyms; **Grammar** – Auxiliaries, Question Tags and Short-form Answers; **Descriptive Writing** – Describing Places; **Listening/ Speaking Exercises** – Narrating one's own experiences of different situations in their day- to-day life.

UNIT IV: RENDEZVOUS WITH A WOMAN CORPORATE GIANT **(09Hrs)**

Glossary; Comprehension Exercises; Vocabulary Exercises – Homonyms, Homophones, Homographs; **Grammar** – Subject-Verb Agreement; **Descriptive Writing** – Describing Processes; **Listening/ Speaking Exercise**s – A short presentation on a given topic ;**Paraphrasing of Proverbs**; **Different kinds of Interviews**.

UNIT V: A UNIQUE PATIENT **(09 Hrs)**

Glossary; Comprehension Exercises; **Vocabulary Exercises** – Compound words; **Grammar** –Tenses; **Descriptive Writing** – Describing Events (Eg: College Day, National Festivals, Etc.); **Comprehension of a paragraph**; **Quiz** – Questions on health and hygiene.

UNIT VI: A FARMER'S WIFE **(08 Hrs)**

Glossary; Comprehension Exercises; Vocabulary Exercises – Formation of plurals; **Grammar** – Active and Passive Voices; **Descriptive Writing** – Describing one's goal and its attainment; **Developing hints into a paragraph; Comprehension of an unseen passage**.

Course Delivery:

The Course will be delivered through lectures, class room interactions, exercises and case studies

Total No. Of Hours: 52 Hours

Text	- 18 Hours
Grammar and Composition	- 34 Hours

Internal Assessment: Total 25 Marks

Internal Assessment Tests	- 20 Marks
Classroom Assignment for Spoken Skills	- 05 Marks

Text Book:

COMMUNICATION SKILLS IN ENGLISH FOR POLYTECHNICS – By ORIENT BLACKSWAN PUBLISHERS – Published By NITTTR CHENNAI

Reference Books:

1. **HIGH SCHOOL ENGLISH GRAMMAR AND COMPOSITION** BY WREN AND MARTIN (S.CHAND & CO.)
2. **THE KING'S GRAMMAR** BY SANJAY KUMAR SINHA (S.CHAND & CO.)
3. **STRENGTHEN YOUR WRITING** BY V.R. NARAYANA SWAMY (ORIENT BLACKSWAN)
4. **ESSENTIAL ENGLISH** BY E. SURESH KUMAR et.al (ORIENT BLACKSWAN)
5. **ENGLISH GRAMMAR &COMPOSITION AND EFFECTIVE BUSINESS COMMUNICATION** BY M.A.PINK AND THOMAS S.E. (S.CHAND & CO.)
6. **WHAT YOUNG INDIA WANTS: SELECTED ESSAYS AND COLUMNS** BY CHETAN BHAGAT (RUPA PUBLICATION, NEW DELHI)
7. **CHICKEN SOUP FOR THE INDIAN DOCTOR'S SOUL** BY JACK CANFIELD et.al (WESTLAND LIMITED PUBLISHERS)
8. **SOFT SKILLS** BY K. ALEX**(**S.CHAND AND COMPANY)
9. **"REFLECTIONS":** I PUC ENGLISH COURSE BOOK, PUBLISHED BY DEPT.OF PRE-UNIVERSITY EDUCATION, GOVT OF KARNATAKA
10. **A PRACTICAL COURSE FOR WRITING SKILLS IN ENGLISH**BY J.K.GANGAL. (PHI PUBLICATIONS)
11. **ENGLISH LANGUAGE LABORATORIES** – A COMPREHENSIVE MANUAL BY NIRAKONAR(PHI LEARNING)

Course outcomes:

On successful completion of the course, the student will be able to:

1. Use the language correctly, concisely and effectively in both spoken and written format.
2. Comprehend Engineering subjects in English and perform their professional activities using English.
3. Participate in group discussion, presentation, reporting and documentation successfully using English.
4. Recognize their latent talents and choose their careers accordingly.
5. Develop their lateral thinking abilities and thus identify innovative methods in solving problems in their lives.
6. Sensitize themselves to various environmental issues and thus take care of the fragile ecology.

Mapping Course Outcomes with Program Outcomes:

COURSE OUTCOMES	PROGRAM OUTCOMES											
	1	2	3	4	5	6	7	8	9	10	11	12
1	S									S		
2	S							S		S		
3	S							S		S		
4	S									S		
5	S							S		S		
6	S							S		S		

S: Strong relationship M: Moderate relationship

Question Paper Blue Print:

Course: COMMUNICATION SKILLS IN ENGLISH

Course code: 15CP 01E

Sl. No.	Content	Knowledge	Comprehension	Application	Analysis	Total
1.	Lesson		24		15	39
2.	Grammar Parts of speech			4		4
3.	Auxiliaries: Primary and Modals			3		3
4.	Articles			3		3
5.	Identification of tenses			4		4
6.	Active and Passive voice			4		4
7.	Prepositions	4				4
8.	Question tags			3		3
9.	Short form answers			2		2
10.	Prefixes and Suffixes	2				2
11.	Homonyms/Homophones/ Homographs	4				4

12.	Synonyms and Antonyms	4				4
13.	Agreement of the Verb with its Subject	4				4
14.	Descriptive writing – Describing objects, people and places.		5			5
15.	Descriptive writing – Describing processes, events.		5			5
16.	Comprehension of an unseen passage		10			10
	Total	23	44	23	10	100

Question Paper Pattern:

Sl. No.	Source	Question	Type	Marks
1.	Textual Units	Answer any twelve of the following questions in one or two sentences each	15 questions to be asked from 6 Textual Units	12 x 2 = 24
2.	Textual Units	Write short notes on any three of the following	5 questions to be asked from 6 Textual Units	5 x 3 = 15
3.	Grammar	Identify the parts of speech of the underlined words	4 sentences are to be given and word to be identified is underlined	4 x 1= 4
4.	Grammar	Fill in the blanks using suitable Auxiliaries	3 sentences are to be given.	3 x 1= 3
5.	Grammar	Fill in the blanks using suitable Articles	3 sentences are to be given	3 x 1=3
6.	Grammar	Identification of Tenses	4 sentences are to be given	4 x 1= 4
7.	Grammar	Active and Passive Voice: Change the voice of the verb in the following sentences	4 sentences are to be given for changing the voice of the verb	4 x 1= 4

8.	Grammar	Prepositions: Fill in the blanks with appropriate prepositions	4 sentences are to be given	4 x 1= 4
9.	Grammar	Question Tags: Add question tags	3 sentences are to be given	3 x 1= 3
10.	Grammar	Short form answers: Give short form answers	2 sentences are to be given	2 x 1= 2
11.	Grammar	Prefixes and Suffixes: Add Prefixes/Suffixes to the stem words	2 stem words are to be given	2 x 1= 2
12.	Grammar	Homonyms, Homophones and Homographs: Use the following words in your own sentences.	4 words are to be given	4 x 1= 4
13.	Grammar	Synonyms / Antonyms: Give the Synonyms/Antonyms for the following words	2 words each are to be given	2 x 1= 2
14.	Grammar	Agreement of the Verb with its Subject: Fill in the blanks with verbs that agree with their subjects	4 sentences are to be given	4 x 1= 4
15.	Composition	Descriptive Writing: Describe objects, people, places and processes	2 questions are to be given	5 x 2=10
16.	Composition	Comprehension of an unseen passage: Read the following passage and answer the questions that follow	Questions to be set for 10 marks	10
	Total	-	-	100

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weightage of marks fixed for each category.(As per model question paper)
2. The question paper pattern provided should be adhered to.
3. Care must be taken so that there is only one possible answer for all ‘fill in the blanks’ questions.

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Three tests (average of three tests will be computed)	20	Blue Books	1 to 6
		Class room Assignments		Any one Activity(*)	05	Log of Activity	1 and 3
				TOTAL	**25**		
	SEE (Semester End Examination)	End Exam	Students	End Of the Course	100	Answer Scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 3 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 6 Effectiveness of delivery of instructions and assessment

Note: I.A. test shall be conducted for 20 marks. Any decimals shall be rounded off to the next higher digit.

* Class room Assignments:

Evaluated for any one activity:

1. Introducing oneself
2. Discussion about weather
3. Discussion about hobbies
4. Discussing holiday plans
5. Telephonic conversation
6. Talking about favorite sports, movie, TV shows etc.
7. Description about one's goal and its attainment.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering and Understanding	20
2	Applying the knowledge acquired from the course	40
3	Analysis	15
4	Evaluation	05
5	Creating new knowledge	20

Tutorial Exercise:

Suggested list of Tutorial Exercises leading to the development of speaking skills:

1. Introducing one self
2. Introduction about family
3. Discussion about weather
4. Seeking permission to do something
5. Description of hobbies
6. Seeking information at bus/railways/air stations
7. Conversation with friends/bank staff/ doctors/ advocates/ superiors/ industrialist etc..,
8. Discussing holiday plans
9. Asking about products and placing orders.
10. Telephonic conversation.
11. Talk about favorite sport/ movie/ actor/ TV show etc.
12. Greeting a friend on his/her birthday, etc.
13. Description about one's goal and its attainment.

Sources:

UNIT 1: CAREER PLANNING: **SOFT SKILLS**-BY DR. K. ALEX

UNIT 2: THE GREAT INDIAN PSYCHOTHERAPY: **WHAT YOUNG INDIA WANTS: SELECTED ESSAYS AND COLUMNS**- BY CHETAN BHAGAT

UNIT 3: GLOBAL WARMING: AN ESSAY BY DR. B.M.RAVINDRA, RETD. DY. DIR., DEPT. OF MINES AND GEOLOGY

UNIT 4: RENDEZVOUS WITH A WOMAN CORPORATE GIANT**: ESSENTIAL ENGLISH** BY E. SURESH KUMAR et.al

UNIT 5: A UNIQUE PATIENT: **CHICKEN SOUP FOR THE INDIAN DOCTOR'S SOUL -** BY JACK CANFIELD et.al

UNIT 6: A FARMER'S WIFE: **REFLECTIONS:** I PUC ENGLISH COURSE BOOK, PUBLISHED- BY DEPT. OF PU EDUCATION, GOVT OF KARNATAKA

Government of Karnataka
Department of Technical Education, Bengaluru

Course: COMMUNICATION SKILLS IN ENGLISH

Course code: 15CP 01E

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Mrs. Geetha K.	Selection Grade Lecturer	GRICP, Bengaluru
2	Mr. C.V. Inamdar	Selection Grade Lecturer	Govt. Polytechnic, Belagavi
3	Mrs. BharathiNaik	Selection Grade Lecturer	Women's Polytechnic, Mangaluru
4	Mrs. RajyashreeSrikant	Selection Grade Lecturer	Govt. Polytechnic, Bagepalli
5	Mrs. Sunitha M.N.	Selection Grade Lecturer	HMS Polytechnic, Tumakuru
6	Mr. Deepak Dongre	Selection Grade Lecturer	Govt. Residential Women's Polytechnic, Shivamogga.

Review committee

	Name	Designation	Institution
1	Mrs. Rajyashree Srikant	Selection Grade Lecturer	Govt. Polytechnic, Bagepalli
2	Mrs. Shailaja D.	Lecturer	Women's Polytechnic, Bengaluru

Model Question Paper:

Code: 15CP 01E

I / II Semester Diploma Examination

COMMUNICATION SKILLS IN ENGLISH

(Common to all Diploma programmes)

Time: 3 Hours] **[Max. Marks: 100**

Note:

(i) Answer all the questions as directed.
(ii) Spelling and grammatical errors shall be penalized.
(iii) Answers to Question No. I and II are based on the prescribed text.

I. Answer any TWELVE of the following in one or two sentences each: 2 x 12=24

1. What do you mean by career?
2. Define 'Career Planning'?
3. What should be the major focus of career planning?
4. What are the questions often asked by the young?
5. What are the three traits as identified by the author?
6. How have the content of our films changed?
7. What is Global Warming?
8. How does Global Warming occur?
9. What are the major causes for Global Warming?
10. What was the usual talk when the parents of the children met?
11. What ambition did Nooyi's mother have for her daughter?
12. Who is the sinner according to the poem?
13. Why did the farmer commit suicide?
14. Explain in your own words the reason for the farmer's visit to the clinic.
15. Describe how the doctor fixed the bull's tooth.

II. Write short notes on any THREE of the following: 5 x 3=15

1. How does career planning play a major role in making career choices?
2. How does our environment contribute to our numbness to injustice?
3. Explain in your own words the traditional and modern views of one or two facts expressed in the interview?
4. Explain in your own words the reason for the farmer's visit to the clinic.
5. Why does the farmer's wife resolve to live?

III. GRAMMAR:

1. Identify the parts of speech of the underlined words:4 x 1=4

a. **All** spoke in his favour.
b. Let us **even** the ground.

c. I can **shift** for myself.
d. She lives in **luxury.**

2. **Fill in the blanks with suitable auxiliaries:3 x 1=3**
   a. You _____ not use calculators in the exam hall.
   b. _____I come in sir?
   c. _____ you lend me your scooter?

3. **Fill in the blanks with suitable articles: 3 x 1=3**
   a. Charlie is ___ European.
   b. She is ____untidy girl.
   c. What is ____matter?

4. **Identify the tense of the verbs in the following sentences: 4 x 1=4**
   a. I am writing a letter.
   b. Sun rises in the east.
   c. I have done my homework.
   d. She has been learning western music.

5. **Change the voice of the verb in the following sentences: 4 x 1 = 4**
   a. Who did this?
   b. The money was lost.
   c. The cat is chasing the mouse.
   d. He was made the king.

6. **Fill in the blanks with appropriate prepositions: 4 x 1=4**
   a. Caesar was killed ____Brutus____ a dagger.
   b. We arrived____ Belagavi_____6 o' clock.

7. **Add suitable question tag:3 x 1=3**
   a. You were late this morning,_____?
   b. I did not hurt you, _____?
   c. Your father is a doctor, _____?

8. **Give short form answers for the following: 2 x 1=2**
   a. Does your father smoke? (Negative)
   b. Have you read today's newspaper? (Affirmative)

9. **Add Suffix and Prefix to the following: 2 x 1=2**
   a. _____ nation_____

10. **Frame sentences using each word to bring out the difference in meaning clearly: 4 x 1 = 4**

a. (i) Sight (ii) Site
b. (i) Present (ii) Present

11. Give Synonyms to the following words: 2 x 1=2

a. Teach
b. Agree

12. Give Antonyms to the following words: 2 x 1 = 2

a. War
b. Happy

13. Fill in the blanks with verbs to agree with their subjects: 4 x 1=4

a. Twenty kilometers _____ not a long distance.
b. Either you or I _____ mistake.
c. Gold and Silver _____ precious metals
d. The captain with his team _____ arrived.

IV. COMPOSITION:

1. Describe your favorite tourist place. 5
2. Describe the process of preparing tea. 5

V. COMPREHENSION:

Read the following passage and answer the questions that follow:

She was all of one-and-a-half years old. Two nurses were holding her down while a third was trying to insert a syringe into a vein to get a blood sample. She was crying loudly, but I was crying even louder. We had no option. It was the fifth day and the fever had not broken; it was imperative that we run the test to rule out typhoid. They finally asked me to leave the room, not just because they were embarrassed at a grown-up crying, but because they thought it would be easier and quicker for the child if the mother was not in the room. They got her out within a few minutes. She jumped into my arms and gave a few more loud wails. Fresh tears streamed down my eyes as we made our way out of the wretched pathology lab. Her paediatrician was getting into the building just then. Between sobs I told him how my daughter had flung the syringe and the lab had to have three attendants on her to collect the sample. As I was talking, my voice broke. To my surprise, Dr. Patel handed me his briefcase and stethoscope, took my girl in his arms and went to the store just a few paces away. He bought her a Cadbury bar and my daughter's face lit up like a million bucks. Gone were the tears, the memory of the syringe, smell of antiseptic, cotton …everything receded to the background as she unwrapped the big bar with her tiny fingers and dug into it with all her heart. I smiled as the angelic doctor handed me my princess.

Meanings of difficult words:

1. **Imperative:** absolutely essential
2. **Wretched:** miserable; unpleasant
3. **Pathology lab:** where the causes and effects of diseases are studied
4. **Receded:** moved back gradually
5. **Paediatrician:** children's doctor
6. **Flung:**(past tense of fling) an act of throwing violently
7. **Attendants:** one who attends

Questions:

1. How old was the child? 1
2. What did the nurses have to do to get a blood sample? 2
3. Why was the mother asked to leave the room? 2
4. Why does the mother called the pathology lab 'wretched'? 2
5. How did Dr. Patel calm down the little girl? 2
6. Suggest a suitable title for this passage. 1

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Model Question Bank:

Course Title :**COMMUNICATION SKILLS IN ENGLISH**	Course Code: **15CP01E**

I. ANSWER IN ONE OR TWO SENTENCES EACH:

1. What do you mean by career?
2. Define 'Career Planning'?
3. What should be the major focus of career planning?
4. List out the benefits of career planning?
5. Identify the guidelines for choosing a career?
6. What are the frequently asked questions about career fields?
7. How do connections help in searching for a suitable job?
8. What are the sample questions asked about a particular job title?
9. What is the role of a career counselor in charting out a career path?
10. List out the factors influencing career decisions?
11. What has startled global experts?
12. What are the questions often asked by the young?
13. What are the three traits as identified by the author?
14. How have the content of our films changed?
15. In what way have we been exposed to corruption from our childhood?
16. How can we contribute to India's progress?
17. What is global warming?

18. How does global warming occur?
19. What are the major causes for Global Warming?
20. What is the quantity of fossil fuel burnt each year?
21. How does the concentration of carbon dioxide in the air increase?
22. Define Greenhouse effect?
23. By burning forests around the world, how much carbon dioxide is added to the atmosphere?
24. What are the steps to be taken to save our environment?
25. What is the possible problem of global warming and its result?
26. What is the effect of global warming?
27. What was the usual talk when the parents of the children met?
28. What ambition did Nooyi's mother have for her daughter?
29. How did Nooyi's mother threaten Nooyi?
30. What good news did Indra Nooyi want to share with her mother?
31. What did Nooyi's mother say when she was told the good news?
32. What lesson did Nooyi learn from her mother?
33. Why does Nooyi's mother take full credit for Nooyi's success?
34. What does Indra Nooyi discover about the language of business in the U.S?
35. What does Indra Nooyi think about herself as a mother?
36. What is the secret of Indra Nooyi's success?
37. How does Indra Nooyi manage time?
38. What is Indra Nooyi's passion?
39. Describe the farmer who visited the dentist's clinic.
41. What was the curious act of the farmer?
42. What request did the farmer make?
43. Why did the doctor almost 'faint in shock'?
44. What did the farmer say when he came back to the clinic?
45. Who do 'you' and 'I' in the poem refer to?
46. Who is the sinner according to the poem?
47. Why did the farmer commit suicide?
48. Explain the meaning of the phrase 'you crossed over'.
49. What are the contrasts depicted by the writer between the farmer's wife and her husband?
50. What memories of her husband trouble her now?

II. ANSWER IN A PARAGRAPH OF NOT MORE THAN 100 WORDS EACH:

1. Write a short note on Guidelines for Choosing a Career.
2. How does career planning play a major role in making career choices?
3. Explain in your own words the first trait of our psyche.
4. How does our environment contribute to our numbness to injustice?
5. Describe the divisiveness that the author talks about**.**
6. What are the causes and effects of global warming?

7. How does deforestation affect our environment?
8. What information do you gather about Indra Nooyi after going through the interview with Nandan Nilekani?
9. How did Indra Nooyi's mother try to teach her the role of a woman in a family? Do you agree with her?
10. How do you think Indra Nooyi's mother and her husband contribute to her success?
11. What does Indra Nooyi mean when she says "I have to decide every moment in time whether I am going be a mother or a wife or an executive"?
12. Explain in your own words the traditional and modern views of one or two facts expressed in the interview?
13. Explain in your own words the reason for the farmer's visit to the clinic.
14. Describe how the doctor fixed the bull's tooth.
15. Describe the lament of the farmer's wife on her husband's death?

III.GRAMMAR:

1. **Write the plurals of:**

a. Cow	b. Dish	c. Tax	d. Cargo	e. Army
f. Loaf	g. Scarf	h. Goose	i. Son–in- law	j. Formula

2. Fill in the blanks with suitable articles:

a. Dr. Sanjay is ___ dentist.
b. My friend is ___ MLA.
c. Have you ever visited___ Himalayas?
d. Please bring me ___ cup of coffee.
e. He is ___untidy boy.
f. She is __backbone of her organization.
g. He is ___ honour to his profession.
h. Raghu is going to___ mall.
i. ____world is ___happy place.
j. I met___ European at ___ party in ___ friend's house.

3. **Fill in the blanks with suitable prepositions:**

a. She works __ a big shop __ Jayanagar.
b. There is a book ___ the floor. Put it __ the table.
c. I often see Mrs. Dixit __ the station, waiting __ her train.
d. Mangalore is __ the coast __ the south __ India.
e. My daughter isn't __ work today because she isn't feeling well.
f. There were several people __ the bus stop.
g. Mr. and Mrs. Sharma were __ the shop talking __ the assistant.

h. Yesterday we spent the day __ the country.
i. We had lunch __ a pretty little village.
j. When I was __ the bus stop this morning; I saw two boys __ the church roof.

4. **Add appropriate prefixes to form new words:**

a. form b. regular c. literate d. accurate e. operate
f. pure g. fix h. technic i. tone j. national

5. Add appropriate suffixes to form new words:

a. rich b. love c. start d. beauty e. differ
f. use g. cheer h. attract i. save j. slow

6. Give the synonyms of the following:

a. release b. arrive c. trap d. happinesse. e. large
f. teach g. change h. confusion i. discover j. charge

7. Give the antonyms for the following:

a. rise b. increase c. smile d. stricte. e.sadness
f. full g. host h. success i. discover j. charge

8. Add the correct question tags to the following statements:

a. It is cold,_____?
b. But it isn't as cold as yesterday, ____?
c. It was very cold yesterday,_____?
d. It hasn't been so cold for a long time, ____?
e. It is snowing in the north, ____?
f. It often snows there, ____?

9. Give short form answers for the following:

a. Does Renu work hard?_____._____.
b. Can you swim?_____._____.
c. Are you angry with me?_____._____.
d. Do you like watching movies?_____._____.
e. Have you met our Prime Minister?_____._____.

10. Fill in the blanks with appropriate words from the brackets:

a. His father-in-law owns a _____ farm. (dairy/diary)
b. Diabetics must take extra care of their _____. (feat/feet)
c. Rekha is a popular ____ of Bollywood.(heroin/heroine)
d. The country was prosperous during the _____ of Krishnadevaraya.(rein/reign/rain)
e. You should be_____ in the class. (quite/quiet)

11. Differentiate between the following pairs of words by using each of them in a sentence of your own:

a. Wrong, rung	b. Principal, principle	c. Hair, hare
d. Gate, gaite.	e. Sea, see	f. Fair, fare
g. Some, sumh.	h. Sell, cell	i. Weather, whether
j. Birth, berth	k. Vacation, vocation	l. Bear, bare

12. Fill in the blanks with verbs to agree with their subjects:

a. Every seat in the bus ____ taken.
b. All the seats in this bus ____ reserved.
c. One of my friends _____ visiting me this week end.
d. Neither Gopal nor Deepak ____ come today.
e. The Captain of Indian team as well as his players ____ staying here.
f. Intelligence and hard work _____ required to get good marks.
g. Mathematics ____ my favourite subject.
h. _____ your father and mother at home?

13. Identify the tense of the verbs in the following in the sentences.

a. He was listening to her attentively.
b. Raghu denies stealing my purse.
c. She has bought a flat near my house.
d. Kiran fought bravely.
e. The teachers are discussing the details of the annual day function.
f. I am not trying to copy you.
g. Sushma was cooking pasta.
h. The students have been waiting eagerly for the results.
i. Risheeba speaks Tamil very fluently.
j. I have been waiting for her for over an hour.

14. Change the voice:

a. Ramu was making a kite.
b. Close the door.
c. Cable wires have been cut.
d. We prohibit smoking.
e. Everyone loves him.
f. My watch was lost.
g. He was refused admission.
h. Do not insult the poor.
i. Without effort nothing can be gained.
j. They made him captain.

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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title:**ENGINEERING MATHEMATICS – I**		Course Code	: **15SC01M**
Semester	: **I**	Core / Elective	: **Core**
Teaching Scheme in Hrs (L:T:P)	: **4:0:0**	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programmes: **Common to all Engineering Diploma Programmes**			

Pre-requisites:

Basics in Algebra, Trigonometry and Coordinate Geometry in Secondary Education.

Course Objectives:

1. Apply the concept of matrices and determinants and their applications to solve the linear equation in engineering field.
2. Apply the vector algebra in solving the problems of statics and mechanics.
3. Analyse the civil engineering problems using concepts of probability.
4. Evaluate the advanced engineering mathematical problems using logarithms.
5. Apply and evaluate trigonometric concept in vector engineering field.
6. Create the basic concept of calculus.

Course Content:

Topic and Contents	Hours	Marks
LINEAR ALGEBRA		
UNIT-1: MATRICES AND DETERMINANTS	10	31
(a) Matrices: Basic concepts of matrices: Definition, types of matrices and mathematical operations on matrices (addition, subtraction and multiplication of matrices).	02	
(b) Determinant: Definition, problems on finding the determinant value of 2^{nd} and 3^{rd} order. Problems on finding unknown quantity in a 2^{nd} and 3^{rd} order determinants using expansion. Solving simultaneous linear equations using determinant method (Cramer's rule up to 3^{rd} order).	04	

(c) Inverse and applications of matrices: Minors and Cofactors of elements of matrix. Adjoint and Inverse of matrices of order 2^{nd} and 3^{rd} order. Elementary row and column operations on matrices. Characteristic equation and characteristic roots (eigen values) of 2x2 matrix. Statement of Cayley-Hamilton theorem and its verification for 2x2 matrix. Solution of system of linear equations using Gauss Elimination method (for 3 unknowns only).	04	
ALGEBRA		
UNITS-2: VECTORS	08	27
Definition of vector. Representation of vector as a directed line segment. Magnitude of a vector. Types of vectors. Position vector. Expression of vector by means of position vectors. Addition and subtraction of vectors in terms of line segment. Vector in plane and vector in a space in terms of unit vector i, j and k respectively. Product of vectors. Scalar product and vector product of two vectors. Geometrical meaning of scalar and vector product. Applications of dot (scalar) and cross (vector) products. Projection of a vector on another vector. Area of parallelogram and area of triangle. Work done by force and moment of force.		
UNITS-3: PROBABILITY AND LOGARITHMS	08	14
(a) **Probability:** Introduction. Random experiments: outcomes and sample space. Event: Definition, occurrence of an event, types of events. Algebra of events- complementary event, the events A or B, A and B, A but not B, mutually exclusive events, exhaustive events, defining probability of an event. Addition rule of probability. Conditional probability: definition, properties of conditional probability, simple problems.	06	
(b) **Logarithms:** Definition of common and natural logarithms. Laws of logarithms (no proof). Simple problems on laws of logarithms.	02	

TRIGONOMETRY		
UNIT-4: ALLIED ANGLES AND COMPOUND ANGLES.	16	47
(a) Recapitulation of angle measurement, trigonometric ratios and standard angles. **Allied angles:** Meaning of allied angle. Signs of trigonometric ratios. Trigonometric ratios of allied angles in terms of θ. Problems on allied angles. (b) **Compound angles:** Geometrical proof of sin(A+B) and cos(A+B) and hence deduce tan(A+B). Write the formulae for sin(A-B), cos(A-B) and tan(A-B), problems. Multiple and submultiple angle formulae for 2A and 3A. Simple problems. Transformation formulae. Expression for sum or difference of sine and cosine of angles into product form. Expression for product of sine and cosine of angles into sum or differences form.	02 06 08	
UNIT-5:COMPLEX NUMBERS	04	09
Meaning of imaginary number i and its value. Definition of complex number in the form of $a + ib$. Argand diagram of complex number$a + ib$ (Cartesian system). Equality ofcomplex numbers.Conjugate of complex number.Algebra of complex numbers, modulus of complex number, principal value of argument of complex number, polar form: $Z = r(cos\theta + i\ sin\theta)$ and exponential form $Z = re^{i\theta}$of complex number, where r is modulus and θ is principal value of argument of complex number.		
UNIT-6: INTRODUCTION TO CALCULUS	06	17
Limits: Constants and variables. Definition of function. Types of functions: Explicit and implicit function, odd and even functions(definition with example). Concept of $x \to a$.Definition of limit of a function. Indeterminate forms. Evaluationof limit of functionsby factorization,rationalization.Algebraic limits. Statement of $\lim_{x\to a} \frac{x^n - a^n}{x-a} = na^{n-1}$ where n is any rational number. Proof of $\lim_{\theta\to 0} \frac{\sin\theta}{\theta} = 1$ where θ is in radian. Related problems. Standard limit (statement only) 1. $\lim_{x\to 0} \frac{a^x - 1}{x} = \log_e a$, 2. $\lim_{x\to 0} \frac{e^x - 1}{x} = 1$ 3. $\lim_{n\to\infty} \left(1 + \frac{1}{n}\right)^n = e$, 4.$\lim_{n\to 0} (1+n)^{\frac{1}{n}} = e$ Simple problems on standard limits.		
TOTAL	**52**	**145**

Course outcomes:

On successful completion of the course, the student will be able to:

1. Find the product of matrices, value of determinants, and inverse of matrix and solve the simultaneous linear equation.
2. Find the product of vectors and their geometrical applications in finding moment of force, work done.
3. Determine probability of various types of events.
4. Solve the problems related to logarithms.
5. Solve the problems on trigonometric functions with angle of any magnitude.
6. Evaluate the limiting value of algebraic and trigonometric functions.
7. Prepare for further study in theoretical courses such as differential and difference equations.
8. Enable students to use linear algebra use for numerical solvability of many problems.
9. Apply linear algebra to many practical applications in fields like computer science, physics and engineering.

Mapping Course Outcomes with Program Outcomes:

Course outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	S	S										
2	S	S										
3	S	S										
4	S	S										
5	S	S										
6	S	S										M
7	S	S										M
8	S	S										M
9	S	S										M

S: Strong relationship M: Moderate relationship

Reference:

1. NCERT Mathematics Text books of class XI and XII.
2. Karnataka State PUC mathematics Text Books of I & II PUC by H.K. Dass and Dr.Ramaverma published by S.Chand & Co.Pvt.Ltd.
3. CBSE Class Xi & XII by Khattar&Khattar published PHI Learning Pvt. ltd.,
4. First and Second PUC mathematics Text Books of different authors.
5. www.freebookcentre.net/mathematics/introductory-mathematics -books.html

Course Assessment and Evaluation:

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

Method	What		To whom	When/where (Frequency in the course)	Max Marks	Evidence collected	Contributing to course outcomes
DIRECT ASSMENT	*CIE	Internal Assessment Tests	Student	Three tests (Average of Three tests will be computed).	20	Blue books	1 to 9
		Assignments		Two Assignments (Average of Two Assignments will be computed)	5	Log of record	1 to 6
				Total	25		
	*SEE	Semester End Examination		End of the course	100	Answer scripts at BTE	1 to 9
INDIRECT ASSESSMENT	Student feedback		Students	Middle of the course	-NA-	Feedback forms	1 to 4, delivery of the course
	End of Course survey			End of course		Questionnaire	1 to 9, Effectiveness of delivery of instructions and assessment methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Any decimals shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering and Understanding	35
2	Applying the knowledge acquired from the course	25
3	Analysis and Evaluation	40

Model Question Paper:

Code: 15SC01M

I Semester Diploma Examination

ENGINEERING MATHEMATICS –I

(Common to All Engineering Diploma Programmes)

Time: 3 Hours.][Max marks: 100

Note:

(i) Answer any**Ten** questions from **section-A,**any **Eight** questions from **section-B** and any **Five** questions from **section-C.**
(ii) Each question carries **3** marks in **section-A**.
(iii) Each question carries **5** marks in **section-B**.
(iv) Each question carries **6** marks in **section-C**.

SECTION – A

1. Find the product of $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ -1 \\ 5 \end{bmatrix}$
2. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 1 \\ 0 & -3 \end{bmatrix}$ find adj(AB).
3. If $A + B = \begin{bmatrix} 3 & -7 \\ 0 & 2 \end{bmatrix}$,$A - B = \begin{bmatrix} 1 & 5 \\ 4 & -6 \end{bmatrix}$ find A.
4. If $\vec{a} = i + 2j - 3k$, $\vec{b} = 3i - 5j + 2k$. Find the magnitude of $2\vec{a} + 3\vec{b}$.
5. If $\vec{A}$=(3,-4), $\vec{B}$= (-5,6) find position vector of A and B and also find $\left|\overrightarrow{AB}\right|$
6. Three coins are tossed simultaneously. List the sample space for event.
7. If $\sin\theta = -{}^{8}/_{17}$ and $\pi < \theta < \frac{3\pi}{2}$ find the value of$4tan\theta + 3sec\theta$.
8. Find the value of $\sin 75^{o}$ using standard angles.
9. Show that $\frac{cosec(180-A)\cos(-A)}{\sec(180+A)\cos(90+A)} = cot^{2}A$
10. Prove that$\sin(A+B)\sin(A-B) = \sin^{2}A - \sin^{2}B$.
11. Prove that$\frac{\sin 3A}{\sin A} - \frac{\cos 3A}{\cos A} = 2$.
12. Express the product $(1+i)(1+2i)$ in $a+ib$ form and hence find its modulus.
13. Evaluate : $\lim_{x\to 3}\left[\frac{x-1}{2x^{2}-7x+5}\right]$
14. Evaluate: $\lim_{x\to\infty}\left[\frac{3x^{2}+4x+7}{4x^{2}+7x-1}\right]$

SECTION – B

1. Find the value of x if $\begin{vmatrix} 1 & x & 0 \\ 2 & -1 & 3 \\ -2 & 1 & 4 \end{vmatrix} = 0.$
2. Find the characteristic equation and its roots of a square matrix $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$
3. Find the $sine$ of the angle between the vectors$2i - j + 3k \; and \; i - 2j + 2k.$
4. If vector $\vec{a} = i + j + 2k, \vec{b} = 2i - j + k$ show that $\vec{a} + \vec{b}$perpendicular$\vec{a} - \vec{b}$.
5. Find the projection of $\vec{a} = 2i + j - k$on $\vec{b} = 2i - 3i + 4k.$
6. Prove that $\frac{1}{\log_a abc} + \frac{1}{\log_b abc} + \frac{1}{\log_c abc} = 1$
7. Find the numerical value of$\sin\left(\frac{\pi}{3}\right).\cos\left(-\frac{\pi}{3}\right) - \cos\left(\frac{\pi}{4}\right).\sin\left(-\frac{3\pi}{4}\right)$
8. Prove that $\sin(A + B) = \sin A \cos B + \cos A \sin B$ geometrically
9. If$A + B + C = \frac{\pi}{2}$, prove that $\tan A \tan B + \tan B \tan C + \tan C \tan A = 1.$
10. Show that$\frac{\sin 56^o - \sin 44^o}{\cos 56^o + \cos 44^o} = \cot 82^o$
11. Evaluate:$\lim_{x \to 0}\left[\frac{\sqrt{1+x+x^2}-1}{x}\right]$

SECTION – C

1. Solve for x, y & z using determinant method

$x + y = 0, y + z = 1 \& z + x = 3.$

2. Solve the equation$x + y + z = 6, 2x - 3y + z = 1 \& x + 3y - 2z = 7$ using Gauss elimination method.
3. A force $\vec{F} = 2i + j + k$ is acting at the point (-3,2,1). Find the magnitude of the moment of force $\vec{F}$ about the point (2,1,2).
4. A die is thrown twice and the sum of the numbers appearing is absorbed tobe. What is the conditional probability that the number 5 has appeared at least once?
5. Prove that $\frac{\cos\left(\frac{5\pi}{2} - \theta\right)}{\sin(4\pi + \theta)} + \frac{\tan(-\theta)}{\cot(\pi - \theta)} = sec^2\theta$
6. Prove that $\cos 80^o \cos 60^o \cos 40^o \cos 20^o = \frac{1}{16}$
7. Find the modulus and argument of the complex number $z = -\sqrt{3} + i$ and hence represent in argand diagram.
8. Prove that $\lim_{\theta \to 0}\left(\frac{\sin\theta}{\theta}\right) = 1$ where θ is in radian.

Question Paper Blue Print:

Course: ENGINEERING MATHEMATICS – I **Course Code: 15SC01M**

UNIT NO		HOURS	Questions to be set (3 Marks) Section - A	Questions to be set in two sub-divisions(5 Marks) Section - B	Questions to be set in two sub division (6 Marks) Section- C	Weightage of Marks
1	**a**	**2**	2	-	-	31
	b	**4**	-	1	1	
	c	**4**	1	1	1	
2		**8**	2	3	1	27
3	**a**	**6**	1	-	1	14
	b	**2**	-	1	-	
4	**a**	**8**	1	1	1	47
	b	**8**	4	3	1	
5		**4**	1	-	1	9
6		**6**	2	1	1	17
TOTAL		**52**	**14**	**11**	**08**	**145**
Questions to be answered			**10**	**08**	**05**	**100**

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weigh age of model fixed for each unit.
2. The question paper pattern provided should be adhered to
   Section-A: 10 questions to be answered out of 14 questions each carrying 03 marks
   Section-B: 08 questions to be answered out of 11 questions each carrying 05 marks.
   Section-C: 05 questions to be answered out of 08 questions each carrying 06 marks.
3. Questions should not be set from the recapitulation topics.
4. Questions should not be set from the recapitulation topics.

Model Question Bank:

Course Title:**ENGINEERING MATHEMATICS – I**	Course Code: **15SC01M**

UNIT-1: MATRICES AND DETERMINANTS

3 MARK QUESTIONS

1. If $A = \begin{bmatrix} 3 & -9 \\ -4 & 7 \end{bmatrix}$, find $A + A'$.
2. If $A = [2 \quad -1 \quad 3]$ and $B = \begin{bmatrix} 5 & -2 \\ 3 & 1 \\ 2 & 4 \end{bmatrix}$, find AB matrix.
3. If matrix $A = \begin{bmatrix} 2 & -1 & 3 \\ 5 & 1 & 0 \\ 1 & 0 & x \end{bmatrix}$ is a singular matrix, then find the value of x.
4. Find the adjoint of the matrix $A = \begin{bmatrix} 4 & -5 \\ 3 & -2 \end{bmatrix}$.
5. If $A = \begin{bmatrix} 3 & -1 \\ 0 & -2 \end{bmatrix}$ find the characteristic equation.

5 MARK QUESTIONS

1. Solve the equations $x + y = 3, 2x + 3y = 8$ by Cramer's rule.
2. Solve for x, if $\begin{vmatrix} 1 & 5 & 7 \\ 2 & x & 14 \\ 3 & 1 & 2 \end{vmatrix} = 0$
3. Verify Cayley-Hamilton theorem if $A = \begin{bmatrix} 1 & 3 \\ 2 & -4 \end{bmatrix}$.
4. Verify $A(\text{Adj}A) = |A|.I.$ if $A = \begin{bmatrix} 5 & -2 \\ 3 & 1 \end{bmatrix}$.
5. Find the adjoint of the matrix $A = \begin{bmatrix} 3 & -1 & 2 \\ 2 & -3 & 1 \\ 0 & 4 & 2 \end{bmatrix}$

6 MARK QUESTIONS

1. Solve for x &y from the equations $4x + y = 7, 3y + 4z = 5, 5x + 3z = 2$by Cramer's rule.
2. Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$
3. Prove that adj(AB)=(adjB).(adjA) if $A = \begin{bmatrix} -1 & 0 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$

4. Find the characteristic roots of a matrix $\begin{bmatrix} 1 & -1 \\ -6 & -2 \end{bmatrix}$.
5. Solve the equations by Gauss elimination method $3x - y + z = 0, x + 2y - 2z = 3, 3x + z = 4$.

UNIT-2: VECTORS

3 MARK QUESTIONS

1. Find the magnitude of vector 2i +3j – 6k
2. If $\vec{a} = i + 2j - 3k, \vec{b} = 3i - 5j + 2k$ find magnitude of $\overrightarrow{3a} - \overrightarrow{2b}$
3. Show that $\cos\theta i - \sin\theta j$ is unit vector
4. Show that the vectors $2i + 5j - 6k$,and $7i + 2j + 4k$ orthogonal vectors.
5. If $\vec{a} = 5i + 2j - 4k$, and $\vec{b} = 2i - 5j + 3k$find $\vec{a}X\vec{b}$.

5 MARK QUESTIONS

1. Find cosine of the angle between the vectors $4i - 2j - 3k$and $2i - 3j + 4k$.
2. Find the projection of $\vec{b}$ on $\vec{a}$ if $\vec{a} = 5i + 2j - 4k$and $\vec{b} = 2i - 5j + 6k$.
3. If $\vec{a} = 3i + 2j - 4k$ and $\vec{b} = i - 2j + 5k$ are two sides of a triangle, find its area.
4. Simplify $(\vec{a} + \vec{b}).(\vec{a} - \vec{b})$and $(\vec{a} + \vec{b})X(\vec{a} - \vec{b})$.
5. Find the magnitude of moment of force $4i - 2j + 5k$ about (2,5,-7) acting at (4,7,0)

6 MARK QUESTIONS

1. If A=(2,5,7), B=(3,9,4) and C=(-2,5,7) are three vertices of parallelogram find its area.
2. If a force $4i + 6j + 2k$ acting on a body displaces it from (2,7,-8) to (3,9,4). Find the work done by the force.
3. Find the sine of the angle between the vectors $4i - 2j - 3k$and $2i - 3j + 4k$.
4. Find the unit vector in the direction perpendicular to both vector $2i - 5j + k$and $5i + j + 7k$.
5. Show that the points whose position vectors are $i - 3j - 5k$, $2i - j + k$ and $3i - 4j - 4k$ form a right angled triangle.

UNIT-3: PROBABILITY AND LOGARITHMS

3 MARK QUESTIONS

1. Define equally likely events, Independent event, and mutually exclusive event.
2. Define probability of an event.
3. A coin is tossed twice. What is the probability that at least one head occurs.
4. A die is thrown once, what is the probability an odd number appears.
5. If E and F are events such that P(E)=0.6, P(F)=0.3 and P(E∩F)= 0.2. Find P(E/F).

5 MARK QUESTIONS

1. Prove that $\frac{1}{1+\log_c ab} + \frac{1}{1+\log_a bc} + \frac{1}{1+\log_b ca} = 1$
2. If $x = \log_c ab$, $y = \log_b bc$, $z = \log_a ca$,
   Prove that $xyz = x + y + z + 2$
3. If $x = \log_{2a} a$, $y = \log_{3a} 2a$, $z = \log_{4a} 3a$, prove that $xyz + 1 = 2yz$
4. If $a^2 + b^2 = 7ab$, prove that $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}(\log a + \log b)$
5. Solve for x given that $(\log_2 x)^2 + (\log_2 x) - 20 = 0$

6 MARK QUESTIONS

1. An integer is chosen at random from the numbers ranging from 1 to 50 . What is the probability that the integer chosen is a multiple of 3 or 10 ?
2. Two unbiased dice are thrown once . Find the probability of getting the sum of the numbers obtained on the two dice is neither a multiple of 2 nor a multiple of 4 .
3. One card is drawn from a well shuffled pack of 52 cards. If E is the event "the card drawn is a king or an ace" and F is the event " the card drawn is an ace or a jack " then find the conditional probability of the event E, when the event F has already occurred .
4. A pair of dice is thrown once. If the two numbers appearing on them are different, find the probability that the sum of the numbers is 6.
5. A family has two children. What is the probability that both the children are boys given that (i) the youngest is a boy. (ii) at least one is a boy ?

UNIT-4: ALLIED ANGLES AND COMPOUND ANGLES

ALLIED ANGLES

3 MARKS QUESTIONS

1. Find the value of $\cos ec(-1110^0)$
2. Find the value of $\frac{\cos ec(180^0 - A)\cos A}{\sec(180^0 + A)\cos(90^0 + A)}$
3. 3.If $\sin\theta = \frac{1}{2}$ and $\frac{\pi}{2} \subset \theta \subset \pi$, find $\cos\theta$
4. 4. If A+B+C =180^0 Prove that $\cot\left(\frac{A+B}{2}\right) = \tan c/2$
5. 5.find the value of $\tan\left(\frac{7\pi}{3}\right)$

5 MARKS QUESTIONS

1. Prove that $\frac{\sin(180^0 - A)COS(360^0 - A)\tan(180^0 + A)}{COS(270 + A)\sin(90 + A)\cot(270 - A)} = 1$
2. If secx = 13/5 and $270^0 \subset x \subset 360^0$, Find the value of $\frac{3\sin x - 2\cos x}{9\cos x + 4\sin x}$
3. Find the value of $\cos 570^0 \sin 510^0 - \sin 330^0 \cos 390^0$
4. Evaluate $\frac{\sin(-\alpha)}{\sin(90^0 + \alpha)} - \frac{\cos(-\alpha)}{\cos(90 - \alpha)} - \frac{\sec(90^0 - \alpha)}{\cos(180^0 + \alpha)}$
5. Show that $\tan225^0 x \cot405^0 + \tan765^0 x \cot675^0 + \operatorname{cosec}135^0 x \sec315^0 = 0$

6 MARK QUESTIONS

1 .Evaluate $\tan315^0 x \cot405^0 + \tan765^0 x \cot675^0 + \operatorname{cosec}135^0 x \sec315^0$

2. Find x if $\frac{x \sin^2 300^0 \sec^2 240^0}{\cos 225^0 \cos ec^2 240^0} = \cot^2 315^0 \tan^2 300^0$

3. If $\sin\theta = \frac{-1}{4} and \pi \subset \theta \subset \frac{3\pi}{2}$, find the value of $\frac{\cos\theta + \tan\theta}{\cot\theta + \sec\theta}$

4. Evaluate $\frac{\sin(2\pi - A)}{\sin(\pi - A)} - \frac{\tan\left(\frac{\pi}{2} + A\right)}{\cot(2\pi + A)} + \frac{\cos ec(-A)}{\sec\left(\frac{\pi}{2} + A\right)}$

5. Show that $\tan^2(315^0)\cot(-405^0) + \cot(495^0)\tan(-585^0) = 0$

COMPOUND ANGLES

3 MARKS QUESTIONS

1. Find the value of $\sin15^0$
2. Show that $\tan(45^0 + \theta) = \frac{1 + \tan\theta}{1 - \tan\theta}$
3. Prove that $\frac{\sin(A-B)}{\cos A \cos B} + \frac{\sin(B-C)}{\cos B \cos C} + \frac{\sin(C-A)}{\cos C \cos A} = 0$
4. Using tan(A+B), prove that $\cot(A+B) = \frac{\cot A \cot B - 1}{\cot A + \cot B}$
5. Prove that $\frac{\sin 2A}{\sin A} - \frac{\cos 2A}{\cos A} = \sin A$

5 MARKS QUESTIONS

1. Prove that cos(A-B) cos(A+B)= $\cos^2 A - \sin^2 B$
2. Show that $\sin\left(A+\frac{\pi}{4}\right)+\cos\left(A+\frac{\pi}{4}\right)=\sqrt{2}\cos A$
3. If sinA=$\frac{1}{\sqrt{10}}, \sin B=\frac{1}{\sqrt{5}}$ $prove that A+B=45^0$
4. Prove that $\tan 3\theta - \tan 2\theta - \tan\theta = \tan\theta \tan 2\theta \tan 3\theta$
5. If A+B = $\frac{\pi}{4}$, $prove that (1+\tan A)(1+\tan B))=2$

TRASFORMATION FORMULAE

3 MARKS QUESTIONS

1 P.T $\frac{\cos A+\cos B}{\sin A+\sin B}=\cot\left(\frac{A+B}{2}\right)$

2 P.T $\frac{\sin 68^\circ+\sin 52^\circ}{\cos 68^\circ+\cos 52^\circ}=\sqrt{3}$

3 Show that $\cos 40^\circ-\cos 50^\circ=\sqrt{2}\ \sin 5^\circ$

4 Show that $\sin 47^\circ+\cos 77^\circ=\cos 17^\circ$

5 Show that $\cos 80^\circ+\cos 40^\circ-\cos 20^\circ=0$

MARKS QUESTIONS

1 P.T $\frac{\sin\theta+\sin 3\theta+\sin 5\theta}{\cos\theta+\cos 3\theta+\cos 5\theta}=\tan 3\theta$

2 In and triangle ABC prove that tanA + tanB +tanC = tanAtanBtanC

3 Show that $\frac{\sin 9^\circ+\cos 9^\circ}{\cos 9^\circ-\sin 9^\circ}=\tan 54^\circ$

4 Prove that $\cos 55^\circ+\cos 65^\circ+\cos 175^\circ=0$

5 Prove that $\sin 20^\circ\times\sin 40^\circ\times\sin 80^\circ=\frac{\sqrt{3}}{8}$

MARKS QUESTIONS

1 Prove that $\cos 20^0 x \cos 40^0 x \cos 80^0 x \cos 60^0 = 1/16$

2 In any triangle ABC prove that sinA+sinB+sinC=4Cos(A/2)cos(B/2)cos(C/2)

3 Show that $\frac{\cos x+\cos 2x-\cos 3x-\cos 4x}{\sin x+\sin 2x+\sin 3x+\sin 4x}=\tan x$

4 If A+B+C = 180^0 prove that $\cos^2 A+\cos^2 B+\cos^2 C=1-2\cos A\cos B\cos C$

5 If A+B+C = 180^0 prove that sin2A-sin2B+sin2C=4cosAcosCsinB

UNIT-5: COMPLEX NUMBERS

3 MARK QUESTIONS

1. Evaluate i^{-999}
2. Find the complex conjugate of $(1+2i)(3i-4)$
3. Express $(3+4i)^{-1}$ in the form a+ib
4. Find the real part and imaginary part of$\frac{1}{\sqrt{2}+i}$
5. $if\, x+iy = \cos\theta + i\sin\theta$ show that $x+\frac{1}{x} = 2\cos\theta$

5 MARK QUESTIONS

1. Evaluate $\left(i^{19}+\left(\frac{1}{i}\right)^{25}\right)^2$
2. Find the modulus and amplitude of$\left(1-i\sqrt{3}\right)$
3. Express in a + ib form: $\frac{(2+3i)}{(1+3i).(2+i)}$
4. Express the complex number 1 + i in the polar form.
5. Find the amplitude of $\sqrt{3}+i$ and represent in Argand diagram.

UNIT-6: INTRODUCTION TO CALCULUS

3 MARK QUESTIONS

1. Evaluate: $\lim_{x\to -3}\frac{x^2-9}{x+3}$
2. Evaluate: $\lim_{\theta\to 0}\left(\frac{\tan \mathrm{m}\theta}{\sin n\theta}\right)$
3. Evaluate: $\lim_{n\to\infty}\left(\frac{\mathrm{n}+1}{\mathrm{n}}\right)^{\mathrm{n}}$.
4. Evaluate: $\lim_{x\to\infty}\left(\frac{3x^2-2x+1}{2x^2+5x-1}\right)$
5. Evaluate: $\lim_{x\to 0}\left(\frac{1-\cos 2x}{\mathrm{x}^2}\right)$

5 MARK QUESTIONS

1. Evaluate:$\lim_{x\to 1}\frac{x^2+x-2}{x^2-1}$.
2. Evaluate: $\lim_{x\to 0}\left(\frac{\sqrt{\mathrm{a}+x}-\sqrt{\mathrm{a}-x}}{3x}\right)$
3. Evaluate: $\lim_{\mathrm{x}\to 1}\left(\frac{\mathrm{x}^{\mathrm{m}}-1}{\mathrm{x}^{\mathrm{n}}-1}\right)$

4. Evaluate: $\lim_{\theta \to 0} \left(\frac{1-\cos x+\tan^2 x}{x \sin x} \right)$
5. Evaluate: $\lim_{x \to 0} \left(\frac{e^{ax}-e^{bx}}{x} \right)$.

6 MARK QUESTIONS

1. Prove that $\lim_{\theta \to 0} \frac{\sin\theta}{\theta} = 1$, if θ is in "radian".
2. Evaluate: $\lim_{x \to 0} \left(\frac{\sin \pi x}{x-1} \right)$
3. Evaluate: $\lim_{n \to \infty} \left(\frac{(5-n^2)(n-2)}{(2n-3)(n+3)(5-n)} \right)$.
4. Evaluate: $\lim_{x \to 1} \frac{x^2-5x+4}{x^2-12x+11}$.
5. Evaluate: $\lim_{x \to 2} \left(\frac{x^2-4}{\sqrt{x+2}-\sqrt{3x-2}} \right)$

Government of Karnataka
Department of Technical Education, Bengaluru

Course: ENGINEERING MATHEMATICS - I

Course code: 15SC01M

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
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2	**Dr.MokaShekhu, ,**	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
3	**Sri.Sathyanaraya Dixit,**	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru
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	Name	Designation	Institution
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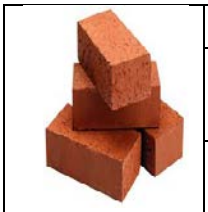
Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **MATERIALS OF CONSTRUCTION**		
	Scheme (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE11T**
	Type of Course: **Lectures, Self Study & Quiz**	Credit **:04**	Core/ Elective: **Core**

Prerequisites: Knowledge of basic Science in Secondary Education.

Course Objectives:

1. Understand properties of various materials.
2. Select suitable materials for appropriate engineering applications.

On successful completion of the course, the students will be able to:

Course Outcome	
CO1	Know the properties and uses of construction materials.
CO2	Understand the behaviour of materials and select different market forms of construction materials for appropriate field applications as per IS code requirements.
CO3	Know the requirements of construction materials as per IS codes.
CO4	Engage in independent lifelong learning in identifying advanced construction materials.

Mapping Course Outcomes with Program Outcomes

Mapping of COs with Pos		Programme Outcome											
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
		Engineering Knowledge	Problem Analysis	Design &Development Solution	Investigation of problems	Modern Tool Usage	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning	Project management and finance
Course Outcome	**CO1**	S	M		M		S	S	M		M	S	
	CO2	S	S	S	S	S	S	S	S	M	S	S	M
	CO3	S	S	S	S	S	S	S	M	M	M	S	
	CO4	S	S		S	M	S	M	M	S	S	S	M

S: Strong Relationship M: Moderate Relationship

COURSE CONTENT

Unit	Major Topics	Hours Allotted	Weightage of Marks
1	STONES	10	30
2	BRICKS	11	30
3	TIMBER	10	30
4	CEMENT	08	20
5	PAINTS, VARNISH & DISTEMPER	04	10
6	FERROUS, NONFERROUS AND ALLOY	09	25
	Total	**52**	**145**

UNIT I-STONES

Classification of rocks, Quarrying of stones by wedging & blasting, Tests on stone (Acid test, Attrition, crushing, impact & water absorption), Characteristics of a good building stone, Deterioration & Preservation of stones

UNIT II-BRICKS

Composition of good brick earth & harmful ingredients, Manufacture of bricks, Burning of bricks by clamps-intermittent (down draught) and continuous kiln (Hoffman's), Classification of bricks as per I S, Test on bricks (Field tests, Crushing strength, absorption, shape & size, efflorescence test), Requirements of good bricks, Substitutes for bricks – Cement concrete blocks (solid), Production process of solid blocks. Fire clay/Refractory bricks,Calcium Silicate Bricks(properties and uses).

UNIT-III-TIMBER

Classification of timber based on mode of growth, Cross- section of an exogenous tree, Properties of good timber, Defects in timber, Preservation of Timber, Seasoning of Timber, Conversion of timber and Market forms(types and uses).

UNIT-IV-CEMENT

Composition of ordinary Portland cement, Functions of ingredient of cement, Manufacture of OPC (Mixing of raw materials by dry process, Burning &Grinding), Storage of cement, Field tests on cement, Types of cement and its uses.

UNIT-V-PAINTS, VARNISH & DISTEMPER

Objects, characteristics &Ingredients of paints, varnishes & distemper

UNIT-VI-FERROUS, NONFERROUS AND ALLOY

FERROUS METALS: Properties & uses of Cast iron, Wrought iron, Mild steel Tor steel, TMT, High tensile steel, Market forms of structural steel NONFERROUS METALS:-

Properties & uses of Copper, Aluminum, Zinc and Tin ALLOY: - Types, properties & uses - aluminum alloy, copper alloy & steel alloy

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TEXT BOOKS

1. Engineering Materials by SC Rangwala
2. Building Materials by S S Bhavikatti

REFERENCES

1. Engineering Materials by GJ Kulkarni
2. Engineering Materials by Sushil Kumar
3. Engineering Materials by Duggal
4. Engineering Materials by Gurucharan Singh
5. Materials of construction by TTTI Publication (Oxford university madras)
6. Building Materials by- P.C.Varghese (Prentice Hall)
7. Materials of construction -I by H.S.Vishwanath- Sapna Publications
8. Civil Engineering handbook by Khanna

Course Delivery: The course will be delivered through lectures and Power point presentations/ Videos

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment civil	CIE *	IA	Students	Three IA tests (Average of three tests will be computed)	20	Blue books	1,2,3,4
				Written Quiz (MCQ)	05	Quiz Sheets	1,2,4
	SEE *	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Any decimals shall be rounded off to the next higher digit.

MODEL QUESTION PAPER

Code: **15CE11T**

I- Semester Diploma Examination

MATERIALS OF CONSTRUCTION

Time: **3 Hours**] [Max Marks**: 100**

Note: Answer any SIX fromPart A and any SEVEN from Part B

PART-A

6x5=30 marks

1. What are the characteristics of good stone?
2. Write short notes on preservation of stones?
3. Explain the burning of bricks in a clamp with a neat sketch?
4. Give comparison between burning bricks in a kiln & clamp?
5. Explain the Cross- section of an exogenous tree with a neat sketch?
6. List market forms of timber?
7. List the functions of ingredient of cement?
8. Briefly explain the field tests conducted on cement?
9. Write the properties of cast iron?

PART-B

7x10=70 marks

10. Explain the process of quarrying by wedging?
11. Briefly explain the physical & chemical classification of rocks?
12. Explain the Crushing strength test & absorption test conducted on brick?
13. Explain burning of bricks in Hoffman's kiln with a neat sketch?
14. Explain classification of timber based on mode of growth?
15. Explain the defects in timber due to natural forces?
16. Explain the burning process of ordinary Portland cement?
17. What are the characteristics of paints & varnish?
18. a) List the properties & uses of TMT bars?
    b)List the properties & uses of Zinc?
19. Explain the alloy of copper & aluminium?

MODEL QUESTION BANK

Diploma in civil Engineering

1st Semester

Course title: Materials of Construction, Course Code:15CE11T

1. Briefly explain the classification of stones? 10m
2. Discuss the geological classification of rocks? 5m
3. Briefly explain the physical & chemical classification of rocks? 10m
4. Explain the method of quarrying by blasting? 10m
5. Explain the process of quarrying by wedging? 10m
6. What are the characteristics of good stone? 5m
7. Write short notes on deterioration of stones? 5m
8. Write short notes on preservation of stones? 5m
9. Explain acid test & attrition test conducted on stone? 10m
10. Explain crushing strength & water absorption test conducted on stones? 10m
11. List the useful & harmful ingredients of good brick earth? 10m
12. Explain the process of manufacture of bricks 10m
13. Explain the burning of bricks in a clamp with a neat sketch? 5m
14. Explain burningof bricksin intermittent down draught kiln with neat sketch?10m
15. Explain burning of bricks in Hoffman's kiln with a neat sketch? 10m
16. Explain with a neat sketch any method of burning bricks in continuous kiln? 10m
17. Give comparison between burning bricks in a kiln & clamp? 5m
18. List the properties of good building bricks? 5m
19. Explain the classification of bricks? 5m
20. Explain the field test conducted on bricks? 5m
21. List any five different Substitutes for bricks ? 5m
22. Write a short note on cement concrete blocks? 5m
23. Explain production processof cement concrete blocks? 5m
24. Explain the Crushing strength test & absorption test conducted on brick? 10m
25. Explain shape & size test & efflorescence test conducted on brick? 10m
26. Explain classification of timber based on mode of growth? 10m
27. Explain the Cross- section of an exogenous tree with a neat sketch? 5m
28. List the properties of good timber? 5m
29. Explain the defects in timber due to natural forces? 10m
30. Explain the defects in timber due to Fungi? 10m
31. Explain the defects in timber due to Seasoning? 10m
32. Explain the defects in timber due to conversion? 10m
33. Explain the defects in timber due to Insects? 10m
34. Write short notes on preservation of Timber? 5m
35. Write short notes on Seasoning of Timber? 5m
36. Explain conversion of timber? 5m
37. List the market forms of timber? 5m
38. Explain the composition on of ordinary Portland cement? 5m

39. List the functions of ingredient of cement?	5m
40. Explain the manufacture of ordinary Portland cement?	10m
41. Explain the mixing of raw materials of cement by dry process?	10m
42. Explain the manufacturing of ordinary Portland cement by burning?	10m
43. Explain the grinding process of cement?	5m
44. Write a short note on varieties of cement?	5m
45. List the precautions to be taken in storing of cement?	5m
46. What are the objects of paints?	5m
47. Write the characteristics of good paint?	5m
48. What are the ingredients of paint?	5m
49. What are the objects of varnish?	5m
50. Write the characteristics of varnish?	5m
51. What are the ingredients of varnish?	5m
52. What are the objects of distemper?	5m
53. Write the characteristics of distemper?	5m
54. What are the ingredients of distemper?	5m
55. Write the types of cast iron?	5m
56. Write the types of wrought iron?	5m
57. Write the types of mild steel?	5m
58. Write the properties & uses of cast iron?	5m
59. Write the properties & uses of wrought iron?	5m
60. Write the properties & uses of mild steel?	5m
61. Write the properties & uses of Tor steel?	5m
62. Write the properties & uses of Tiscon steel?	5m
63. Write the properties & uses of Tor steel & Tiscon steel	10m
64. List the properties & uses of deformed bars?	5m
65. List the properties & uses of TMT bars?	5m
66. Write the properties & uses of High tensile steel?	5m
67. List the properties & uses of copper?	5m
68. Write the properties & uses of aluminium?	5m
69. List the properties & uses of zinc?	5m
70. Write the properties & uses of tin?	5m
71. Write the types of aluminium alloy?	5m
72. Write the types of copper alloy?	5m
73. Write the types of steel alloy?	5m
74. Write the properties & uses of aluminium alloy?	5m
75. Write the properties & uses of copper alloy?	5m
76. Write the properties & uses of steel alloy?	5m

	**Course Title:ENGINEERING DRAWING-I**		
	Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE12D**
	Type of Course: **Tutorials and Drafting**	Credit **:03**	Core/ Elective: **Core**

(*(Common to all Civil/Civil (Draughtsmen/Environmental/Public Health Engineering/Water Technology and Health Sciences Programme)*****

Prerequisites: Basic Geometry in Secondary Education and zeal to learn the course.

Course Objectives:

1. The course is aimed at developing Basic Drawing skills.
2. Develop Skills in Preparation of Basic Drawings.
3. Skills in Reading and Interpretation of Engineering Drawings.

On successful completion of the course, the students will be able to:

COURSE OUTCOME	
CO1	Acquire Knowledge to use the drawing instruments effectively and able to dimension the given figures and print letters
CO2	Appreciate the usage of engineering curves in solving civil engineering problems and develop attitude of lifelong learning.
CO3	Understand the concept of projection and acquire visualization skills
CO4	Draw the basic views related to projections of points, Lines and Planes.
CO5	Read and communicate Drawings in solving Civil Engineering problems for efficient management.

Mapping of COs withPos

		Programme Outcome										
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
POs → / COs ↓		Engineering Knowledge	Problem Analysis	Design and Development of Solution	Investigation of problems	Modern Tool Usage	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning	Project management and finance
Course Outcome	**CO1**	S	S				S		S		S		
	CO2	S	S				S		S		S	S	
	CO3	S	S				S		S		S		
	CO4	S	S				S		S		S		
	CO5	S	S	S			S		S		S	**M**	S

S: Strong Relationship M: Moderate Relationship

COURSE CONTENTS

UNITS	CONTENT	HOURS 78
1	**INTRODUCTION TO ENGINEERING DRAWING AND LETTERING PRACTICE** Drawing Instruments Standard Sizes of Drawing sheets Layout of drawing sheets Types of lines and their applications Different types of lettering as per I.S.I; uppercase letters of vertical and slanting type as per I.S.I Numerical figures of vertical and slanting type as per I.S.I.	**09**
2	**DIMENSIONING PRACTICE** Introduction to Dimensioning, Elements of Dimensioning, Systems of Dimensioning, Methods of arrangements of Dimensioning Dimensioning of common features like diameters, radii, arcs and chords. Dimensioning of simple civil Engineering Objects.	**06**
3	**GEOMETRICAL CONSTRUCTIONS AND CONIC SECTIONS** Drawing of tangents to circles and arcs, Drawing a common tangent of given arcs to circles of equal or unequal radii. Inscribing a circles in a regular polygon Inscribing circles touching each side of a regular polygon and its two adjacent circles. Inscribing circles touching two sides of polygon and two other circles - graded exercises. Introduction to conic sections Division of a line into equal number of parts Types of conic section Construction of ellipse by Intersecting lines method (Rectangular and parallelogram methods) and Concentric circles method Construction of parabola by rectangle method, parallelogram method and tangential method.	**18**
4	**SCALES** Construction of plain and diagonal scales and marking distances on scales constructed - exercises	**09**
5	**ORTHOGRAPHIC PROJECTIONAND PROJECTION OF POINTS** Introduction to orthographic projection Principal planes of projection- Four Quadrants- Concept of First angle & Third angle projection methods- Projection of points in all the four quadrant system.	**06**
6	**PROJECTION OF LINES AND PLANES SURFACES** (Only first angle projection) Projection of lines – Line Parallel to both HP and VP, Line parallel to one plane and Perpendicular to other-Line parallel to one plane and Inclined to the other, Line inclined to both HP and VP. Projection of plane Surfaces Construction of polygons Plane surface parallel to one plane and Perpendicular to other two – Plane surface Perpendicular to one plane and inclined to the other- Plane surface inclined to both HP and VP	**30**

Total Hours= 78 Hours

Note: Students should complete atleast 5 to 8 drawing exercises in each unit

TEXT BOOK

1. K.R.Gopalakrishna"Fundamentals of Drawing" Subhas Publications, 2010.
2. K.R.Gopalakrishna"Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, "A text book of Engineering Drawing", S.ChandPublishers, Delhi, 2010.
2. G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
5. DhananjayA.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGrawHill Publishing Company Limited, 2008.
6. BasantAgarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. IS 962 (1989) Code of practice for Architectural and Building Drawings

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method	CIE*	IA	Students	Graded Exercises (Average of marks allotted to each graded exercise)	25	Drawing Sheets	1,2,3,4
	SEE*	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3 ,Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1. Remembering and Understanding : - 30% weightage
2. Applying the knowledge acquired from the course : - 65 % weightage
3. Analysis : - 1% weightage
4. Evaluation : - 1% weightage
5. Creating new knowledge : - 3% weightage

Weightage of Marks

UNIT NO	UNIT NAME	HOUR	QUESTIONS TO BE SET FOR (10MARKS) PART – A	QUESTIONS TO BE SET FOR (15MARKS) PART – B
I	INTRODUCTION TO ENGINEERING DRAWING AND LETTERING PRACTICE	09	01	-
II	DIMENSIONING PRACTICE	06	01	-
III	GEOMETRICAL CONSTRUCTIONS AND CONIC SECTIONS	18	03	01
IV	SCALES	09	-	01
V	ORTHOGRAPHIC PROJECTIONAND PROJECTION OF POINTS	06	01	-
VI	PROJECTION OF LINES AND PLANE SURFACES	30	-	04
	TOTAL	**78**	06 (60 marks) (any Four)	06 (90marks) (any Four)

UNIT NO	NAME OF THE UNIT	SHEETS	TITLE OF THE DRAWING	MINIMUM NO OF EXERCISE
I	INTRODUCTION TO ENGINEERING DRAWING AND LETTERING PRACTICE	1	Use of drawing instruments	06
		3	Lettering	10
II	DIMENSIONING PRACTICE	3	Dimensioning	15
III	GEOMETRICAL CONSTRUCTIONS AND CONIC SECTIONS	2	Arc and line tangents	12
		2	Incribing circles in polygon	10
		2	Elipse and parabola	10
IV	SCALES	3	Plain and Diagonal scales	15
V	ORTHOGRAPHIC PROJECTIONAND PROJECTION OF POINTS	2	Projection of Points	10
VI	PROJECTION OF LINES AND PLANE SURFACES	3	Projection of Lines	20
		3	Projection of Planes	20
	TOTAL	**24**		**128**

Model Question Paper

Code:**15CE12D**

I semester Diploma Examination

ENGINEERING DRAWING-I

Time: 4 Hours][Max. Marks: 100

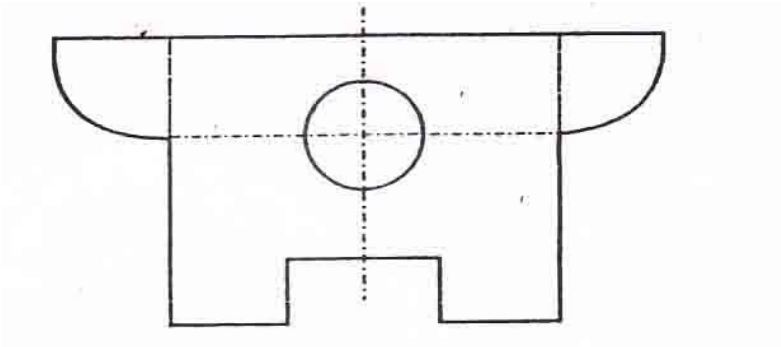
Note: Answer any**FOUR** questions from **Section-A& B**

SECTION –A

1.Print the following Statement in single stroke vertical capital letters of height 22mm.
(10 Marks)

ANNUAL SPORTS MEET 2015

2. Draw the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method
(10 Marks)



3. Draw an arc of radius 90mm tangential internally to a circle of radius 30mm and externally to another circle of radius 15 mm the center of the two circles are 80mm apart.
(10 Marks)

4. Inscribe 6 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles. (10 Marks)

5. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000. (10 marks)

6. A point P is 40 mm in front of VP, 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point. (10 Marks)

(Turn over)

SECTION –B

7. An ellipse has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method.

(15Marks)

8. The distance between Bangalore and Chennai is 352km. On a map, it is represented by a length 70.4mm. What is the R.F. on which the map has been drawn? Draw a diagonal scale of this R.F. to read up to one km and long enough to measure 800km. Mark on the scale the distances 549km and 207km.

(15 Marks)

9**.** A line AB 80 mm long has one of its extremities 25 mm in front of VP and 30 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views.

(15Marks)

10. A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three principal views of the line.

(15Marks)

11. An equilateral triangular lamina of side 50mm rests with one its sides on HP so that the surface of the lamina is inclined at 40° to HP. The side on which the lamina rests is inclined at 50° to VP. Draw the projections of the lamina.

(15Marks)

12. A hexagonal lamina of sides 30mm rests on one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the lamina.

(15Marks)

MODEL QUESTION BANK

1ST Semester Diploma in Civil Engineering

Course: **ENGINEERING DRAWING-I**Code: **15CE12D**

UNIT-I

10 Marks Questions

1.Print the following title to a height of 20mm single stroke vertical capital letters.

COMMON WEALTH GAMES

2.Print the following Statement in single stroke vertical capital letters of height 22mm.

DEPARTMENT OF CIVIL ENGINEERING

3.Print the following statement in single stroke inclined capital ksletters of height 18mm.

HONESTY IS BEST POLICY

4.Print the following statement in single stroke inclined capital letters of height 16 mm

MERA BHART MAHAN

5. Print the following Statement in single stroke vertical capital letters of height 22mm.

ANNUAL SPORTS MEET 2015

6. (a) List the standard sizes of drawing sheets.

(b)Mention the types of lines and their applications.

7.(a) Illustrate the elements of dimensioning with the help of a sketch.

b) Illustrate the dimensioning of given common features: diameter, radius, chord, Arc and angle.

8 (a) Mention the uses of the following drawing instruments.

i) T-square ii) Set square iii) Bow compass iv) Clinograph v) Mini-drafter

b) Mention the uses of the following drawing instruments.

i) French curves ii) Protractor iii) Clips iv) Erasing Shield v) Drafting machine

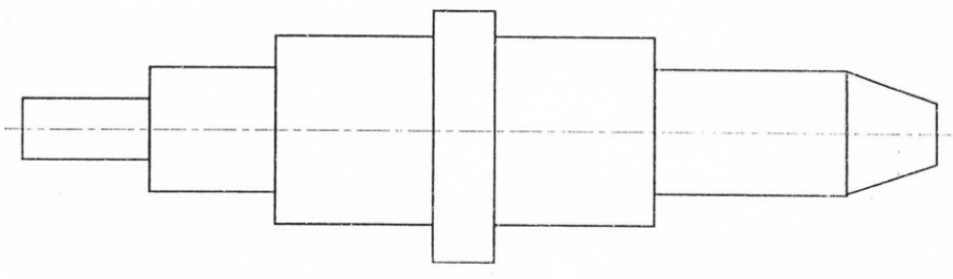
9. Mention the types of lines and their applications

UNIT-II

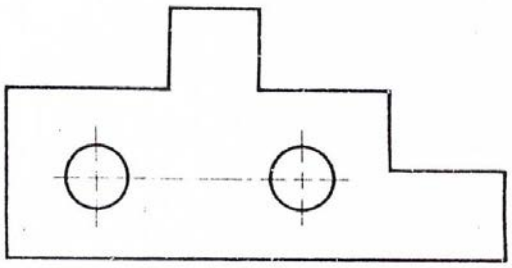
(10 Marks questions)

10.Copy the given sketch to 1:1 scale and dimension adopting aligned system with parallel

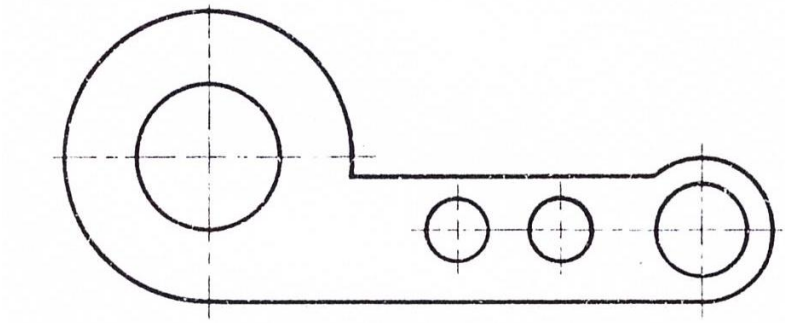
Dimensioning method.



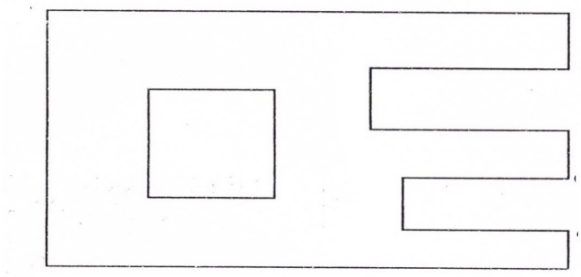
11. Copy the given sketch to 1:1 scale and dimension adopting aligned system with progressive dimensioning method.



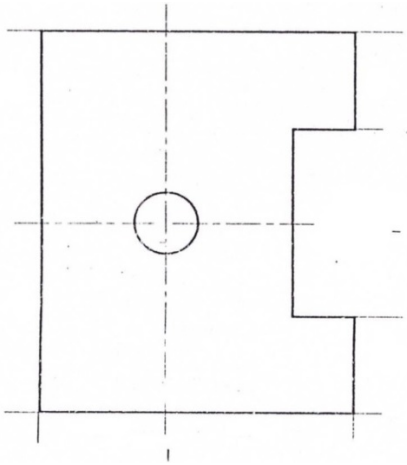
12. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with chain dimensioning method.



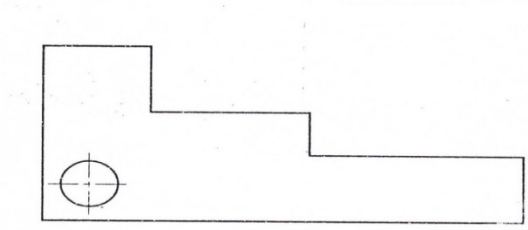
13. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with combined dimensioning method.



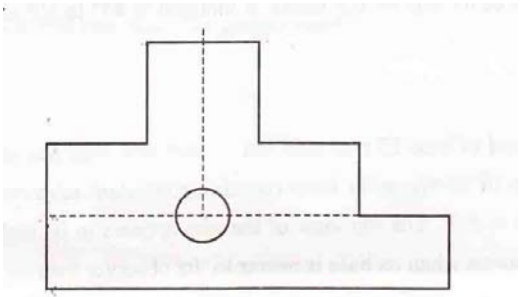
14. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with parallel dimensioning method.



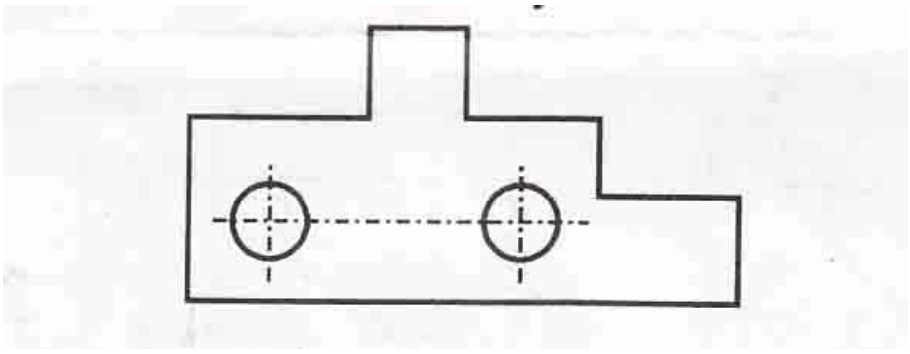
15. Copy the given sketch to 1:1 scale and dimension adopting aligned system with chain dimensioning method.



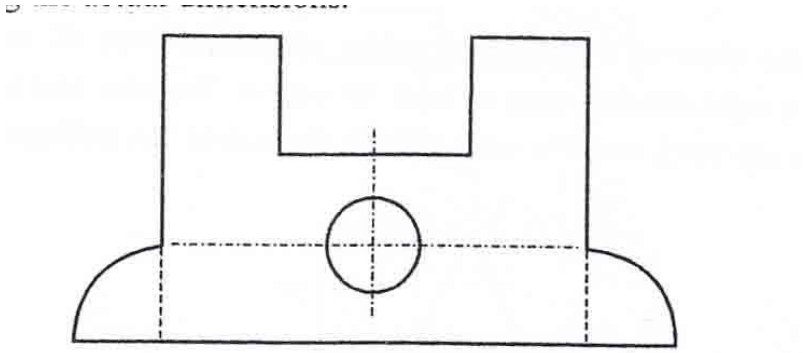
16. Copy the given sketch to 2:1 scale and dimension adopting aligned system with chain dimensioning method



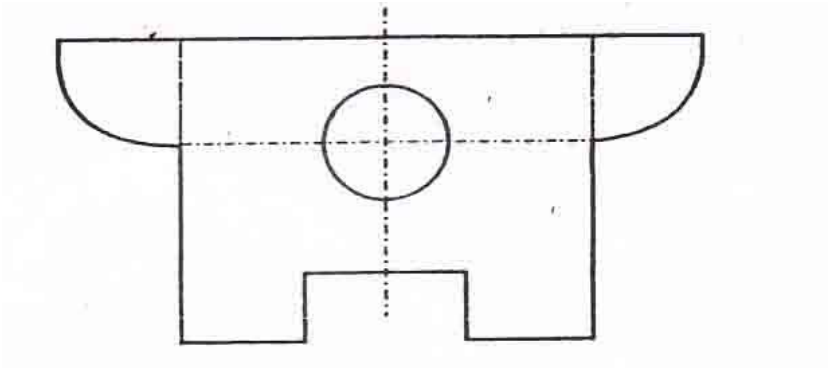
17. Copy the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



18. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



19. Draw the given sketch to 1:2 scale and dimension adopting aligned system with chain dimensioning method



UNIT-III

(10 MARKS)

20. Draw an arc of radius 50mm tangential external to two circles of radii 30mm and 20mm and having their centers 90mm apart.

21. Draw an arc of radius 80mm tangential internally to two circles of radii 35mm and 25mm and having their centers 100mm apart.

22. Draw a common external tangent to two circles of radius 40mm and 20mm whose centers are 90 mm apart.

23. Draw an arc of radius 90mm tangential internally to a circle of radius 30mm and externally to another circle of radius 15 mm the center of the two circles are 80mm apart.

24. Draw a common external tangent to two circles of equal radii 30mm and having their centers 80mm apart.

25. Draw a common internal tangent to two circles of diameters 60mm and 40mm having their centers 100mm apart.

26. Inscribe 5 equal circles in a regular Pentagon of side 60mm so as to touch each side and two adjacent circles.

27. Inscribe 6 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles.

28. Inscribe 5 equal circles in a regular Pentagon of side 50 mm so as to touch two sides and two adjacent circles.

29. Inscribe 6 equal circles in a regular Hexagon of side 50 mm so as to touch two side and two adjacent circles.

30. Inscribe 3 equal circles in a regular Hexagon of side 60 mm so as to touch two side and two adjacent circles.

31. Inscribe 3 equal circles in a regular Hexagon of side 60 mm so as to touch one side and two adjacent circles.

UNIT-III

(15 marks Questions)

32. Inscribe an ellipse in a rectangle of side 150mm and 120mm.

33. A parallelogram has sides 130 mm and 90mm at an included angle of 65^0. Inscribe an ellipse in the parallelogram. Find the major axes and minor axes of the ellipse.

34. An ellipse has the major and minor axes in the ratio 3:2. Draw the ellipse when the major axis is 120mm by concentric circles method.

35. Inscribe parabola in a rectangle of side 120mm and 80mm.

36. Inscribe parabola in a parallelogram of side 100mm and 70mm and having included angle 55^0.

37. A shot is discharged from the ground level at an inclination of 55^0 to the ground which is assumed to be horizontal. The shot returns to the ground at a point 75m distance from the point of discharge. Trace the path of the shot. Take scale 1:1000.

38. A shot thrown from the ground level reaches a maximum of 45mt and falls on the ground at a distance of 100mt from the point of projection. Trace the path of the stone in space, select scale of 1:1000.

39. Construct a diagonal scale of RF$\frac{1}{20,000}$to show kilometers and decimals of kilometer. Mark on the scale a distance of 2.37 kilometer and 3.42 kilometer.

40. On building plan a line 10cm long represents a distance of 5m. Construct a diagonal scale for the plan to read up to 6m. Show, meters, decimeters and centimeters indicate on the scale the length 4.54m and 5.37m.

41. The distance between Bangalore and Chennai is 352km. On a map, it is represented by a length 70.4mm. What is the R.F. on which the map has been drawn? Draw a diagonal scale of this R.F. to read up to one km and long enough to measure 800km. Mark on the scale the distances 549km and 207km.

42. Construct a plain scale to show kilometre and hectometer when R.F = 1:40000 and long enough to measure 6 km. Mark on the scale 3.2km and 4.3 km on the scale.

43. Construct a plain scale to read centimeter and decimeter and long enough to measure 6 decimetre. RF=1/4. Show on it a distance of 4.9 decimetre.

UNIT-IV

(10 marks Questions)

44. A point P is 40 mm in front of VP, 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point.

45. A point P is 30 mm above HP, 50 mm behind VP and 45 mm in front of left PP. Draw the three principal views of the point

46. Draw the three principal views of a point P lying 40 mm behind VP, 60 mm below HP and 30 mm behind the right PP.

47. Draw the three principal views of a point P lying 60 mm below HP, 50 mm in front of VP and 45 mm in front of the left PP.

UNIT-V

(15 Marks questions)

48. Draw the three principal views of a line 90 mm long placed parallel to VP and perpendicular to HP. The line is 60mm in front of VP and 50mm in front of right PP. The lower end of the line is 40mm above HP.

49. Draw the three principal views of a line 90 mm long when it is placed parallel to both HP & VP. One of the ends of the line is 60 mm above HP, 30 mm in front of VP and 40mm in front of the right PP.

50. A line AB 95 mm long is inclined at 40° to HP and parallel to VP. The line is 90 mm in front of VP. The lower end A is 35 mm above HP, 110 mm in front of the right PP and is away from it than the higher end. Draw the three principal views of the line.

51. A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three principal views of the line.

52. Draw the projections of a line AB, 80 mm long inclined at 30° to HP and parallel to VP. The line is 40 mm in front of VP. The lower end A is 20 mm above HP.

53 The length of a line is 100 mm long and is inclined at 45° to VP and parallel to HP. The line is 15 mm above HP and one end of the line is 10 mm in front of VP. Draw the projections of the line and measure top and front views.

54 A line AB 80 mm long has one of its extremities 25 mm in front of VP and 30 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views.

55. A line AB measuring 70 mm has its end A 15 mm in front of VP and 20 mm above HP. The other end B is 60 mm in front of VP and 50 mm above HP. Draw the projections of the line with HP & VP.

56. A line PQ has its end P 15 mm above HP and mm in front of VP. The end Q is 55 mm above HP and the line is inclined at 30° to HP. The distance between the end projectors of the line when measured parallel to the line of intersection of HP & VP is 50 mm. Draw the projections of the line and find its inclinations with VP.

57. The distance between the end projectors passing through the end points of a line AB is 40 mm. The end A is 20 mm above HP and 15 mm in front of VP. The line AB appears as 65 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP & VP.

UNIT-VI

(15 marks Questions)

58. An equilateral triangular lamina of side 50mm rests with one its sides on HP so that the surface of the lamina is inclined at 40° to HP. The side on which the lamina rests is inclined at 50° to VP. Draw the projections of the lamina.

59. An equilateral triangular lamina of sides 40mm is resting with one of its corners on HP, The surface of the lamina is inclined at 50° to HP and the side opposite to the corner on which the lamina rests is inclined at 40° to VP. Draw the projections of the lamina.

60 A square lamina of 40mm side rests with one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the square lamina in this position.

61. A square lamina of 40mm sides rests with one of its corner on HP. The diagonal passing through this corner is inclined at 45° to VP and Lamina appears to be inclined at 35° to HP. Draw its projections.

62. A square lamina of side 40mm rests with one of its corner on HP. The diagonal passing through this corner is inclined at 55° to HP and 30° to VP. Draw its projections.

63..A hexagonal lamina of sides 30mm rests on one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the lamina.

64. A hexagonal lamina of side 30mm is resting with one of its corner on HP so that the diagonal passing through that corner is inclined at an angle of 45° and appears to be inclined at 30° to VP. Draw the top and front views of the lamina.

65. A square lamina of ABCD of 40mm side rests on the corner C such that diagonal AC appears as at 35° to the VP in the top view. The two sides BC and CD containing the corner C make equal inclinations with the HP. The surface of the lamina makes 40° with HP. Draw its top and front views.

66.A pentagonal plane lamina of edges 30mm is resting on HP with one of its corner touching it such that plane surface makes an angle of 50° with HP. The two of the base edges containing the corner on which the lamina rests make equal inclinations with HP. If the edge opposite to this corner makes an angle of 40° with the VP, draw the top and front views of the plane lamina in this position.

67.A hexagonal lamina of 40mm sides rests on HP on one of its sides. The side which is on HP is perpendicular to VP and the surface of the lamina is inclined to HP at 45°.The lamina is then rotated through 90° such that the side on HP is parallel to the VP, while the surface is still inclined to HP at 45°. Draw the front view and the top view of the lamina in its final position.

68. A circular lamina of 65mm diameter rests on HP such that the surface of the lamina is inclined at 40° to HP. The diameter through the point on which the lamina rests on HP appears to be inclined at 50° to the VP in the top view. Obtain its projections.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title: **BASIC COMPUTER SKILLS LAB**		Course Code	: **15CE13P**
Semester	: **1**	Course / Elective	: **Core**
Teaching Scheme (L:T:P)	: **0:2:4**	Credits	: **3 Credits**
Type of course	: **Tutorial, Practice**	Total Contact Hours	: **78**
CIE	: **25 Marks**	SEE	: **50 Marks**

Prerequisites: Knowledge of English comprehension in Secondary Education.

Course Objectives: Will learn and understand the Basics of Computers and apply the application tools like word processor, spread sheet and presentation.

Course Outcomes:

On successful completion of the course, the students will be able to:

1. Understand the basic organisation of the computer.
2. Use the different tools and utilities of the operating system.
3. Demonstrate skills using a) Word Processor b) spreadsheet c) presentation.
4. Construct the concepts learned through a mini project.

Course Contents

Tutorials and Practice

Unit – I

Computer Hardware and Software

1. Identify and understand the models of Computers, Identify and understand front panel and back panel connections of a Computer system, Identify and understand the physical components of a Computer.
2. Conduct computer system connection and understand the booting process.
3. Familiarization of GUI based Operating System environment.
4. Practice creating Icons and Folders, Creating/Opening of file, Editing and saving the document, Copy, Cut and Paste operations, in-built utilities of OS like – Text editors, paint, calculator, etc.
5. Practice browsing of different sites using search engine.
6. Practice Creating E-Mail accounts, E-Mail Group, Sending, and Receiving of E-Mails.

Unit –II

Word Processing

1. Create a Business Letter and Personal Letter.
2. Create a Company Letterhead.

3. Create a Simple Newsletter with minimum three columns. Insert a Clip art in the newsletter.
4. Create a Resume for a Job Application.
5. Create the cover page of a Project Report(use Word Art, insert Picture Image).
6. Prepare the class time table for your class.

Spreadsheet

1. Create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.
2. You have a monthly income of Rs.11000. Your monthly expenditures are Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month).
3. Create a worksheet containing the pay details(containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF,PT, Insurance, Gross and Net salary) of the employees using formulas.
4. Create a Simple Bar Chart to highlight the sales of a company for three different periods.
5. Create a Pie Chart for a sample data and give legends.

Presentation

1. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.
2. Create a presentation about a book containing Title, Author, Publisher and Contents.
3. Create an automated (with timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool.

Mini-project [CIE- 05 Marks]

1. Prepare a mini project using the above concepts of Unit-I and/or Unit-II.
    - Repair and Overhauling of PC of laboratory
    - Formatting of PC
    - Servicing of UPS
    - Prepare a report using the learned skills on Unit 1 to Unit II

Course Delivery:

The course will be delivered through tutorials of two hours and four hours of hands on practice per week

References:

1. Computer Fundamentals Concepts, Systems, Application, D.P.Nagapal, S.Chand Publication, RP-2014, ISBN: 81-219-2388-3
2. http://www.tutorialsforopenoffice.org/
3. http://www.libreoffice.org/get-help/documentation/
4. http:// www.kingsoftstore.com/

S/w Tools: Any open source tool or equivalent proprietary tools

Mapping Course Outcomes with Program Outcomes:

Course outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	S	S			M							
2	S	S			M							
3	S									M	M	
4	S	S			M					M	M	

S: Strong Relationship M: Moderate Relationship

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
DIRECT ASSESSMENT	CIE (Continuous Internal Evaluation)	IA Tests	Students	Two Tests (Average of two tests will be computed)	10	Blue books	1,2,3,4
				Record Writing (Average of Marks allotted for each expt.)	10	Record Book	1,2,3,4
				Mini Project	05	Report	1,2,3,4
				TOTAL	25		
	SEE (Semester End Examination)	End Exam		End of the course	50	Answer scripts at BTE	1,2,3,4
INDIRECT ASSESSMENT	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3,4 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4 Effectiveness of Delivery of instructions & Assessment Methods

Note: I.A. test shall be conducted as per SEE scheme of valuation. However the obtained marks shall be reduced to 10 marks. (Any decimals shall be rounded off to next higher digit).

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1. Remembering and Understanding : - 20% weightage
2. Applying the knowledge acquired from the course : - 70 % weightage
3. Analysis : - 1% weightage

4. Evaluation : - 1% weightage
5. Creating new knowledge : - 8% weightage

Scheme of Evaluation for End Exam

SN	Scheme	Max. Marks
2	Testing skills/ abilities from Unit - I	10
3	Writing steps on any one from Unit -II	10
4	Execution	15
5	Presentation of result	05
6	Viva voce	10
Total		**50**
Note: 1. Candidate shall submit Lab Record for the Examination. 2. Student shall be allowed to execute directly even if she / he unable to write the procedure 3. In case of change in experiment or no write up, marks will not be awarded for writing procedure/steps.		

Resource requirements for Basic Computer Skills Lab
(for an Intake of 60 Students [3 Batches])

Hardware requirement

Sl. No.	Equipment	Quantity
1	PC systems (latest configurations with speakers)	20
2	Laser Printers	03
3	Networking (Structured) with cat 6e / wireless 24 Port switches / Wireless Router I/O Boxes for networking(as required)	03
4	Broad Band Connection	01

Software Requirement: Linux, Libre Office / Open Office / Kingsoft Office / any equivalent software.

Note: *Students: Computers* ratio in the Lab should be strictly 1:1 for a batch of twenty Students.

MODEL QUESTIONS FOR PRACTICE AND SEE

Course Title: **BASIC COMPUTER SKILLS LAB**	Course Code : **15CE13P**

Note: *One Question from Unit-I and Unit-II*

UNIT-I

1. Identify Physical components of a Computer System.
2. Demonstrate the basic formatting features in Text Editors.
3. Create two file in a folder and place the shortcut of these files on the desktop.
4. Demonstrate how search engine may be used in browsing Internet.
5. Create an email account
6. Create and Send an email with a picture attachment.
7. Demonstrate how documents can be downloaded using Internet.

UNIT-II

1. Using Word Processor Application create a Business Letter.
2. Using Word Processor Application create a Personal Letter.
3. Using Word Processor Application create a letter head for company.
4. Using Word Processor Application create a Simple Newsletter with minimum of three columns. Insert a Clip art in the newsletter.
5. Using Word Processor Application create a Resume for a Job application.
6. Using Word Processor Application create the cover page of a Project Report (use Word Art, insert Picture Image).
7. Prepare the class time table for your class using Word Processor Application.
8. Using Spread-sheet Application, create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.
9. You have a monthly income of Rs.11000. Your monthly expenditures are Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month).Use Spread-sheet Application.

10. Using Spreadsheet Application, create a worksheet containing the pay details(containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF,PT, Insurance, Gross and Net salary) of the employees using formulas.
11. Using Spreadsheet Application, create a Simple Bar Chart to highlight the sales of a company for three different periods.
12. Using Spreadsheet Application, create a Pie Chart for a sample data and give legends.
13. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.
14. Create a presentation about a book containing Title, Author, Publisher and Contents.
15. Create an automated (timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool.

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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **MATERIALS OF CONSTRUCTION LAB**		
	Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE14P**
	Type of Course:**Practical,Demo & Assignments**	Credit **:03**	Core/ Elective: **Core**

Pre-requisites: Basic knowledge of science in secondary education.

Course Objectives: Identification & understanding the properties & uses of various building materials.

Course Outcomes:

On successful completion of the course, the students will be able to:

Course Outcome	
CO1	Understand the important properties of various building materials
CO2	Recognize the need & to engage in independent lifelong learning in identifying miscellaneous materials..
CO3	Apply the properties of materials in societal & environmental context & demonstrate knowledge for sustainable development.
CO4	Apply knowledge of building materials to provide predictive capability to optimize building performance & to minimize building failure

Mapping Course Outcomes with Program Outcomes

Mapping of COs with Pos		Programme Outcome											
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
		Engineering Knowledge	Problem Analysis	Design &Development Solution	Investigation of problems	Modern Tool Usage	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning	Project management and finance
Course Outcome	**CO1**	S	S		M		S	S	S		S		S
	CO2	S	S	S	M	M	M	S		S		M	S
	CO3	S	S	S	S		S	S		S	M	M	S
	CO4	S	S		S	M	S	S	S	S	S		S

S: Strong Relationship M: Moderate Relationship

COURSE CONTENT

Unit	Major Topics	Hours Allotted
1	BUILDING UNITS	12
2	FLOORING MATERIAL	6
3	BINDING MATERIAL	6
4	CLADDING &ROOFINGMATERIAL	9
5	FINISHING, DECORATIVE & FALSE CEILING MATERIAL	9
6	TIMBER	6
7	PLASTICS & GLASS	6
8	COATING MATERIAL	6
9	MISCELLANEOUS MATERIALS	9
10	MINI PROJECT	9
	Total	**78**

UNIT –I BUILDINGUNITS

i) Stones

Identification & understanding the properties & uses of the following stones:Granite, Trap, Basalt, Sandstone, Limestone, Gneiss, Laterite, Marble, Quartzite, Slate.

Identification	Geological Classification	Properties	Uses

ii) Bricks

Identification & understanding the properties& uses of the following bricks:
Ground moulded, Table moulded, Machine moulded (Wire cut), Soil stabilized blocks, Concrete blocks (solid-hallow), Fly ash bricks, Fire bricks, Light weight blocks (clay hallow blocks & autoclave aerated concrete blocks)
Specimen tabular column

Identification	Standard size	Properties	Uses

UNIT-II FLOORING MATERIAL

Identification & understanding the properties & uses of the following flooring materialsGranolithic, CC with red oxide finish, Shahabad, Vitrified, Marble, Granite, Pressed Clay tiles, Interlocking pavers, Cobble stone, Wooden flooring

Identification	Properties	Uses

UNIT-III BINDINGMATERIAL

Identification & understanding the properties & uses of the following binding materials Cement, White cement, Lime, Clay, Fly ash, Plaster of Paris, Lime putty, Water proofing compound, and White cement based putty.
Specimen tabular column

Identification	Properties	Uses

UNIT IV CLADDING&ROOFINGMATERIAL

Identification & understanding the properties & uses of the following Cladding material- Exterior surface wall cladding material, Bath & kitchen wall cladding, Sloped roof cladding.
Roofing Material- Mangalore tiles, Country tiles, A C sheet, Plastic sheets, Non asbestos Hi tech roofing sheet, Meta colour sheets, Alpha sheet, corrugated aluminium sheets, Puff-sandwiched roofing sheets.

Identification	Properties	Uses

UNIT VFINISHING, DECORATIVE & FALSE CEILING MATERIAL

Identification & understanding the properties & uses of the following: Mortar plaster, Stucco plaster, Designer tiles, Acoustic ceiling board, Gypsum ceiling board, Fibre board, Pulp board, Straw board, Polystyrene, Thermocol, Hair felt.

Identification	Properties	Uses

UNIT VITIMBER

Identification & understanding the properties & uses of the following timberTeak, Honne, Sal, Casuarina, Deodar, Jackfruit, Mahogany, Mango, Neem, Silver oak, Bamboo.
Industrial timber- Veneers, Plywood, Fibre board, Hardboard, Block board, Laminated sheets

Identification	Properties	Uses

UNIT-VIIPLASTICS & GLASS

Identification & uses of the following material
Glass panels- Plain, Dark cool, Brown cool, printed; Mesh glass, Wired glass, Glass bricks, Structural glass, Ribbed glass, Perforated glass, Foam glass, Fibre glass, Float glass, Toughened glass.
Plastics- Thermosetting plastic articles, Polycarbonate.

Identification	Uses

UNIT-VIIICOATING MATERIAL

Identification & understanding the uses of the following paints, primers, varnishes & distemper
Paints- Exterior primer water based, Metal-wood & wall primer, emulsion paint, enamel paint, cement paint (Snowcem), Texture paints, Interior paints
Varnish-French polish, Metallic paint (grills & all purpose)
Distemper- Water based & weather proof exterior emulsion.

Identification	Uses

UNIT-XIMISCELLANEOUS MATERIALS

Identification & uses of the following material
Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Glass fibre reinforced polyesters, Synthetic rubber adhesives, Tile joint filler material, Sealants, PVC products, Asphalt, Expanded metal strips for joints, FRP, Geo fabrics & Geogrids.

Identification	Uses

UNIT-X MINI PROJECT

Each Student should collect at least five different building materials & prepare the report.

TEXT BOOKS&REFERENCEBOOKS

1. Materials by SC Rangwala
2. Engineering Building materials by S S Bhavikatti
3. Engineering Materials by GJ Kulkarni
4. Engineering Materials by Sushil Kumar
5. Market brochures

E-Links

1. www.constructionmaterials.com/
2. en.wikipedia.org/wiki/Building material
3. en.wikipedia.org/wiki/List_of_building_materials
4. www.exponent.com
5. http://www.tce.co.in/
6. www.prakruthibuilding.com
7. http://www.aboutcivil.org

Course Delivery: The course will be delivered through Tutorials and Demonstration of materials.

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	**CIE***	IA	Students	Two IA Tests (average of two tests will be computed)	10	Blue books (Test Papers)	1,2,3,4
				Record writing (average of marks allotted for each experiment)	10	Lab Record	1,2,3,4
				Mini project	05	Report	1,2,3,4
				Total	**25**		
	SEE*	End Exam		End of the course	50	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course	---	Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course	---	Questionnaires	1,2,3,4 Effectiveness of Delivery of instructions & Assessment Methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note: I.A. test shall be conducted as per SEE scheme of valuation. However the obtained marks shall be reduced to 10 marks. (Any decimals shall be rounded off to next higher digit)

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1. Remembering and Understanding : 60 % weightage
2. Applying the knowledge acquired from the course : 25 % weightage
3. Analysis : 10 % weightage
4. Evaluation : 02 % weightage
5. Creating new knowledge : 03 % weightage

List of equipment and materials

Sl No	Description	Nos
	Furniture	
1	Display table 4'X8'	8
2	Stools/ Chairs	40
3	Display Racks	10
4	Metal Trays	10
	Specimens	
6	**STONES** Granite, Trap, Basalt, Sandstone, Limestone, Gneiss, Laterite, Marble, Quartzite, Slate.	Each 5Nos
7	**BRICKS** Ground moulded, Table moulded, Machine moulded (Wire cut), Soil stabilized blocks, Concrete blocks (solid-hallow), Fly ash bricks, Fire bricks, Light weight blocks (clay hallow blocks & autoclave aerated concrete blocks)	Each 5Nos
8	**FLOORING MATERIAL** Granolithic, CC with red oxide finish, Shahabad, Vitrified, Marble, Granite, Pressed Clay tiles, Interlocking pavers, Cobble stone, Wooden flooring	Each 5Nos
9	**BINDING MATERIAL** Cement, White cement, Lime, Clay, Fly ash, Plaster of Paris, Lime putty, Water proofing compound, and White cement based putty.	Each 5Nos
10	**CLADDING MATERIAL** Exterior surface wall cladding material, Bath & kitchen wall cladding, Sloped roof cladding. **ROOFING MATERIAL**- Mangalore tiles, Country tiles, A C sheet, Plastic sheets, Non-asbestos Hi tech roofing sheet, Meta colour sheets, Alpha sheet, corrugated aluminium sheets, Puff-sandwiched roofing sheets.	Each 5Nos
11	**FINISHING, DECORATIVE & FALSE CEILING MATERIAL** Mortar plaster, Stucco plaster, Designer tiles, Acoustic ceiling board, Gypsum ceiling board, Fibre board, Pulp board, Straw board, Polystyrene, Thermocol, Hair felt	Each 5Nos

Sl No	Description	Nos
12	**TIMBER** Teak, Honne, Sal, Casuarina, Deodar, Jackfruit, Mahogany, Mango, Neem, Silver oak, Bamboo. Industrial timber- Veneers, Plywood, Fibre board, Hardboard, Block board, Laminated sheets	Each 5Nos
13	**PLASTICS & GLASS** Glass panels- Plain, Dark cool, Brown cool, printed; Mesh glass, Wired glass, Glass bricks, Structural glass, Ribbed glass, Perforated glass, Foam glass, Fibre glass, Float glass, Toughened glass. Plastics- Thermosetting plastic articles, Polycarbonate.	Each 5Nos
14	**COATING MATERIAL** (Paint samples to be dispalayed on panels of size 30cm X 30cm) Paints- Exterior primer water based, Metal-wood & wall primer, emulsion paint, enamel paint, cement paint (Snowcem), Texture paints,Interior paints Varnish-French polish, Metallic paint (grills & all purpose) Distemper- Water based & weather proof exterior emulsion.	15X2=30 panel
15	**MISCELLANEOUS MATERIALS** Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Glass fibre reinforced polyesters, Synthetic rubber adhesives, Tile joint filler material, Sealants, PVC products, Asphalt, Expanded metal strips for joints, FRP, Geo fabrics & Geogrids	Each 5Nos

Note: Minimum Floor area required for establishing Material-testing Lab is 60 Sqm.

SCHEME OF VALUATION

Course**: MATERIALS OF CONSTRUCTION LAB** Course Code: **15CE14P**

Sl. no.	Performance	Max. Marks
1	Identify & list the properties & uses of given 8 material Identification-1 mark Properties-2 marks Uses-2 marks	40
2	Viva-Voce	10
	TOTAL	**50**

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title:**ENGINEERING MATHEMATICS – II**		Course Code	: **15SC02M**
Semester	: **II**	Course Group	: **Core**
Teaching Scheme (L:T:P)	: **4:0:0**(in hours)	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programmes: **Common to all Engineering Diploma Programmes**			

Pre-requisites:

Engineering Mathematics-I in First Semester Diploma curriculum.

Course Objectives:

1. Apply the concept of straight line and conic section in engineering field.
2. Determine derivatives of functions involving two variables.
3. Apply the concepts of differentiation in physics and engineering courses.
4. Evaluate the integrals of functions of two variables.
5. Apply the concepts of definite integrals and its application over a region.
6. Solve the ODE of first degree, first order in engineering field.

Course Contents:

Topic and Contents	Hours	Marks
Unit-1: COORDINATE GEOMETRY	08hr	23
a. **Straight lines:** Differentforms of equations of straight lines: $y = mx + c$, $y - y_1 = m(x - x_1)$, $y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1}\right)(x - x_1)$. General equation of a line$ax + by + c = o$ (graphical representation and statements) and problems on above equations. Equation of lines through a point and parallel or perpendicular to a given line. Problems.	04 hr	
b. **Conic Section:** Definition of conic section.Definition of axis, vertex, eccentricity, focus and length of latus rectum. Geometrical representation of parabola, ellipse and hyperbola: Equations of parabola$y^2 = 4ax$,	04hr	

Equation of ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$and Equation of hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$(without proof of above 3 equations). Equations of parabola, ellipse and hyperbolawith respect to x-axis as axis of conic. Finding axes, vertices, eccentricity, foci and length of lattice rectum of conics.Problemson finding the above said equations with direct substitution.		
UNIT – 2: DIFFERENTIAL CALCULUS	15hr	39
Differentiation. Definition of increment and increment ratio. Definition of derivative of a function. Derivatives of functions ofx^n, $\sin x$, $\cos x$and $\tan x$with respect to 'x' from first principle method. List of standard derivatives of $\operatorname{cosec} x$, $\sec x$, $\cot x$, $\log_e x$, a^x, e^x.....etc. Rules of differentiation: Sum, product, quotient rule and problems on rules. Derivatives of function of a function (Chain rule) and problems. Inverse trigonometric functions and their derivatives. Derivative of Hyperbolic functions, Implicit functions, Parametric functions and problems. Logarithmic differentiation of functions ofthe type u^v,where u and v are functions of x.Problems. Successive differentiation up to second order and problems on all the above types of functions.		
UNIT – 3: APPLICATIONS OF DIFFERENTIATION.	07hr	17
Geometrical meaning of derivative. Derivative as slope. Equations of tangent and normal to the curve y = f(x) at a given point- (statement only). Derivative as a rate measure i.e.to find the rate of change of displacement, velocity, radius, area, volume using differentiation. Definition of increasing and decreasing function. Maxima and minima of a function.		
UNIT-4: INTEGRAL CALCULUS.	12hr	30
Definition of Integration. List of standard integrals. Rules of integration (only statement) 1.$\int kf(x)dx = k\int f(x)dx.$ 2.$\int \{f(x) \pm g(x)\}dx = \int f(x)dx \pm \int g(x)dx$ problems. Integration by substitution method. Problems.		

Standard integrals of the type $1.\int \frac{dx}{x^2+a^2} = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)+c$ $2.\int \frac{dx}{\sqrt{a^2-x^2}} = \sin^{-1}\left(\frac{x}{a}\right)+c$. $3.\int \frac{dx}{x\sqrt{x^2-a^2}} = \frac{1}{a}\sec^{-1}\left(\frac{x}{a}\right)+c$ (1 to 3 with proof) $4.\int \frac{dx}{x^2-a^2} = \frac{1}{2a}\log\left(\frac{x-a}{x+a}\right)+c$ if x > a > 0. $5.\int \frac{dx}{a^2-x^2} = \frac{1}{2a}\log\left(\frac{a+x}{a-x}\right)+c$ if a > x > 0. (4 & 5 without proof) and problems on above results Integration by parts of the type $\int x^n e^x dx$,$\int x\sin x dx$, $\int x\cos x dx$, $\int x\log x dx$, $\int \log x dx$, $\int \tan^{-1} x\, dx$, $\int x\sin^2 x\, dx$, $\int x\cos^2 x\, dx$where n=1, 2. Rule of integration by parts. Problems		
UNIT – 5: DEFINITE INTEGRALS AND ITS APPLICATIONS	05 hr	22
Definition of Definite integral. Problems on all types of integration methods. Area, volume, centres of gravity and moment of inertia by integration method. Simple problems.		
UNIT – 6: DIFFERENTIAL EQUATIONS.	05 hr	14
Definition, example, order and degree of differential equation with examples. Formation of differential equation by eliminating arbitrary constants up to second order. Solution of O. D. E of first degree and first order by variable separable method. Linear differential equations and its solution using integrating factor.		
Total	52	145

Course Delivery:

The Course will be delivered through lectures, class room interaction, exercises, assignments and self-study cases.

Course outcome:

On successful completion of the course, the student will be able to:

1. Formulate the equation of straight lines and conic sections in different forms.
2. Determine the derivatives of different types of functions.
3. Evaluate the successive derivative of functions and its application in tangent, normal, rate measure, maxima and minima.
4. Evaluate the integrations of algebraic, trigonometric and exponential function.
5. Calculate the area under the curve, volume by revolution, centre of gravity and radius of gyration using definite integration.
6. Form and solve ordinary differential equations by variable separable method and linear differential equations.

Mapping Course Outcomes with Program Outcomes:

Course outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	S	S										M
2	S	S										M
3	S	S										M
4	S	S										M
5	S	S										M
6	S	S										M

S: Strong relationship **M:** Moderate relationship

Reference Books:

1. NCERT Mathematics Text books of class XI and XII.
2. Higher Engineering Mathematics by B.S Grewal, Khanna publishers, New Delhi.
3. Karnataka State PUC mathematics Text Books of I & II PUC by H.K. Dass and Dr. Ramaverma published by S.Chand & Co.Pvt. ltd.
4. CBSE Class Xi & XII by Khattar & Khattar published PHI Learning Pvt. ltd.,
5. First and Second PUC mathematics Text Books of different authors.
6. E-books:www.mathebook.net
7. www.freebookcentre.net/mathematics/ introductory-mathematics -books.html

Course Assessment and Evaluation:

Method	What		To whom	When/where (Frequency in the course)	Max Marks	Evidence collected	Contributing to course outcomes
DIRECT ASSMENT	*CIE	Internal Assessment Tests	Student	Three tests (Average of Three tests to be computed).	20	Blue books	1 to 6
		Assignments		Two Assignments (Average of Two assignments to be computed)	5	Log of record	1 to 4
				Total	25		
	*SEE	Semester End Examination		End of the course	100	Answer scripts at BTE	1 to 6
INDIRECT ASSESSMENT	Student feedback		Students	Middle of the course	-NA-	Feedback forms	1 to 3, delivery of the course
	End of Course survey			End of course		Questionnaire	1 to 6, Effectiveness of delivery of instructions and assessment methods

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering and Understanding	35
2	Applying the knowledge acquired from the course	25
3	Analysis&Evaluation	40

Model Question Paper:

Code: 15SC02M

II Semester Diploma Examination

ENGINEERING MATHEMATICS –II

(For All Engineering Diploma Programmes)

Time: 3 Hours][Max. Marks: 100

NOTE: i)Answer any 10 questions from section A, 8 questions from section B and 5 questions from section-C

ii) Each question carries 3 marks in section A.

ii) Each question carries 5 marks in section B.

iii) Each question carries 6 marks in section C.

SECTION-A

1. Find the equation of the line passing through the point (2,-3) with slope 1/3.
2. Find the equation of parabola with vertex (2,0) and focus (5,0)
3. Differentiate: $(3x + 8)^7$ with respect to x.
4. If $y = \cos^{-1} x$ show that $\frac{dy}{dx} = \frac{-1}{\sqrt{1-x^2}}$.
5. If $y = x^x$, find $\frac{dy}{dx}$.
6. If $y = \frac{1+\sin x}{1-\sin x}$ find $\frac{dy}{dx}$.
7. Find the equation to the tangent to the curve $2x^3 + 5y - 4 = 0$ at (-2,4).
8. The volume of the sphere is increasing at the rate of 6cc/sec. Find the rate of change of radius when the radius is 3 cm.
9. Integrate: $(2x + 1)(x + 5)$ with respect to x
10. Evaluate: $\int \tan^2 x dx$
11. Evaluate: $\int \frac{\cos x}{1+\sin x} dx$
12. Evaluate: $\int_0^{\pi/4} (\sec^2 x + 1) dx$.
13. Find area bounded by the line $x + 2y = 0$, x- axis, and ordinates $x = 0, and x = 4$ by integration.
14. Form differential equation for curve $y^2 = 4ax$

SECTION – B

1. Find the equation of line passing through the point (2,5) and (-3,2).
2. Differentiate $\sqrt{x} + \log x + \sin^{-1} x + e^{\tan x} - a^x$ with respect to x.
3. Differentiate $\tan x$ with respect to x using first principal method.
4. If $y = \sinh 3x \cosh 2x$ then find $\frac{dy}{dx}$.
5. If $S = t^3 - t^2 + 9t + 8$, where S is distance travelled by particle in t seconds. Find the velocity and acceleration at t = 2 sec.
6. Integrate: $\frac{1}{x} - \tan x + e^{-3x} + \frac{1}{1+x^2} + 5$ with respect to x.
7. Evaluate: $\int \frac{(1+\log x)^2}{x} dx$
8. Evaluate: $\int x \sin x dx$

9. Evaluate: $\int_0^{\pi/2} \cos 5x \cos 3x \, dx$
10. Evaluate: $\int_0^{\pi/2} \cos^3 x \, dx$
11. Solve the differential equation $\sin^2 y dx - \cos^2 x dy = 0$

SECTION – C

1. Find the equation of median through B in a triangle with vertices A(-1 ,3), B(-3, 5) and C(7,-9)
2. Find the equation of hyperbola, given that vertices are $(\pm 7, 0)$ and eccentricity, e=4/3
3. If $x^y = a^x$, show that $\frac{dy}{dx} = \frac{x \log_e a - y}{x \log_e x}$.
4. If $y = e^{\tan^{-1} x}$ then show that $(1 + x^2)\frac{d^2y}{dx^2} + (2x - 1)\frac{dy}{dx} = 0$.
5. Find the maximum and minimum values of the function
$f(x) = 2x^3 - 21x^2 + 36x - 20$.
6. Evaluate: $\int \tan^{-1} x \, dx$
7. Find the volume of solid generated by revolving the curve
$y = \sqrt{x^2 + 5x}$ between x=1 & x=2.
8. Solve the differential equation $x\frac{dy}{dx} - 2y = 2x$

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Question Paper Blue Print:

Course: **ENGINEERING MATHEMATICS – II** Course Code**: 15SC02M**

UNIT NO		HOURS	Questions to be set (3 Marks) Section - A	Question to be set in two sub division (5 Marks) Section - B	Question to be set in two sub division (6 Marks) Section- C	Weightage of Marks
1	a	4	01	01	01	23
	b	4	01	--	01	
2		15	04	03	02	39
3		07	02	01	01	17
4		12	03	03	01	30
5		05	02	02	01	22
6		05	01	01	01	14
TOTAL		52	14	11	08	145
Questions to be answered			**10**	**08**	**05**	**100**

Guidelines to Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weight age of model fixed for each unit.
2. The question paper pattern provided should be adhered to
   Section-A: 10 questions to be answered out of 14 questions each carrying 03 marks.
   Section-B: 08 questions to be answered out of 11 questions each carrying 05 marks.
   Section-C: 05 questions to be answered out of 08 questions each carrying 06 marks.
3. Questions should not be set from the recapitulation topics.

Model Question Bank:

Course Title:**ENGINEERING MATHEMATICS – II**	Course Code: **15SC02M**

UNIT-1: STRAIGHT LINES AND CONIC SECTION:

3 MARK QUESTIONS

1. Find the equation of the straight line passing through (2,3) and having slope 5.
2. Find the slope and x-intercept and y-intercepts of the line $2x + 3y - 11 = 0$.
3. Find the vertex and focus of the parabola $(y - 2)^2 = 8x$.
4. Show that the lines 3x-2y+2=0, 2x+3y+7=0 are perpendicular.
5. Find the eccentricity of the ellipse $\frac{x^2}{64} + \frac{y^2}{9} = 1$

5 MARK QUESTIONS

1. Find the equation to the line passing through the point (6,-4) and perpendicular to the line 7x-6y+3=0.
2. Find the equation to the line passing through the point (2,3) parallel to the line joining the points (-8,-6) & (2,-4).
3. Find the equation of straight line inclined at 135o to the x-axis having y-intercept 2/3.
4. Find the equation of straight line joining the points (2,3) & (-4,6).
5. Find the equation of the line passes through (-3,-2) which is perpendicular to x-axis.

6 MARK QUESTIONS

1. Find the equation to the median of the triangle through the vertex A with vertices A(-1,3), B(-3,5) &C(7,-9).
2. The vertices of a quadrilateral taken in order are A(1,2), B(2,1),C(3,4) & D(-1,-2). Find the equation to the diagonal BD.

3. Obtain the equation of the hyperbola in the form $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, whose eccentricity is 8 and distance between the foci is 12.
4. Find the equation of the ellipse with length of major axis is 8 and minor axis is 3.
5. Find the equation to the line passing through point (3,-2) and perpendicular to the line joining points (5,2) &(7,-6).

UNIT-2: DIFFERENTIATION:

3 MARK QUESTIONS

1. Find $\frac{dy}{dx}$, if $y=2x^2-3x+1$.
2. Differentiate $x\tan x$ with respect to x.
3. Find $\frac{dy}{dx}$, if $x^2+y^2=25$
4. Find $\frac{dy}{dx}$ if $x=ct, y=\frac{c}{t}$,
5. If $y=4ax$, find $\frac{d^2y}{dx^2}$.

5 MARK QUESTIONS:

1. Differentiate the function x^n by method of first principle.
2. Find $\frac{dy}{dx}$ if $y=6x^3-3\cos x+4\cot x+2e^{-x}-\frac{5}{x}$.
3. Find $\frac{dy}{dx}$ if $y=\frac{\cos x+\sin x}{\cos x-\sin x}$
4. Find $\frac{dy}{dx}$ if $y=(\cos x)^{\sin x}$
5. If $y=\tan^{-1}x$, prove that $(1+x^2)y_2+2xy_1=0$

6 MARK QUESTIONS:

1. Find $\frac{dy}{dx}$ if $y=\frac{x\log x}{1+\sin x}$
2. Find $\frac{dy}{dx}$ if $x=a\cos^3\theta, y=a\sin^3\theta$ at $\theta=\pi/4$.
3. Find $\frac{dy}{dx}$ if $y=x^{x^{x^{x^{\cdot^{\cdot^{\cdot^{\infty}}}}}}}$.
4. If $y=\tan^{-1}\left(\frac{1+x}{1-x}\right)$, find $\frac{dy}{dx}$.
5. If $y=e^{m\sin^{-1}x}$, prove that $(1-x^2)y_2-xy_1-m^2y=0$

UNIT-3 APPLICATIONS OF DIFFERENTIATION

3 MARK QUESTIONS

1. Find the slope of the tangent to the curve $x^2 + 2y^2 = 9$ at a point (1, 2) on it.
2. Find the slope of the normal to the curve $y = 2 - 3x + x^2$ at (1, 0).
3. The law of motion of a moving particle is $S = 5t^2 + 6t + 3$ where 'S' is the distance in metres and 't' time in seconds. Find the velocity when t=2.
4. Find the rate of change of area of a circle with respect to its radius.
5. Show that the curve $2x^3 - y = 0$ is increasing at the point (1, 2).

5 MARK QUESTIONS

1. For a moving body vertically upwards, the equation of motion is given by $S = 98t - 4.9t^2$. When does the velocity vanish?
2. Find the equation to the tangent to the curve $y = 2x^2 - 3x - 1$ at (1,-2).
3. A circular patch of oil spreads on water and increases its area at the rate of 2 sq.cm/min. find the rate of change of radius when radius when radius is 4 cm.
4. The volume of the spherical ball is increasing at the rate of 36π cc/sec. Find the rate at which the radius is increasing. When the radius of the ball is 2cm.
5. Find the max value of the function $y = x^3 - 3x + 4$.

6 MARK QUESTIONS

1. Find the max & min values of the function $y = x^5 - 5x^4 + 5x^3 - 1$.
2. Find the equation of normal to the curve $y = x^2 + 2x + 1$ at (1,1).
3. If S is the equation of motion where $S = t^3 - 2t^2$ find its acceleration when velocity is 0.
4. The volume of sphere is increasing at 3c.c per second. Find the rate of increase of the radius, when the radius is 2cm.
5. Water is flowing into a right circular cylindrical tank of radius 50 cms at the rate of 500π cc/min. Find how fast is the level of water going up.

UNIT-4: INTEGRATION

3 MARK QUESTIONS

1. Evaluate: $\int (x^2 + x + 1)\, dx$.
2. Evaluate: $\int \cot^2 x\, dx$
3. Evaluate: $\int e^{5x+8}\, dx$
4. Evaluate: $\int \frac{1}{2x+5}\, dx$
5. Evaluate: $\int \sin^5 x \cos x\, dx$

5 MARK QUESTIONS

1. Evaluate $\int \left(x^4 - \frac{1}{x} + \operatorname{cosec}^2 x - e^{-2x} + \cos x\right) dx.$
2. Evaluate: $\int \cos^3 x \, dx$
3. Evaluate: $\int \sin 6x \cos 2x \, dx$
4. Evaluate: $\int \log x \, dx$
5. Evaluate: $\int \frac{(\tan^{-1} x)^3}{1+x^2} dx$

6 MARK QUESTIONS

1. Evaluate: $\int (\tan x + \cot x)^2 dx.$
2. Evaluate: $\int (x+1)(x-2)(x-3) dx$
3. Evaluate: $\int x^2 \cos x \, dx$
4. Prove that $\int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + c$
5. Evaluate: $\int \frac{1}{9\sin^2 x + 4\cos^2 x} dx$

UNIT-5: DEFINITE INTEGRATION AND ITS APPLICAITON.

3 MARK QUESTIONS

1. Evaluate: $\int_2^3 (2x+1) \, dx.$
2. Evaluate: $\int_0^{\pi/4} \sec^2 x \, dx.$
3. Evaluate: $\int_0^2 e^x \, dx$
4. Evaluate: $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx.$
5. Evaluate: $\int_0^{\pi/2} \cos x \, dx.$

5 MARK QUESTIONS

1. Evaluate: $\int_0^{\pi/2} \sin 3x \cos x \, dx.$
2. Evaluate: $\int_0^{\pi} \frac{\cos x}{1+\sin^2 x} dx.$
3. Evaluate: $\int_0^1 x(x-1)(x-2) \, dx.$
4. Find the area bounded by the curve $y = x^2 + 1$ the x-axis and ordinates$x = 1, x = 3.$
5. Find the volume of the solid generated by the revolving of the curve $y^2 = x^2 + 5x$ between the ordinates x=1, x=2 about x-axis.

6 MARK QUESTIONS

1. Evaluate: $\int_0^1 \frac{\cos(\tan^{-1} x)}{1+x^2} dx$.
2. Find the area between the curves $y = x^2 + 5$ and $y = 2x^2 + 1$.
3. Find the volume of ellipsoid generated by revolving $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ between the ordinates $x = \pm a$ about x-axis.
4. Find the centre of gravity of a solid hemisphere.
5. Determine the moment of inertia of a uniform rod of length 2l,
   Cross-sectional area "a" about an axis perpendicular to the rod and passing through the mid-point of the rod.

UNIT-6: INTEGRATION

3 MARK QUESTIONS

1. Write the order and degree of the differential equation $\left(\frac{dy}{dx}\right)^8 + 3\frac{d^2y}{dx^2} - ye^x = 0$.
2. Form the differential equation by eliminating arbitrary constants in $y = m\,e^{2x}$.
3. Solve $xdx + ydy = 0$.
4. Solve $\frac{dy}{1+y^2} = \frac{dx}{1+x^2}$.
5. Solve $e^x dx + dy = 0$.

5 MARK QUESTIONS

1. Form the differential equation by eliminating arbitrary constants A and B in $y = Ae^x + Be^{-x}$.
2. Form the differential equation by eliminating arbitrary constants in $y = a\cos mx + b\sin mx$.
3. Solve $(1 + y)dx + (1 + x)dy = 0$.
4. Solve $\frac{dy}{dx} + 3y = e^{2x}$.
5. Solve $\frac{dy}{dx} + y\tan x = \cos x$

6 MARK QUESTIONS

1. Solve $x(1 + y^2)dx + y(1 + x^2)dy = 0$.
2. Solve $\sec^2 x \tan y\, dx + \sec^2 y \tan x\, dy = 0$.
3. Solve $x\frac{dy}{dx} + y = x^3$
4. Solve $\frac{dy}{dx} + 3y = e^{2x}$.
5. Solve $\frac{dy}{dx} + 2y\cot x + \sin 2x = 0$

Government of Karnataka
Department of Technical Education, Bengaluru

Course: ENGINEERING MATHEMATICS - II

Course code: 15SC02M

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	**Dr. D.S. Prakash**	Asst. Director (LRDC)	DTE, Bengaluru
2	**Dr.MokaShekhu**	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
3	**Sri.Sathyanaraya Dixit**	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru
4	**Sri. Guruprasad V**	Lecturer (Selection Grade /Science)	APS Polytechnic, Somanahalli
5	**Dr.RajasekharHeera**	Lecturer/Science,	Government Polytechnic, Gulbarga.

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Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title	:**APPLIED SCIENCE**	Course Code	: **15SC03S**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme in Hrs (L:T:P)	: **4:0:0**	Credits	: **4 Credits**
Type of course	: **Lecture &Assignments**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programme: **Common to all Engineering Diploma Programmes**			

Prerequisite:

Dynamics, Heat, Sound, Matter, recent trends in Physics, Basic chemistry in Secondary Education.

Course Objective:

1. Learn concepts of Units, Laws of vectors, parallel forces, moment of force, couple.
2. Learn the fundamentals of properties and behavior of the materials
3. Learn the concepts of heat and thermodynamics.
4. Enhance theoretical and practical principles with applications of sound wave.
5. Understand different types of communication systems.
6. Develop awarenessabout corrosion, materials, and energy sources in engineering field.

Course Content:

UNIT I:MECHANICS **(08 Hrs)**

Units and Measurements: Definition of unit, types of unit (fundamental and derived)
SI units: Definition, Basic and supplementary units, advantages.
Measuring Instruments: Vernier calipers, principle and least count, diagram of vernier calipers with labeling the parts. Screw gauge(pitch, ZE, ZC), principle and least count, diagram of screw gauge with labeling the parts, simple problems.

Scalars and Vectors: Definition of scalar and vector with examples, representation of a vector, definition of resultant, equilibrium and equilibrant. Laws of vectors: Statement of law of parallelogram of forces, Converse law of triangle of forces, Lami's theorem. Deriving an expression for magnitude and direction of resultant of two vectors acting at a point.Resolution of vectors, mentioning rectangular component of resolution of

vector.Experimental verification of law of parallelogram of forces, Converse law of triangle of forces, Lami's theorem. Simple problems on laws of vectors

Parallel forces. Types of parallel forces, Moment of force: definition, S.I unit, types and examples. Couple: definition with examples. Moment of a couple. Conditions of equilibrium of coplanar parallel forces, applications. Experimental verification of Conditions of equilibrium of coplanar parallel forces using moment bar and simple problems.

UNIT-2: PROPERTIES OF SOLIDS AND LIQUIDS: (10 Hrs)

Properties of solids: Definitions of deforming force, elasticity and plasticity, examples for elasticity and plasticity, definition of stress and its types with examples and its S.I unit, definition of strain and its types with examples, elastic limit, Hooke's law, stress - strain graph with explanation. Modulie of elasticity and its types, derivation of an expression for Young's modulus of a material. Definition of Compressibility and factor of safety. Simple problems on stress, strain and Young's modulus.

Properties of liquids: Definition of thrust and pressure with S.I units.Derivation of expression for pressure at a point inside the liquid at rest,simple problems.

Energy of liquid in motion: Kinetic, Potential energies and Pressure energy in moving liquid. Bernoulli's theorem: statement and expression (No derivation). Cohesive and adhesive forces, angle of contact.

Surface Tension: Definition of surface tension and its S.I unit, factors affecting surface tension, applications of surface tension, capillarity and its applications.

Viscosity: Types of flow of liquid, definition of stream line flow and turbulent flow,definition of viscosity, expression for coefficient of viscosity, experimental determination of coefficient of viscosity of water, effect of temperature on viscosity.List of applications of viscosity.Simple problems.

UNIT III: HEAT AND PROPERTIES OF GASES. (07Hrs)

Concept of heat & temperature:Definitions of heat and temperature with S.I units,definition of Specific heat of substance with S I unit,equation for specific heat of a substance (no derivation).

Transmission of heat: Definitions of conduction, convection and radiation with examples, definition of thermal conductivity,derivation of co-efficient of thermal conductivity(K) and its S.I unit. Applications of conduction, convection and radiation,simple problems on K.

Gas laws: Statement ofBoyle's law, Charle's law, Gay-Lussac's law, derive the relation between them (PV=nRT), definition of C_p and C_v ,relation between them (Mayer's equation no derivation), simple problems on Boyle's law and Charle's law.

Thermodynamics: Definition of thermodynamics, Laws of thermodynamics: Zeroth law, I^{st} law and II^{nd} law (only statement), types of thermodynamics process: isothermalprocess, adiabatic process.

UNIT IV: WAVE MOTION (10Hrs)

Simple Harmonic Motion: Definition of periodic motion with example, definition of Simple Harmonic Motion, representation of S.H.M with respect to particle in circular motion, derivation of displacement of a particle executing S.H.M. Definitions of period, frequency, amplitude, in case of vibrating particle.

Wave: Definition of wave, wave period(T), wave frequency (n or f), wave amplitude (a), wave length(λ) and wave velocity (v) in case of wave motion. Derive the relationbetween v, n and λ. simple problems.

Types of waves: Mechanical and Non mechanical waves with examples. Definition of longitudinal and transversewaves, differences.

Propagation of sound waves in air: Newton's formula for the velocity of sound in air and Laplace's correction to it, various factors affecting velocity of sound in air. Simpleproblems.

Vibrations: Free vibrations, Forced vibration, Damped vibrations and Un-damped vibrations with examples. Resonance with examples.Laws of transverse vibrations of stretched string, derivation of equation for fundamental frequency of vibrations of stretched string. Simple problems.

Experiment to determine the unknown frequency of a given tuning fork by absolute and comparison methods using sonometer.

Stationary waves: Formation of stationary waves and their characteristics. Experimental determination of velocity of sound in air by using resonance air column apparatus.

Beats: Formation of Beats, definition of beat frequency, its applications.

UNIT V:MODERN PHYSICS (07Hrs)

Electromagnetic waves: Definition, generation ofelectromagneticwaves and their properties.

Electromagnetic spectrum:Definition, classification and its applications.

Lasers: Principle and listing the types of Laser, properties of Laser, applications.

Nano-Technology: Definition of Nano-Technology, advantages and dis-advantages of nano-Technology.

Advance Communication Systems: Basic elements of communication systems with block diagram, List commonly used terms in electronic communication systems.

Satellite communication: Introduction, advantages and disadvantages,
Optical fiber: principleand applications.

UNIT VI: INDUSTRIAL CHEMISTRY (10 Hrs)

Electrolysis: Definition of electrolyte, types of electrolytes with examples,definition of electrolysis.Arrhenius theory of electrolytic dissociation.Mechanism of Electrolysis.Faradays laws of Electrolysis: state and explain.
Corrosion: Definition, necessary conditions for corrosion, electrochemical theory of corrosion, list the preventive methods of corrosion.
Batteries: Basic concept, classification and applications of batteries.
Fuel cells: Definition, mentioning the types and advantages.
Metallurgy: Definitions of minerals, ore, flux, slag, alloys. Purpose of making alloys, composition and uses of alloys.
Polymers: Definition and classification of polymers, methods of polymerization and applications.
Composite materials: Definition, types, advantages and dis-advantages of composite materials.
Solutions: Definition of solute, solvent, solutions. Saturated and unsaturated solutions,concentration of solutions: normal, molar and molal solutions, simple problems on concentration of solution.
pH Value: Hydrogen ion concentration and concept of pH,definition of pH of solution, pH scale, applications of pH in different fields.

Course Delivery:

The Course will be delivered through lectures, class room interaction and exercises.

Course Outcome:

On successful completion of the course, the student will be able to-

1. Determine the dimensions of objects using measuring instruments and analyze vector in mechanics.
2. Create knowledge of properties of matter applicable to engineering.
3. Apply the concepts of thermal properties of matter and gas laws related to engineering.
4. Analyse the different concepts of waves and vibration in the field of engineering.
5. Analyse the recent trends in physics related to engineering.
6. Apply the basic concepts of chemistry in the field of engineering.

Mapping Course Outcomes with Program Outcomes:

Course outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	S	M		M								
2	S	M										
3	S	S								M		
4	S	S								M		
5	S	S					M					
6	S	S					M					

S: Strong relationship **M: Moderate relationship**

Reference Books:

1. Principle of physicsfor class XI and XII by V.K.Mehata and Rohit Mehta, as per Karnataka state PUC syllabusS.Chand and Company, New Delhi
2. Engineering chemistry for Diploma by Ranjan Kumar Mahapatra (PHI Learning Pvt. Ltd., New Delhi)
3. Basic Physics by KongbamChandramaniSingh (PHI Learning Pvt. Ltd., New Delhi)
4. Principle of physics by P.V.Naik (PHI Learning Pvt. Ltd. New Delhi)

Website:

1. www.rsc.org/Education/Teachers/resources/Inspirational/…/4.3.1.pdf
2. www.nanogloss.com/nanotechnology/advantages and disadvantages
3. www.freebookcentre.net/physics/ introductory-physics-books.html

e-books:

1. Introduction to physics – II, Robert P Johnson.
2. Lecture notes physics university of Rochester.
3. Text book of Physics poynting J.H Thomson sir J.J.

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Three tests (average of three tests will be computed)	20	Blue Books	1 to 6
		Class room Assignments		Two Assignments(Average of Two Assignments will be computed)	05	Log of Activity	1 and 5
				TOTAL	25		
	SEE (Semester End Examination)	End Exam	Students	End Of the Course	100	Answer Scripts at BTE	1 to 6
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 3 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 6 Effectiveness of delivery of instructions and assessment

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering and Understanding	20
2	Applying the knowledge acquired from the course	30
3	Analysis	30
4	Evaluation	15
5	Creating new knowledge	05

Question Paper Blue Print:

Course Title	:**APPLIED SCIENCE**	Course Code	: **15SC03S**

Name and Unit No.	Allotted Hours	Questions to be set for (2marks) PART - A	Questions to be set for (5marks) PART - B	Questions to be set for (6marks) PART - C
Mechanics **I**	08	04	02	01
Properties of Solids and Liquids **II**	10	03	03	01
Heat and properties of gases **III**	07	02	02	01
Wave motion **IV**	10	02	02	03
Modern Physics **V**	07	02	02	01
Industrial chemistry **VI**	10	02	04	01
Total	**52**	**15**	**15**	**8**

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weightage of model fixed for each unit.
2. The question paper pattern provided should be adhered to

Part – A: 10 questions to be answered out of 15 questions each carrying 02 marks
Part – B: 10 questions to be answered out of 15 questions each carrying 05 marks.
Part – C: 05 questions to be answered out of 08 questions each carrying 06 marks.

Model Question Paper:

Code:15SC03S

I Semester Diploma Examination

APPLIED SCIENCE

(Common for All Engineering Programmes)

Time: 3 Hours][Max Marks: 100

***Note*:** i) Answer any 10 questions from section A, each carry 02marks.
ii) Answer any 10 questions from section B, each carry 05 marks.
iii) Answer any 05 questions from section C, each carry 06 marks.

SECTION – A

1. Define Unit.
2. Differentiate scalars and vectors.
3. Define Resultant of forces.
4. Define moment of couple.
5. Define plasticity.
6. Define compressibility.
7. Define viscosity of liquid.
8. Define specific heat of substance.
9. Define thermodynamics.
10. Define time period.
11. Define beats.
12. Define Electro-magnetic waves.
13. Define Nano-Technology.
14. Define electrolyte.
15. Define composite materials.

PART-B

1. Draw a neat diagram of Vernier calipers and label its parts.
2. Write the condition for equilibrium of coplanar parallel forces with an example.
3. Explain stress-strain graph.
4. Define K.E of liquid in motion. State Bernoulli's theorem.
5. Define capillarity? Write any three application of surface tension.
6. State 1st law of thermodynamics. Explain isothermal & adiabatic process.
7. State the three gas laws.(Boyle's law, Charle's law & Gay-Lussac law)
8. Explain mechanical &non- mechanical waves with examples.
9. Distinguish between longitudinal & transverse waves.
10. Write any three advantages and two disadvantages of F.M.
11. Write the principle of laser. Lists its properties.
12. Explain the mechanism of electrolysis of HCL.
13. Write the basic concepts of batteries. Mention any three applications of batteries.
14. Distinguish between minerals and ore. Write any three applications of pH.
15. Define composite materials. Write the advantages of composite materials.

PART-C

1. Derive an expression for magnitude and direction of resultant of two forces acting at a Point.
2. Describe an experiment to determine coefficient of viscosity of water by Poiseuille's method.
3. 1.25cc volume of a gas at 15^0C &755mm of mercury pressure. Calculate volume at NTP.
4. Derive an expression for fundamental frequency of transverse vibrations of stretched string.
5. Describe an experiment to find the unknown frequency of the given tuning fork using sonometer by comparison method.
6. Calculate the velocity of sound in air at 25^0C & 75cm of mercury pressure, if thedensity of air at 0^0C & 76cm of mercury pressure is 1.29kgm^{-3}. (given γ=1.41 for air).
7. Write the basic elements of communication system with block diagram.
8. Explain any two methods of polymerization.

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Model Question Bank:

Course Title :**APPLIED SCIENCE**	Course Code : **15SC03S**

UNIT – I : MECHANICS

PART – A (02MARKS QUESTIONS)

1. Define unit of a physical quantity.
2. Define fundamental and derived units.
3. List supplementary units in S.I systems.
4. Define S.I units give two eg of S.I, basic units.
5. Define least count of measuring instrument.
6. Write the principle of Vernier calipers and screw gauge.
7. Define least count of Vernier calipers?
8. Define pitch of a screw.
9. Define ZE and ZC in screw gauge.
10. Define scalar quantity & give its examples.
11. Define vector quantity & give its examples.
12. Write the relation between resultant and equilibrant.
13. State law of parallelogram of vectors.
14. State Converse law of triangle of forces.
15. State Lami's theorem.
16. Define moment of force.
17. Write the two rectangular component of a vector.
18. Write how moment of force is measured.
19. Discus why the handles of the doors and windows are fixed at the end.
20. Define couple.
21. Define is moment of couple.
22. Write how you measure moment of couple.
23. Define equilibrium.
24. Write the conditions of equilibrium when number of co-planar parallel forces acting on a body.
25. Define like & unlike parallel forces.

PART – B (05 MARKS QUESTIONS)

1. Mention seven basic units and two supplementary units of SI system.
2. Draw a neat diagram of Vernier calipers and label its parts.
3. Draw a neat diagram of Screw Gauge and label its parts.
4. Explain parallel forces with their types.

5. List two types of moment of force. Write any three applications of couple.
6. Write the advantages of S.I system.
7. Mention the difference between scalars and vectors.
8. State Converse law of triangle of forces; write the line diagram & equationof Converse law of triangle of forces.
9. State Lami's theorem, write the line diagram & equation of lami's theorem
10. Define moment of force, write the equation to measure moment of force & give its examples.

PART – C (06 MARKS QUESTIONS)

1. Derive an expression for magnitude and direction of resultant of two forces acting at a point.
2. Derive an expression for horizontal and vertical components of force acting at an angle θ with horizontal.
3. Write the conditions for equilibrium of coplanar parallel forces acting on a rigid bodywith equations & diagram.
4. Describe an experiment to verify law of parallelogram of forces.
5. Describe an experiment to verify Converse law of triangle of forces.
6. Describe an experiment to verify Lami's theorem.
7. Describe an experiment to verify the conditions of equilibrium of co-planar parallel forces using moment bar.
8. A main scale is divided into 0.5 mm the length of vernier attached to it is 12mm and isdivided into 25equal parts. Calculate the value of 1vsd and L.C of vernier.
9. In Vernier calipers, main scale is divided into 1mm;9division of main scale is divided into 10 equal parts on Vernier scale. In a setting zero of Vernier scale lies between 4.8cm and 4.9cm, and 7^{th} division of vernier coincide with the main scale division. What is the total reading?
10. A screw gauge has a pitch of 0.5mm and 50 divisions on head scale. The reading when jaws touch is +5div. When gripping a wire the reading is 3 turns and 17 div. What is the diameter of the wire?
11. The resultant of two equal forces acting at a right angle to each other is 1414N.Findthe magnitude of each force.
12. Two forces of 5kg wt. and 10kg wt. acts at right angles to one another. Find the magnitudeand direction of the resultant forces.
13. Two unlike parallel forces equal to 20N and 12N acts at two points A and B on a rigidbody.Find the magnitude and direction of their resultant and the point where it acts if AB=0.8m
14. Two like parallel forces equal to 80N and 100N act on a body at two points A and B. If AB=0.6m,find the magnitude and the point where there resultant acts.
15. Three forces P, Q and 100 N acting on a body in equilibrium. If the angles opposite to P and Q are 120^0 and 150^0 respectively. Find the magnitude of P and Q.

UNIT II: PROPERTIES SOLIDS & LIQUIDS

PART – A (02MARKS QUESTIONS)

1. Define plasticity.
2. Define elasticity.
3. Define deforming force.
4. Define restoring force.
5. Define stress.
6. Write the types of stress.
7. Define strain.
8. Write the type of strain.
9. Define elastic limit.
10. State Hooke's law.
11. Define Young's modulus.
12. Define Bulk modulus.
13. Define Rigidity modulus.
14. Define compressibility? Write its S.I unit.
15. Write S.I units of stress and strain.
16. Define pressure of liquid.
17. Write equation for the pressure at a point inside the liquid at rest.
18. State Bernoulli"s theorem.
19. Define cohesive force.
20. Define Adhesive force.
21. Write reason why glue stick to paper?
22. Define angle of a contact.
23. Name the type of angle of a contact formed for water and glass, water and mercury.
24. Define surface tension.
25. List the factors affecting surface tension.
26. Define capillarity.
27. Write any four applications of capillarity.
28. List the applications of surface Tension.
29. Write the equation used to determine surface tension of water by capillary raise method.
30. Define viscous force.
31. Give two examples of viscous liquid.
32. Define co-efficient of viscosity. Write its S.I unit.
33. List the factors affecting viscosity of liquid.
34. Write the effect on viscosity of gas if temperature is increased.
35. Write any four applications of viscosity.
36. List the types of flow of liquid.

PART – B (05 MARKS QUESTIONS)

1. Explain elasticity with an example.
2. Define elasticity and list three types of modulei of elasticity.
3. Define strain. Write the types of strain. Give e.g. for each type of strain.
4. Define stress. Write the types of stress. Give e.g. for each type of stress.
5. Define elastic limit. State Hooke's law? Write its mathematical form .
6. Explain stress-strain graph.
7. Define compressibility and factor of safety. Write the SI unit of stress.
8. Define thrust and pressure,write their SI units.
9. Define K.E and P.E of liquid. State the Bernoulli's theorem.
10. Define cohesive and adhesive force with an example.
11. Define pressure energy and angle of contact.
12. Define two types of flow of liquid with an example.
13. Define angle of a contact. What type of angle of contact is formed for water and glass, water and mercury? List the factorsaffecting surface tension.
14. Define capillarity.Write any four applications of capillarity.
15. Write the difference between stream line flow and turbulent flow of liquids.
16. Define viscosity and write the effect of temperature on viscosity of liquid & gas.
17. Define stress and explain the types of stress.
18. Define strain and explain the types of strain.
19. State Hooke's law?List any three applications of viscosity.
20. Define surface tension. Mention any three factors affecting surface tension.

PART – C (06 MARKS QUESTIONS)

1. Derive an expression for young's modulus of elasticity.
2. Derive an expression for pressure at any point inside the liquid at rest.
3. Derive an expression for co-efficient of viscosity of liquid.
4. Describe an experiment to determine the surface tension of water by capillary rise method.
5. Describe an experiment to determine coefficient of viscosity of water by Poiseuille's method.
6. A uniform wire of length 0.5m and diameter 0.0006m when stretched by a mass of 5kgextends by 0.0004m. Calculate Young's modulus of wire.
7. A wire of length 1m is fixed at one end and a mass of 1kg is hung from free end,the area of cross section of the wire is 2.5×10^{-6} m^2 and the Young's modulus of the material of the wire is 2×10^{11} $Nm^{-2.}$ Calculate stress, strain and extension ofthe wire.
8. A spring 60cm long is stretched by 2cm by the application of a load 200g. What will bethe length when the load of 500g is applied (given g = 980cm/s^2).

9. A rectangular tank is 3m long,2m wide and 1.5m in height, it contains water to a depth of 1m,the density of water is 1000kg/m^3. Calculate the pressure at the bottom of the tank.
10. Calculate the pressure at the bottom of a swimming pool 10m wide if the water is 3m deep,the density of water is 1000kg/m^3.
11. A square plate of 6cm side moves parallel to another plate with a velocity of 10cm/s, both theplates being immersed in water (η = 0.01poise). If the distance between the plates 0.5mm.Calculate the viscous force.
12. In a certain experiment on the flow of water through a capillary tube, the following data were obtained. Volume of water coming out per minute = 15cc; pressure head of water = 30cm
    Length of tube = 25cm; radius of tube = 0.05cm; calculate coefficient of viscosity of water(g=980cm/s^2, density=1gm/cc)
13. A castor oil of viscosity 98.6NS/ m^2 fills the space between two horizontal plates1cm apart. If the lower plate is stationary and upper plate is moving horizontally with a velocity of 3m/s . Find the tangential force per unit area.

UNIT-III: HEAT AND PROPERTIES OF GASES.

PART – A (02MARKS QUESTIONS)

1. Define heat & write SI unit of heat.
2. Define temperature & write SI unit of temperature.
3. Define specific heat of substance & write its SI unit.
4. Define conduction of heat.
5. Define convection of heat.
6. Define Radiation of heat.
7. Define Thermal conductivity.
8. Define specific heat of a gas at constant volume.
9. Define specific heat of a gas at constant pressure.
10. State Boyle's law.
11. State Charle'slaw.
12. State Gay-Lussac's law
13. Define isothermal process.
14. Define adiabatic process.
15. Define thermodynamics.
16. State zeroth law of thermodynamics.
17. State I^{st} law of Thermodynamics.
18. State II^{nd} law of Thermodynamics
19. Write Mayer's equation.

PART – B (05 MARKS QUESTIONS)

1. Write any five differences between heat & temperature.

2. Define heat, temperature & specific heat of Substance. Write Mayer's equation for gas.
3. Define conduction, convection, radiation and thermal conductivity.
4. Write any five applications of conduction.
5. Write any five applications of convection.
6. Write any five applications of radiation.
7. Define Cp&Cv , write the relation between them.
8. Define conduction, write applications of conduction.
9. Define convection, write applications of convection.
10. Define radiation, write applications of radiation..
11. State 1st law of thermodynamics, explain isothermal & adiabatic process.
12. Derive an expression for coefficient of thermal conductivity (K).
13. Compare the three modes of transfer of heat.
14. State the three gas laws. (Boyle's law, Charle's law & Gay-Lussac's law).
15. State zeroth law, 1st law& 2nd law of thermodynamics.

PART – C (06 MARKS QUESTIONS)

1. With usual notations prove that pv = nRT
2. Define thermal conductivity. Derive an equation for co-efficient of thermal conductivity(K).
3. Define specific heat of a substance. Derive an equation for specific heat of substance.
4. Describe an experiment to verify Boyle's law.
5. The volume of a gas at 27^0c at2 atmospheric pressure is 2 liters.

If the pressure is double & absolute temperature is reduced to half.

What will be the new volume of gas?

6. A sealed glass bulb contains air at 30^0C at normal pressure. The bulb is immersed in an oil bath &heated gradually. Find the temperature in degree centigrade at which the bulb bursts if it can withstand a maximum pressure of 3.5atm.
7. The volume of certain mass of a gas at STP is $2x10^{-4}$ m^3. Find its volume at 27 ^{0}C at pressure $2.2x10^5$ Pa.
8. The volume of a gas at 15^0C is1.25cc &755mm of mercury pressure. Calculate volume at NTP.
9. How much heat is required to raise the temperature of 5kg of copper from 27^0C to its melting point of 1063^0C? Given that specific heat of copper is 400 J/k^{0}C.
10. A hot iron ball of mass 0.2kg is dropped into 0.5g of water at 10^0C. The resulting temperature is 30^0C. Calculate the temperature of the hot ball. Specific heat of iron = 336J/kg^{0}C and specific heat of water = 4200J/kg^{0}C.
11. A silver rod 0.15m long has cross-sectional area of 0.0003m^2. If one end is maintained at 10^0C and other end at 75^0C. How much heat will flow through the rod in 5 minutes? Given that co-efficient of thermal conductivity of silver = 406 J/ms^{0}C.

UNIT-IV: WAVE MOTION

PART – A (02MARKS QUESTIONS)

1. Define frequency and amplitude of a vibrating particle.
2. Wrote the relation between frequency and time period.
3. Define periodic motion with example.
4. Define S.H.M with example.
5. Write the equation for displacement of the particle in S.H.M.
6. Define wave motion.
7. Define wave period, wave frequency.
8. Write the relation between wave velocity, wavelength & wave frequency
9. Define non mechanical wave. Give an example.
10. Define mechanical wave. Write two types of Mechanical wave
11. Define transverse wave & givean example.
12. Define longitudinal wave & give anexample.
13. Write any two differences between transverse wave and longitudinal wave.
14. Write twocharacteristics of transverse wave.
15. Write two characteristics of longitudinal wave.
16. Write Newton's equation for velocity of sound in a medium and name the terms involved in the equation.
17. Write the Newton's Laplace equation for velocity of sound in air
18. Write the effect of pressure on velocity of sound in air.
19. Write the effect of temp on velocity of sound in air.
20. Write the equation for velocity of sound in air at 0°c.
21. Write the effect of humidity on velocity of sound in air.
22. Define free and forced vibration.
23. Define natural frequency.
24. Define resonance.
25. Give any two practical examples of resonance.
26. Define how stationarywaves areproduced?
27. Write any two characteristics of stationary waves.
28. Define nodes and antinodes.
29. Write the difference between stationary waves and progressive waves.
30. Write the fundamental note in vibration of stretched string.
31. Write the formula for the fundamental frequency of vibration of stretched string.
32. State the law of tension as applied to the vibration of stretched string.
33. State the law of length as applied to the vibration of stretched string.
34. State the law of mass per unit length as applied to the vibration of stretched string.
35. Define beats.
36. Define beat frequency.
37. Write any two applications of beats.

38. Write how beat frequency can be calculated?

PART-A (05 MARKS QUESTIONS)

1. Define period, frequency & amplitude of vibrating particle.
2. Explain mechanical &non mechanical waves with examples.
3. Define longitudinal waves & transverse waves.
4. Define beat and beat frequency.
5. Obtain the relation between v, n andλ.
6. Define periodic motion & SHM with example in each.
7. Derive an expression for displacement of a particle executing SHM.
8. Define wave period, wave frequency, wave amplitude, wave length and wave velocity.
9. Distinguish between longitudinal & transverse waves.
10. Explain propagation of sound waves in air with practical example.
11. Describe Newton's formula for velocity of sound in air.
12. Explain Newton's formula for velocity of sound in air and hence Laplace correction to it.
13. Explain various factors affecting velocity of sound in air.
14. What is stationary wave? Mention the characteristics of stationary waves.
15. Why the soldiers are asked to break steps while marching across bridges.

PART- C (06 MARKS QUESTIONS)

1. Derive an expression for displacement of a particle executing SHM
2. Derive an expression for velocity of wave in terms of its frequency and wavelength.
3. Derive an expression for fundamental frequency of vibrations of stretched string.
4. Describe an experiment to determine the velocity of sound in air at room temperature by resonance air column method.
5. Describe an experiment to find the unknown frequency of the given tuning fork using sonometer by comparison method.
6. Describe an experiment to determine frequency of Turing fork by absolute method using sonometer.
7. A wave of frequency 600MHZ travels at a speed of $3x10^8$ m/s. Calculate itswavelength &calculate the frequency of same type of wave whose wavelength is 40m.
8. If the frequency of tuning fork is 500Hz & velocity of sound is 300m/s. Find how far sound travels while the fork completes 25 vibrations.
9. Calculate the velocity of sound in air at 25^0C & 75cm of mercury pressure, if thedensity of air at 0^0C & 76cm of mercury pressure is 1.29kgm^{-3}. (Given γ=1.41 for air).
10. Calculate the speed of sound at -50^0 C & at $+100^0$C, given speed of sound at 0^0c is 332m/s.

11. The density of air at NTP is 1.293 kgm^{-3}&γ=1.402. Calculate the frequency of a tuning fork which emits sound of wavelength 0.75m at 26^0 c.
12. A string of length 2m is stretched by a force of 3200N. If the frequency of vibration is 100Hz. Find the mass of the string.
13. A string has length of 0.3m & weight $2x10^{-3}$kg. What must be the tension in the string so that when vibrating string transversely, it has a fundamental frequency 320 Hz?
14. A Sonometer wire of 0.5m long vibrates in two segments & is stretched by a force of 5kg wt. Calculate the frequency of the note emitted. ($g=9.8m/s^2$ linear density of the wire=0.018kg/m).
15. The frequency of Sonometer wire is doubled when the tension is increased by 12kg wt.Find the original tension.

UNIT V: MODERN PHYSICS

PART – A (02MARKS QUESTIONS)

1. Define electromagnetic waves.
2. State two characteristics of electromagnetic waves.
3. Write how electromagnetic waves are produced?
4. Define electromagnetic spectrum.
5. Write any two uses of electromagnetic spectrum.
6. Write the principle of LASER.
7. List any two types of LASER.
8. Write any two principle of LASER.
9. Write any two applications of LASER.
10. Define nanotechnology.
11. Write two advantages of nanotechnology.
12. Write two disadvantages of nanotechnology.
13. Write what do you mean by communication?
14. Write the basic elements of communication system.
15. List any two commonly used terms in electronic communication system.
16. Write two advantages of communication satellite.
17. Write two disadvantages of communication satellite.
18. Define optical fiber.
19. Write the principle of optical fiber.
20. Write two advantages of optical fiber.

PART-B (05 MARKS QUESTIONS)

1. Describe the generation of electromagnetic waves.
2. Write any five properties of electromagnetic waves.
3. Explain how electromagnetic spectrum is classified?
4. Write any five applications of electromagnetic spectrum.
5. Explain the principleof LASER. List the properties of LASER.

6. Write any five advantages of LASER.
7. Write five advantages of nanotechnology.
8. Write advantages and disadvantages of nanotechnology.
9. Write the block diagram of communication system.
10. List any five commonly used terms in electronic communication system..
11. Write five advantages of satellite communication.
12. Write any five disadvantages of satellite communication.
13. Write any five advantages of optical fiber.
14. Explain satellite communication. List any two disadvantages of satellite communication system.

PART- C (06 MARKS QUESTIONS)

1. Define electromagnetic waves. Write four properties of electromagnetic waves.
2. Define electromagnetic spectrum. Explain how electromagnetic spectrum is classified.
3. Write the applications of electromagnetic spectrum.
4. List six applications of LASER.
5. Write six advantages of nanotechnology.
6. Write what you mean by communication system. Write the block diagram of communication system..
7. Define satellite communication system. Write four advantages of satellite communication system.

10.Write the principle of optical fiber.Write four applications of optical fiber.

UNIT VI INDUSTRIAL CHEMISTRY

PART – A (02MARKS QUESTIONS)

1.Define electrolysis.
2.Define electrolyte.
3.Write any four examples of electrolyte.
4.Define strong and weak electrolyte.
5.Write any two postulates of Arrhenius theory of electrolytic dissociation.
6.State Faradays Ist law of electrolysis.
7.State Faradays IInd law of electrolysis.
8.Define corrosion.
9.List any two preventive methods of corrosion.
10.Define batteries.
11.Write any two applications of batteries.
12.Define fuel cells.
13.Write any two types of fuel cells.
14.Write any two advantages of fuel cells.
15.Define minerals.
16.Define ore.
17.Define flux.

18.Define slag.
19.Define an alloy.
20.Write any two uses of alloys.
21.Define polymers.
22.Define polymerization.
23.Write any two applications of polymers.
24.List the methods of polymerization.
25. Define composite materials.
26.Write any two types of composite materials.
27.Write two advantages of composite materials.
28. Write two disadvantages of composite materials.
29.Define solute.
30.Define solvent.
31.Define solution.
32.Define saturated solution.
33.Define unsaturated solution.
34.Define concentration of a solution.
35.Define normal solution.
36. Define molar solution.
37.Define molal solution.
38.Define pH of a solution.
39.Write any two applications of pH.
40.Write hydrogen ion concentration in case of neutral solution.

PART-B (05 MARKS QUESTIONS)

1.Explain the mechanism of electrolysis of HCl.
2.Define corrosion. Write the necessary condition of corrosion.
3.Write any five postulates of Arrhenius theory of electrolytic dissociation.
4.State Ist and IInd Faradays laws of electrolysis.
5.Write any five preventive methods of corrosion.
6. Write the classification of batteries. Write two applications of batteries.
7. Write two types of fuel cells. List any three advantages of fuel cells.
8.Define alloys. Write the purpose of making alloys.
9. Write the classification of polymers. Write any three applications of polymers.
10.Define composite material. Write any two advantages of composite materials.
11. Calculate the concentration of solution when 110gmof copper sulphate is dissolved in 550gm of a solvent.
12. Define pH of a solution. Explain acid, base, and neutral solution on the basis of pH value.

PART- C (06 MARKS QUESTIONS)

1. State and explain Faradays laws of electrolysis?
2. Explain the mechanism of electrolysis of HCL.

3. Define corrosion. Write the necessary condition for corrosion.
4. Write any six preventive methods of corrosions.
5. Explain the electrochemical theory of corrosion.
6. Mention what is battery? Write the applications of batteries.
7. Define fuel cells. Mention the types of fuel cells.
8. Write the advantages of fuel cells.
9. Define minerals, ore, flux, slag and alloys?
10. Write the composition steel. List three uses of alloys.
11. Explain any two methods of polymerization.
12. Write the applications of polymers.
13. Write the advantages and disadvantages of composite materials.
14. Define molar and normal solution. What is concentration of a solution?
15 .Write any six applications ofpH.

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Government of Karnataka
Department of Technical Education, Bengaluru

Course: APPLIED SCIENCE

Course code: 15SC03S

Curriculum Drafting Committee 2015-16

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4	Dr. Hanumantha Nayak	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
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Curriculum Review Committee

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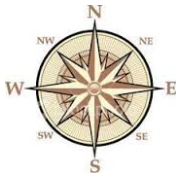
Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **SURVEYING - I**		
	Credits (L:T:P) : **4:0:0**	Total Contact Hours: **52**	Course Code: **15CE21T**
	Type of Course: **Lectures, Self Study & Quiz**	Credit **:04**	Core/ Elective: **Core**

Prerequisites: Knowledge of Basic Science and Mathematics in Secondary Education.

Course Objective:

1. To provide knowledge of basic Principles of surveying.
2. To develop the techniques of taking measurements and plotting the details.
3. Interpretation of data collected analyze and evaluate for the purpose of design, estimation

Course Outcome:

On successful completion of the course, the studentwill be able to:

Course Outcome	
CO1	Apply the knowledge of mathematics in surveying
CO2	Understand the basic principles of surveying
CO3	Conduct the survey, interprete data collected and prepare the drawings.
CO4	Analyse the data from the drawing and estimate the quantities
CO5	Present the case study using survey techniques and engage in lifelong learning.

Mapping of COs with Pos

Mapping of COs with Pos		PROGRAMME OUTCOME											
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Course Outcome	CO1	S	S										
	CO2	S	S				S						
	CO3	S	S	S	S		S	M	M	M		M	
	CO4	M	M	S	S		S		M	M		M	
	CO5	M	M	S	S	S	S	M	M	M	S	S	S

S: Strong Relationship M: Moderate Relationship

Course Contents:

UNIT	COURSE CONTENTS	HOURS	WEIGHTAGE OF MARKS
1	INTRODUCTION Definition and objectives of surveying, primary divisions, classifications, and principle.	2	30
	CHAIN SURVEYING Purpose, Accessories, Principles of chain surveying, Different operations, Ranging, Cross staff survey, Plotting the chain survey, adopting suitable conventions, Errors&corrections in chain surveying, Simple problems	10	
2	COMPASS SURVEYING Introduction and purpose, Bearing & its type, Problems on bearings, Compass and its type, Dip and declination, Simple problems, Local attraction, Open and closed traverse, checks, Errors	10	30
3	LEVELLING – Terms used in levelling, types of levels, Bench marks, Temporary adjustments of level Concept of B.S, I.S, F.S, C.P, H.I and remarks, Simple levelling and differential levelling Reduction of levels i) Plane of collimation method ii) Rise and fall methods Problems on reduction of levels.	10	30
4	LEVELLING – APPLICATION Different types of levelling - fly levelling, check levelling, profile levelling, cross sectioning, Plotting of longitudinal and cross section, Errors in levelling and precautions, Setting grade stakes and setting out grades for sewers and problems on it.	10	30
5	CONTOURING Concepts of contour and terms used in contouring, characteristics of contour, uses of contours, Methods of contouring , Interpolation by arithmetical method, calculation of capacity of the reservoir .	05	15
6	AREAS & VOLUMES Computation of Area of Irregular figures using Trapezoidal & Simpson's rule - problems. Volumes of Irregular solids- using Trapezoidal & Prismoidal Rule - Problems on Embankment & Cutting	05	10
7	CASE STUDY		

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Three tests (Average of three tests to be computed)	20	Blue books	1,2,3,4,5
				Case study	05	Reports	1 2 3 4,5
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3,4,5 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4,5 Effectiveness of Delivery of instructions & Assessment Methods

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1. Remembering and Understanding : - 30% weightage
2. Applying the knowledge acquired from the course : -30% weightage
3. Analysis : - 30% weightage
4. Evaluation : - 5% weightage
5. Creating new knowledge : - 5% weightage

TEXT BOOKS

1. Surveying and Levelling Vol- I & II by B C Punmia
2. Surveying and Levelling by T P konetkar & S V Kulkarni
3. Plane Surveying by Dr. Alak De
4. Surveying and Levelling by S SBhavikatti
5. Surveying by Duggal
6. Surveying by R Agor
7. Fundamentals of Surveying by S K Roy
8. Surveying and Levelling by N NBasak

E-links

1. www.elearning.com/survey
2. http://nptel.ac.in/video.php?subjectId=105104101
3. http://media.sakshat.ac.in/NPTEL-IIT-Videos/
4. http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
5. http://nptel.iitk.ac.in/

Model question paper

Code:**15CE21T**

Second Semester Diploma Examination

SURVEYING-I

Time: **3 hours]** **[Max**. Marks**: 100**

Note: 1. Answer any **SIX**questions from **Section-I**, Each question carries **5** marks
2. Answer any **SEVEN** questions from **Section-II**, Each question carries **10** marks

SECTION- I

1.Define surveying. State the objects of surveying.
2. With a neat sketch, explain stepping method of chaining on Sloping Ground.
3. Compare Prismatic compass with surveyors compass
4. At a place the bearing of sun is measured at local noon and found to be 175^0 15'. What is the magnitude and direction of magnetic declination of the place?
5. Define the following terms
   i) Level line ii) Parallax iii) change point
6. Explain the temporary adjustments of a Dumpy level
7. What are the uses of taking L/S & C/S?
8. What are the different sources of errors in levelling?
9. What is Contour interval? List the factors affecting it.

SECTION- II

1. a) What is Reconnaissance survey and state its importance?
   b) Differentiate between Check line and Tie line?
2. a) What is Cross staff survey? Mention its applications?
   b) A 30m chain was fond to be 10cm too long after chaining 1000m. Again chain wasfound to be 15cm too long after chaining another 500m. If the chain was correct before commencement of the work, find the true distance.
3. a) Compare WCB system and R.B. system.

b) Convert the following W.C.B to R.B
   i) 10^0 ii) $45^0$15' iii) $135^0$45' iv) $315^0$15' v) 215^0 15'

4. The following bearings were observed in running a closed traverse.

Line	Fore bearing	Back bearing
AB	75^0 05’	254^0 20’
BC	115^0 20’	296^0 35’
CD	165^0 35’	345^0 35’
DE	224^0 50’	44^0 05’
EA	304^0 50’	125^0 05’

At what station do you suspect local attraction? Determine the corrected bearings

5. Explain the special methods of spirit levelling.
6. a) Compare Rise & fall Method with Collimation method.

b) What are the different sources of errors in levelling?

7. In running Fly levels from a BM. Of RL. 384.705m the following readings were obtained :

   BS: 3.215, 1.030, 1.295, 1.855

   FS: 1.225, 3.290, 2.085

   From the last position of the instrument, Six pegs at 25.00m intervals are to be set out on a uniformly falling gradient of 1 in 100, the first peg is to have RL of 384.500m. Work out the staff readings required for setting the top of the pegs on the given gradient.
8. Four sight rails are to be erected over points A,B,C and D 50m apart in a straight line. The invert level of sewer at d is 74.500m. The sewer is on a gradient of 1 in 200 rising from D to A. The RL of pegs on the surface of ground are 76.300, 75.500, 74.850, and 75.650 respectively from A to D. The height of sight rail at d is 1.5m. find the suitable height of the boning rod and height of the sight rail above the pegs at A, B, and C
9. a) Mention any three uses of contour.

   b) The areas within the contour lines at the site of reservoir and face of the proposed dam are as follows.

Contour (m)	Area (m^2)
100	1000
103	128000
106	16600
109	18800
112	24400
115	30600
118	38400

   If 100.00m is the bottom level and 118.00m is the maximum water level of the reservoir, calculate the capacity of reservoir using trapezoidal formula and Prismoidal formula.
10. A road of constant RL 120.00m runs from North to South. The GL along the centre line of the road are as follows:

Chainage	R.L.
0	117.50
30	116.25
60	115.95
90	116.65

120	117.20
150	117.85
180	115.70

Assuming no transverse slope, find the volume of earth work for a road of formation width 8.00m with side slopes 1.5 :1 by;

i) Trapezoidal method ii) Prismoidal method

MODEL QUESTION BANK

Code**: 15CE21T**

Second Semester Diploma Examination

SURVEYING-I

1. Define surveying. State the objects of surveying
2. List the Principle of survey.
3. What are the uses of Survey
4. What is reconnaissance survey? State its importance in surveying.
5. Explain the following terms : a) Base line b) Check line c) Tie line
6. Explain with neat sketch indirect ranging
7. List the different methods of dropping perpendicular to a chainline. Explain any one
8. Briefly explain the classification of surveying based on the objects of survey
9. Differentiate between Check line and Tie line
10. State the use of Chain / tape, ranging rod, Peg, Arrows in chaining process.
11. Define Base line, Tie line and state their significance in chain Triangulation.
12. State the Procedure of setting Offsets with open cross staff.
13. What is Cross staff survey? Mention its applications
14. What are the cumulative and Compensating errors in chain survey
15. A 30m chain was fond to be 10cm too long after chaining 1000m. Again chain was found to be 15cm too long after chaining another 500m. If the chain was correct before commencement of the work, find the true distance.
16. Plot the following details of a field and calculate the area, all measurements being taken in metres.
17. Write the conventional signs for plotting survey works.
18. Briefly explain any five errors in chaining.
19. Explain the temporary adjustments of Compass.
20. Explain prismatic compass with a neat sketch
21. Explain i) True Bearing and Magnetic bearing ii) Dip and Declination
22. Compare Prismatic compass with surveyors compass
23. Differentiate between i) fore bearing and back bearing ii) closed traverse and open traverse
24. Convert the following fore bearing toBack. Bearing

    a) 125° 15’ b) N30° E c) 360° d) S45° 45’W e) N 25° 45’E

    Compare WCB system and R.B. systems

25. Convert the following W.C.B to R.B
    i) 10^0 ii) 45^0 15' iii) 135^0 45' iv) 315^0 15' v) 215^0 15'
26. Convert the following RB to WCB
    i) N 30° 15' W ii) N 45° 45' E iii) S 15° 15' W iv) S 2 5° 15' E
27. State any four instrumental and personnel errors in prismatic compass survey.
28. What is meant by local attraction? How it is detected and eliminated?
29. The following bearings were observed in running a closed traverse.

Line	Fore bearing	Back bearing
AB	75^0 05'	254^0 20'
BC	115^0 20'	296^0 35'
CD	165^0 35'	345^0 35'
DE	224^0 50'	44^0 05'
EA	304^0 50'	125^0 05'

At what station do you suspect the local attraction? Determine the corrected bearings

30. The following bearings were observed with compass. Calculate the interior angles.

Line	Fore bearing	Back bearing
AB	60° 30′	240^0 30'
BC	122^0 0'	302^0 0'
CD	46^0 0'	226^0 0'
DE	205^0 30'	25^0 30'
EA	300^0 0'	120^0 0'

31. What are the sources of errors in compass survey and what precautions will you take to eliminate them
32. At a place the bearing of sun is measured at local noon and found to be 175^0 15'. What is the magnitude and direction of magnetic declination of the place?
33. In an old survey made when the declination was 4^0W, the magnetic bearing of a given line was 210^0.The declination in the same locality is now10^0E. What is the true and present magnetic bearing of the line?
34. Define the following terms used levelling
    i) Level surface ii) level line iii) datum iv) elevation v) mean sea level vi) bench mark vii) station viii) HI ix) BS, IS, FS x) change point xi) parallax xii) line of collimation xiii Axis of telescope
35. Explain the temporary adjustments of a dumpy level?
36. What are the different types of levelling staff?
37. Comparison of HI method & Rise & Fall method of computing the levels?
38. Explain the special methods of spirit levelling.
39. What are the uses of taking L/S & C/S?
40. During the fly levelling operation the following observations were made :
    Back sight: 0.650, 2.155, 1.405, 2.655, 2.435
    Fore sight: 2.455, 1.305, 0.5555, 2.405

The first back sight was taken on a BM of RL 100.500m. From the last back sight it is required to set four pegs each at a distance of 30m on a falling gradient of 1 in 100. Calculate the RL of these four pegs. Apply the check.

41. Four sight rails are to be erected over points A, B, C and D 50m apart in a straight line. The invert level of sewer at d is 74.500m. The sewer is on a gradient of 1 in 200 rising from D to A. The RL of pegs on the surface of ground are 76.300, 75.500, 74.850, and 75.650 respectively from a to D. The height of sight rail at d is 1.5m. find the suitable height of the boning rod and height of the sight rail above the pegs at A, B, and C
42. The following consecutive readings were taken with a dumpy level: 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765. The first reading was taken with the staff held upon a BM of elevation 132.135. Enter the readings in level book form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points.
43. Calculate the reduce level by Rise and Fall method on a continuous sloping ground with four meter levelling staff at common interval of 30m.
0.855(onA),1.545,2.335,3.115,3.825,0.455,1.380,2.055,2.855,3.455,0.585,1.015, 1.850, 2.755,3.845 (on B);The reduced level of A was 380.500. Make the entries in a level book and apply usual checks. Determine the gradient of AB
44. Compare the Rise and fall method of reducing levels with the height of collimation method
45. What are the different sources of errors in levelling? How are they eliminated?
46. What is Contour? What are the uses of Contour maps?
47. Explain the characteristics of contours with sketches
48. What is Contour interval? List the factors affecting it.
49. Mention the methods of locating Contours. Explain the method of locating contour by cross-sections
50. What is interpolation of contours? Explain arithmetical method of interpolating contours
51. The areas within the contour lines at the site of reservoir and face of the proposed dam are as follows.

Contour (m)	Area (m^2)
100	1000
103	128000
106	16600
109	18800
112	24400
115	30600
118	38400

If 100.00m is the bottom level and 118.00m is the maximum water level of the reservoir, calculate the capacity of reservoir using trapezoidal formula and Prismoidal formula.

52. A road of constant RL 120.00m runs from North to South. The GL along the centre line of the road are as follows:

Chainage	R.L.
0	117.50
30	116.25
60	115.95
90	116.65
120	117.20
150	117.85
180	115.70

Assuming no transverse slope, find the volume of earth work for a road of formation width 8.00m with side slopes 1.5 :1 by;

ii) Trapezoidal method

iii) Prismoidal method

	Course Title:ENGINEERING DRAWING-II		
	Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE22D**
	Type of Course: **Tutorialand Drafting**	**Credit :03**	Core/ Elective: **Core**

(*(Common to all Civil/Civil (Draughtsman/Environmental/Public Health Engineering/Water Technology and Health Sciences Programme)*****

Prerequisites: Student should know Engineering Drawing-I

Course Objectives

1. The course is aimed at developing Basic Drawing skills.
2. Develop Skills in Preparation of Engineering Drawings.
3. Develop Skills In Preparation of Engineering Drawings, their Reading and Interpretation

Course Outcomes

On successful completion of the course, the students should be able to:

	Course Outcome
CO1	Draw Orthographic views of given Civil Engineering Objects.
CO2	Develop the ability to draw the isometric view from the orthographic views of a given Building Components and vice versa.
CO3	Develop the perspective views for simple Civil Engineering components
CO4	Understand the concept of developing cross sections for Building components.
CO5	Develop Plan and Elevation for single and two room Buildings for sustainable development

Mapping of COs with POs

Mapping of COs with Pos		Programme Outcome											
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
		Engineering Knowledge	Problem Analysis	Design and Development of Solution	Investigation of problems	Modern Tool Usage	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning	Project management and finance
Course Outcome	**CO1**	S	S				S		S		S		
	CO2	S	S				S		S		S	S	
	CO3	S	S				S		S		S		
	CO4	S	S				S		S		S		
	CO5	S	S	S			S		S		S		S

Key: S-Strong Relationship **M**-Moderate Relationship

Course Contents

UNITS	COURSE CONTENTS	HOURS
1	**PROJECTION OF SOLIDS** Introduction-Positioning of solids –Solid lying with base on HP- Solids lying with base or axis inclined to HP- Solids lying with one of the lateral faces on HP-Solids lying with one of their lateral edges on HP-Cylinder lying with its axis or base inclined to HP- Cone lying with its axis or base inclined to HP -Solid lying with their axis inclined to both HP and VP.	**15**
2	**CONVERSION OF ISOMETRIC VIEWS INTO ORTHOGRAPHIC VIEWS** Introduction – Guidelines for conversion of pictorial views into orthographic views-Illustrative problems.	**06**
3	**ISOMETRIC VIEWS** Principles of isometric Views Isometric views of simple solids – cube – prisms, pyramids, cylinder and cone . Conversion of orthographic views into isometric View Drawing of Isometric views of combination of solids , Civil Engineering components i.e. column footing, carpentry joints	**15**
4	**PERSPECTIVE PROJECTIONS** Technical terms used in perspective projection- one point Perspective projection and two point perspective projection for simple objects like Cube, Prism, Pyramids, combination of solids and simple civil engineering objects,.	**12**
5	**CROSS SECTION OF BUILDING COMPONENTS** Conventional Representation of Civil Engineering materials. Cross section of Wall showing components of a Building from parapet to foundation through door, window, wardrobe, wall, steps & columns.	**09**
6	**BUILDING DRAWING** Draw Plan, Elevation and Section for Single ,Double Room Building and Three Room Building form the given line Diagram and Building details.	**21**
	Total	**78 Hrs**

TEXT BOOK

1. K.R.Gopalakrishna "Fundamentals of Drawing" Subhas Publications, 2010.
2. K.R.Gopalakrishna "Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, "A text book of Engineering Drawing", S.ChandPublishers, Delhi, 2010.
2. G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited,2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
5. DhananjayA.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGraw Hill Publishing Company Limited, 2008.
6. BasantAgarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. IS 962 (1989) Code of practice for Architectural and Building Drawings

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Graded Exercises (Average of marks allotted to each graded exercise)	25	Drawing Sheets	1,2,3,4,5
	SEE	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3 ,Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,Effectiveness of Delivery of instructions & Assessment Methods

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1. Remembering and Understanding : - 20% weightage
2. Applying the knowledge acquired from the course : - 65 % weightage
3. Analysis : - 10% weightage
4. Evaluation : - 2% weightage
5. Creating new knowledge : - 3% weightage

Weightage of Marks

Unit No	Unit Name	Hour	Questions to be set for (10marks) PART - A	Questions to be set for (15marks) PART - B
I	PROJECTION OF SOLIDS	15		02 (30 Marks)
II	CONVERSION OF PICTORIAL VIEWS INTO ORTHOGRAPHIC VIEWS	06	01 (20 Marks)	
III	ISOMETRIC PROJECTIONS	15		02 (30 Marks)
IV	PERSPECTIVE PROJECTIONS	12		01(15 Marks)
V	CROSS SECTION OF BUILDING COMPONENTS	09	02 (20 Marks)	
VI	BUILDING DRAWING	21		01(35 Marks)
	Total	78	03 (30Marks) Any 2	05 (75Marks) Any 3
				01 (35 marks)

GRADED EXERCISES

UNIT NO	NAME OF THE UNIT	SHEETS	TITLE OF THE DRAWING	MINIMUM NO OF EXERCISE
I	PROJECTION OF SOLIDS	5	Projection of solids	20
II	CONVERSION OF ISOMETERIC VIEWS INTO ORTHOGRAPHIC VIEWS	3	Isometric projections	15
III	ISOMETRIC PROJECTIONS	5	Isometric projections	20
IV	PERSPECTIVE PROJECTIONS	4	Perspective projections	16
V	CROSS SECTION OF BUILDING COMPONENTS	3	Cross section of building components	15
VI	BUILDING DRAWING	6	Building drawing	10
	TOTAL	**26**		**96**

Model Question Paper

Code: **15CE22D**

II semester Diploma Examination

ENGINEERING DRAWING-II

Time: 4 Hours][Max. Marks: 100

Note: Answer Any Three full questions from Part-A, Any 3full Questions from Part B&Part C is compulsory.

Part –A(Any Two)

1. Draw the three principal views of the component as shown in the figure 1 10 marks

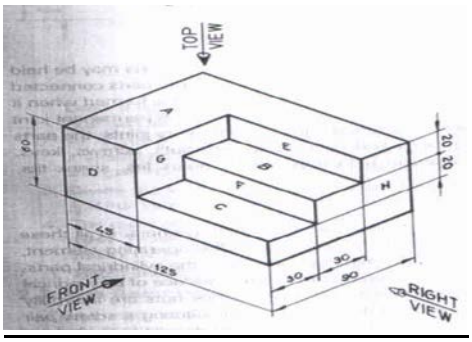


Fig-1

2. Draw the three principal views of the component as shown in the figure2

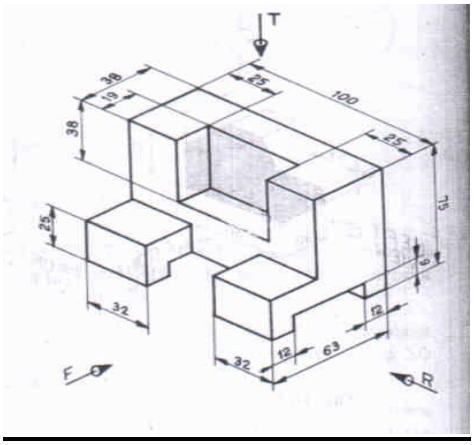


Fig.2

3.Show the conventional representation of Building materials in Section (IS: 962)10 marks
(a) Brick Masonary (b) Stone Masonary (c) Steel works (d)Wood

PART-B(Any Three)

4. An equilateral triangular prism 30 mm side of base and 50mm long rests with one of its shorter edge on HP such that rectangular face containing the edge on which the prism rests is inclined at 30^0 to HP. The edge on which the prism rests is inclined at 60^0 to VP. Draw its projections. 15marks

5. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections of the solid in its final position.
15marks

6. Draw the isometric view of the following objects whose orthographic views are given Fig 3
15 marks

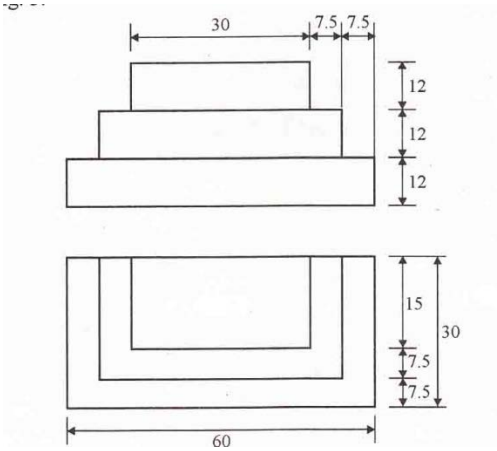


Fig-3

7. Draw the isometric view of the following objects whose orthographic views are given Fig 4

15marks

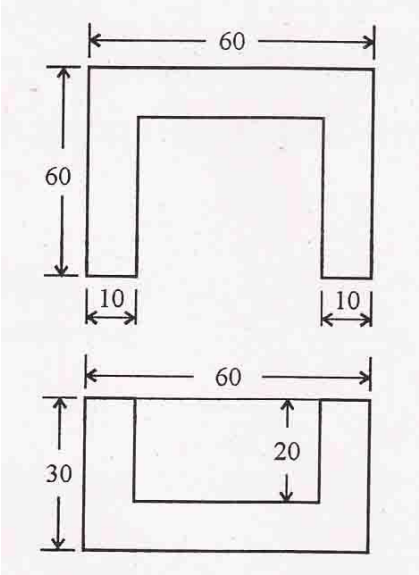


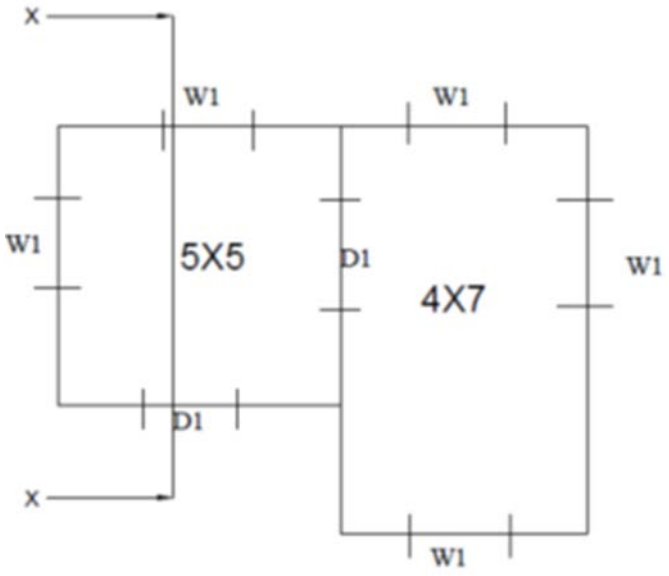
Fig-4

8. A Square based prism of 30mm side of base and height 50mm rests with its base and height 50mm rests with its base on ground such that one of the rectangular faces is touching the picture plane. The station point lies on the center line of the object, 60mm aboveground and 50mm in front of the picture plane. Draw the perspective view of the square prism.
15 marks

PART- C(Compulsory)

9.The Line Diagram of a Two room building is shown in Fig 5.The Details and specification are as follows. 35 Marks

(a) Level of Plinth above ground - 0.5m
(b) Height of ceiling from the floor- 3m
(c) Burnt Brick Masonry wall Thickness of wall 0.3m
(d) Doors 1.0mX 2.1m
(e) Windows 1.2mX1.2m
(f) RCC Roof 0.15m thick
(g) Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
(h) Provide suitable Foundation of Size Stone Masonry



Draw to a scale of 1:50

(i)	Plan of the Building and	15Marks
(ii)	Front Elevation of the Building.	10Marks
(iii)	Section along xx	10 Marks

MODEL QUESTION BANK

Course: **ENGINEERING DRAWING-I**Code: **15CE22D**

UNIT-I (15 Marks)

1. A hexagonal pyramid, base 30mmside and axis 60mm long has one of its triangular face containing the slant edge on which it rests are equally inclined to HP. The axis appears to be inclined at 45^0 to VP. Draw its projections when its base is nearer to the observer than its apex.

2. Draw the projection of a pentagonal prism of base side 25mm and axis length 45mm resting on a corner such that the two base edges passing through it make equal inclination with HP and its base inclined at 60° to HP and the axis appears to be inclined at 30° to VP in the top view.

3. An equilateral triangular prism 30 mm side of base and 50mm long rests with one of its shorter edge on HP such that rectangular face containing the edge on which the prism rests is inclined at 30^0 to HP. The edge on which the prism rests is inclined at 60^0 to VP. Draw its projections.

4. A cone of base diameter 50mm and altitude 70mm is lying with one of its generators on HP and the axis appears to be inclined to VP at an angle of 40^0 in the top view. Draw its top and front views.

5. A Hexagonal prism of 30 mm side of base and axis 60mm long is placed with one of its base edges on HP such that the axis is inclined at 35^0 to HP and 45^0 to VP. Draw its projections.

6. A Pentagonal pyramid 25mm side of base and 50mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which rests make equal inclinations with HP. The axis is inclined at 50^0 to VP and 30^0 to HP. Draw the top and front views of the pyramid.

7. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45^0 to HP and 30^0 to VP. Draw the top and front views of the cone.

8. Draw the top and front views of a right cylinder of base 50mm diameter and 70mm long when it lies on HP, such that its axis is inclined at 30^0 to HP and axis appears to be perpendicular to VP in the top view.

9. An equilateral triangular prism of base side 25mm and 50mm long rests with one of the its shorter edges on HP so that the rectangular face containing the edge on which the prism rests inclined at 30° to the HP. The edge on which the prism rests is inclined at 60° to the VP. Draw its projections.

10. A pentagonal prism of base edge 30mm and 60mm long has its base edge on HP. The axis of the prism is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the top view and the front views of the prism.

11. A hexagonal prism of 30mm base edge and axis 60mm long is placed with one of its base edges on HP so that the axis is inclined at 30° to HP and the axis appears to be inclined at 45° to VP. Draw the projections when the base of the prism is nearer to the observer.

12. A square prism of base edge 40mm and 60mm long rests with one of its corners of the base so that the longer edge passing through this corner is inclined at 40° to the HP. Draw the projections if the axis appears to be inclined at 45° to the VP in the top view.

13. A square pyramid of base edge 40mm and 60mm long has one of its shorter edges on HP. The axis of the pyramid is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the projections if the apex is near to the observer.

14. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections.

15. A cone of base diameter 50mm and axis 80mm lies on HP with its axis inclined at 45° to HP and appears to be inclined at 30° to the VP in the top view. Draw the top and front views of the cone.

16. A right cylinder is 50mm diameter of base and height 70mm. It rests such that the axis is inclined at 30° and 45° to HP and VP respectively. Draw the top and front views.

17. A cone of base 80mm diameter and height 100mm is lying with one of its generators on HP and its axis appears to be inclined at 40° to VP in the top view. Draw its front and top views.

18. Draw the projections of a pentagonal prism 20mm side of base and axis 40mm long resting on a corner such that two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP, and the axis appears to be inclined at 30° to VP in the top view.

19. Draw the top and front views of a rectangular pyramid of sides of base 20x25mm and height 35mm when it lies with one of its triangular faces containing the longer edge of the base on HP. This longer edge of the base containing the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid nearer to VP.

20. A pentagonal pyramid 20mm side of base of 35mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid.

21. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its slant edges on HP such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.
22. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° and 30° with HP and VP respectively. Draw the top and front views of the cone.

23. Draw the top and front views of a right cylinder of base 45mm diameter and 60mm long when it lies on HP, such that its axis is inclined at 30° to HP and the axis appears to be perpendicular to the VP in the top view.

UNIT-2(10 MARKS)

1. Draw the three principal views of the component as shown in the figure.

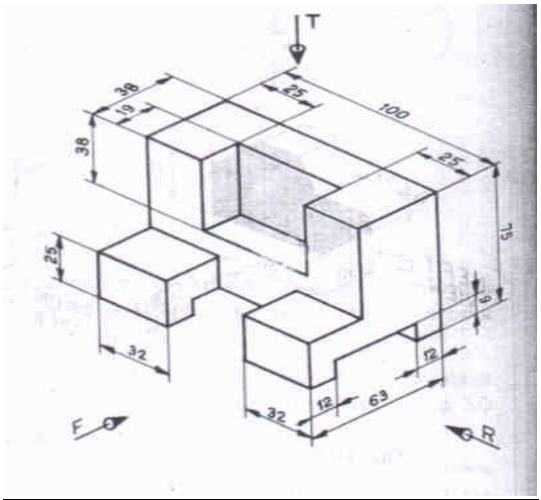


Fig-1

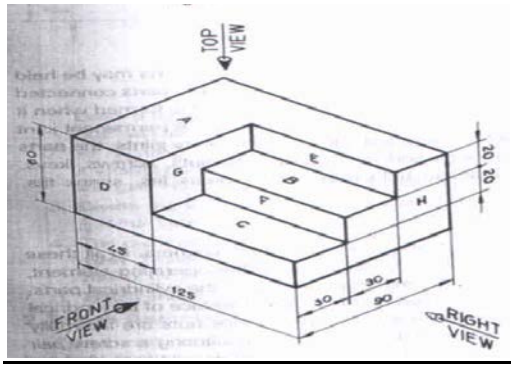


Fig-2

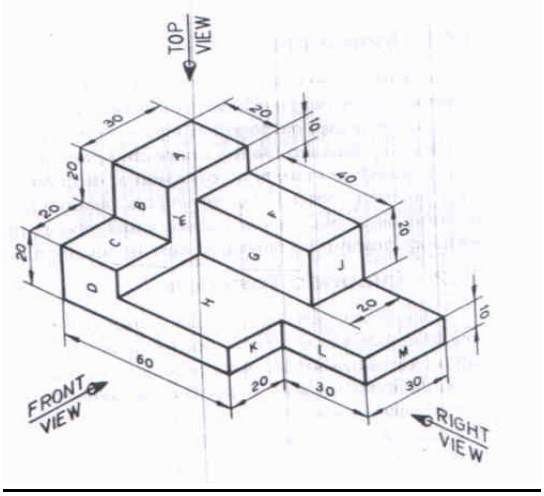


Fig-3

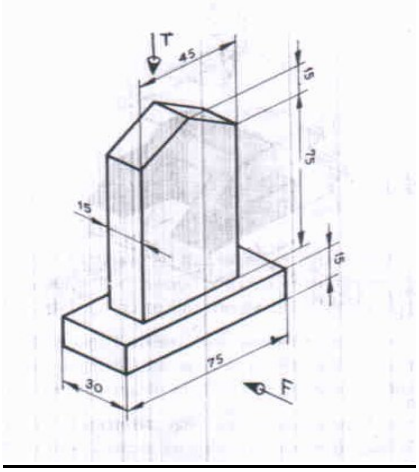


Fig-4

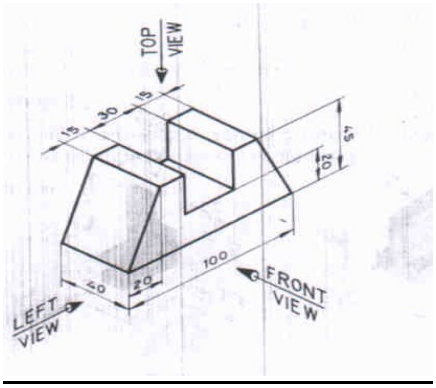


Fig-5

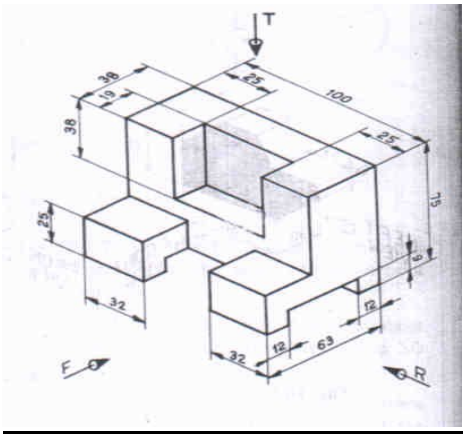
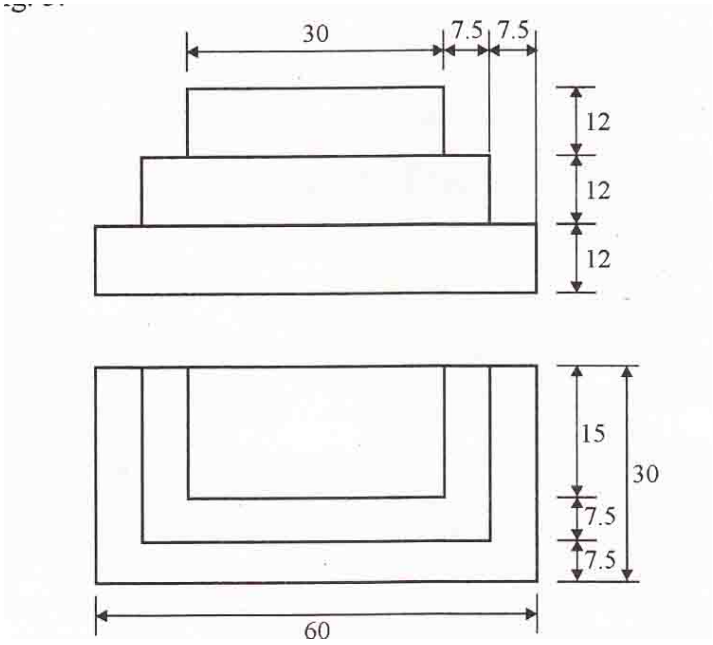


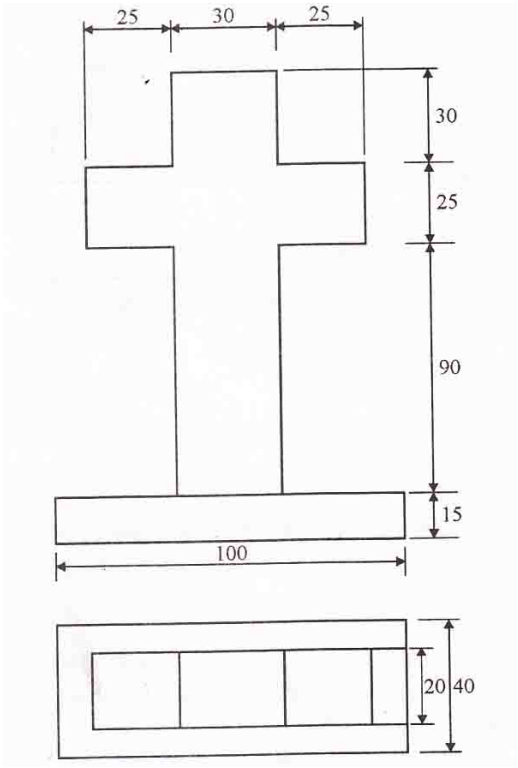
Fig-6

UNIT-3 (15 Marks)

1. Draw the isometric view of the following objects whose orthographic views are given below:



2. Draw the isometric view of the following objects whose orthographic views are given below:



3. Draw the isometric view of the following objects whose orthographic views are given below:

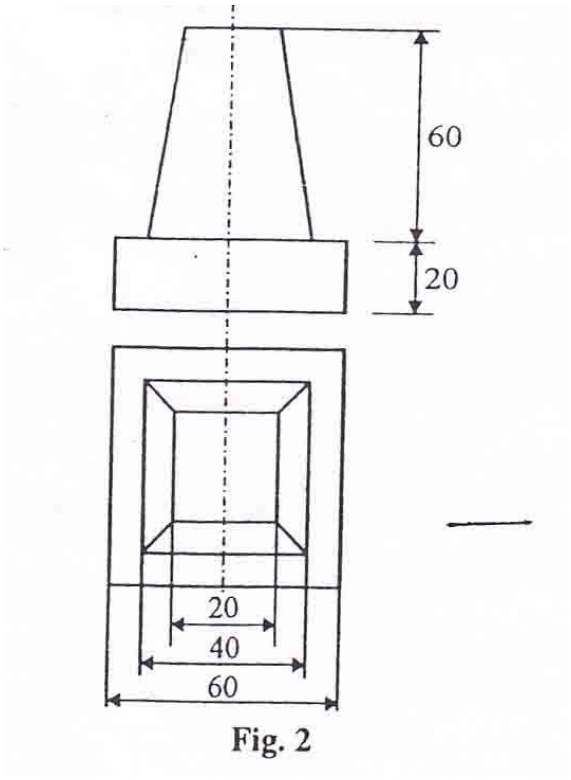


Fig. 2

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4. Draw the isometric view of the following objects whose orthographic views are given below:

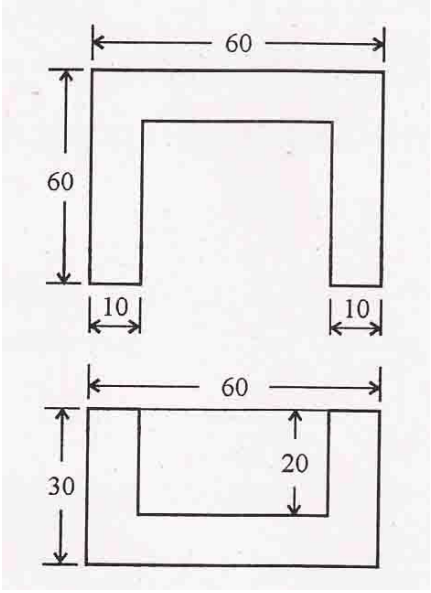


Fig-1

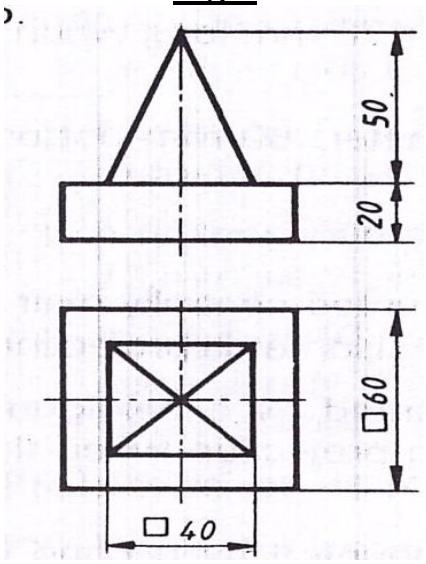


Fig-2

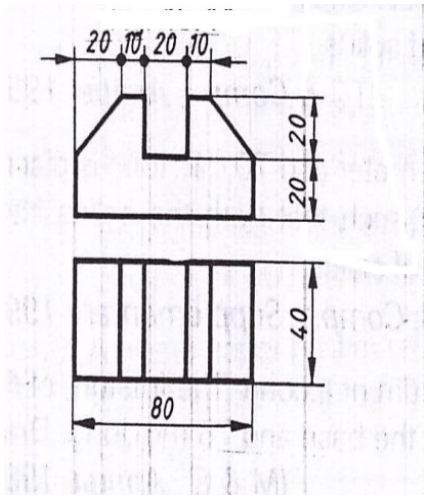


Fig-3

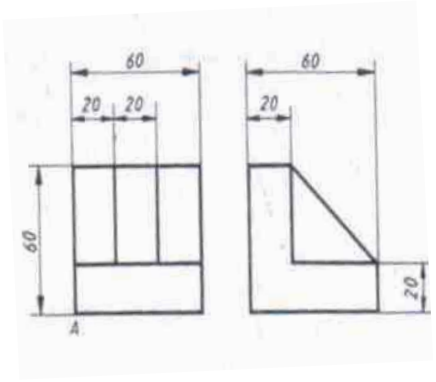


Fig-4

5. A Circular column of side 40mm and height 50mm is placed centrally on a square footing of side 100mm and thickness 25mm. Draw the Isometric projections of the combination

6. A Cube of side 50mm is resting coaxially over a circular slab of diameter 100mm and thickness 30mm.Draw the isometric view of the combination of the solid.

7. A cone having diameter of the base 60mm and height 70 mm is resting co- axially on the square slab of side 100mm and thickness 40mm. Draw the isometric view of the combination of the solid.

8. A cylinder of 50mm diameter and 50mm high is placed centrally on the rectangular footing of sides 75mm and 100mm and thickness 25mm. Draw the isometric projections of the arrangement.

9. A frustum of a cone 30mm top diameter and 60mm bottom diameter and 70mm long is placed vertically on a square block of 80mm side and 30mm thick such that both the solids have common axis. Draw the isometric of the combination of the solids.

10. A cylindrical slab 100mm diameter and 40mm thick is supporting a cube of 50mm edge. On the top of the cube rests a square pyramid of altitude 55mm and side of base 30mm such that the base edges of the pyramid are parallel to the edges of the top face. The axes of the solids are in the same straight line. Draw the isometric projection of the combination of the solids.

11. A square pyramid of base edge 50 mm and height 80 mm rests on the top of the cube of side 100 mm. Two sides of the base of the pyramid are parallel to the top edges of the cube. Draw the isometric view of the solid.

12. Three cubes of sides 60mm,40mm and 20mm are placed centrally one above the other. Draw the isometric projections of the combination.

UNIT-IV (15MARKS)

1. A Square based prism of 30mm side of base and height 50mm rests with its base and height 50mm rests with its base on ground such that one of the rectangular faces is touching the picture plane. The station point lies on the center line of the object, 60mm aboveground and 50mm in front of the picture plane. Draw the perspective view of the square prism.

2. A Cube of side 50mm side rests with its base on ground such that one of the square face is 20 mm behind the picture plane. The station point lies on the centerline of the object, 80mm above ground and 75mm in front of the picture plane.

3. A rectangular based pyramid of sides of base 30mm and 20mm, and height 35mm rests with its base edges in parallel to the picture plane and 30mm behind it. The station point is 50mm in front of the picture plane, 30mmto the left of the axis of the pyramid and 50mm above the ground. Draw the perspective view of the pyramid.

4. A model of steps has three steps of 15mm tread and rise 10mm. The steps measure 60mm widthwise. Draw the perspective view of the model when placed with its first step 25mm behind the picture plane and longer edge being parallel to it. The station point is 95mm from the picture plane, 60mm above ground and lies on the center line.

5. Draw one point parallel perspective view of the block shown below. The station point is located at 80mm to the right of the centre of the block and 100mm from the picture plane. The observers eyelevel is 60mm above the ground level.

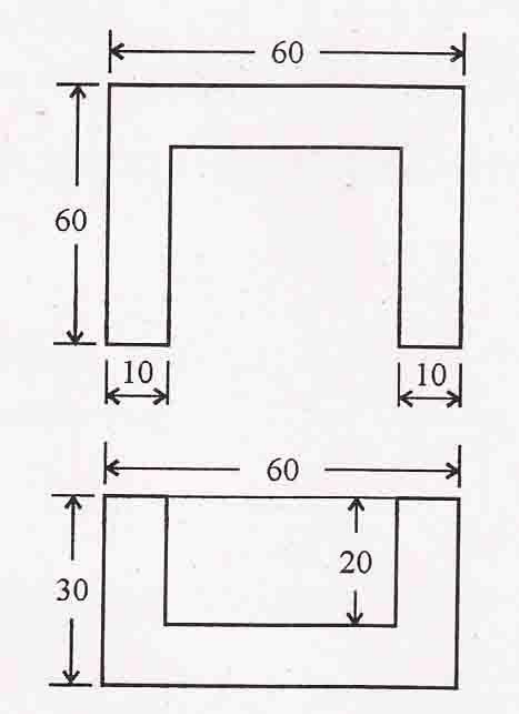


Fig-1

6. Draw the perspective view of a cube 25mm edge, resting on ground on one of its faces. It has one of its vertical edges in the picture plane and all its vertical faces are equally inclined to the picture plane. The station point is 55 mm in front of the picture plane. The station point is 55mm in front of the picture plane, 40mm above the ground and is in a central plane 9mm to the left of the centre of the cube.

7. A Square prism of 30mm side of base and height 40mm rests with its base on ground such that one of the rectangular faces is inclined at 30^0 to the picture plane. The nearest vertical edge touches the picture plane. The station point is 45mm infront of the picture plane, 65mm above ground and lies opposite to the nearest vertical edge that touches the picture plane. Draw the perspective view.

8. A cube of 45mm side of base rests on ground such that one of the square face is inclined at 25^0 to the picture plane. The nearest vertical edge touches the picture plane. The station point is 65mm in front of the picture plane, 85mm above ground and lies opposite to the nearest vertical edge that touches the picture plane. Draw the perspective view.

9. Draw one point perspective view of the block shown below. The station point is located at 80mm to the right of the centre of the block and 100mm from the picture plane. The observers eye lebvel is 60mm above the ground level.

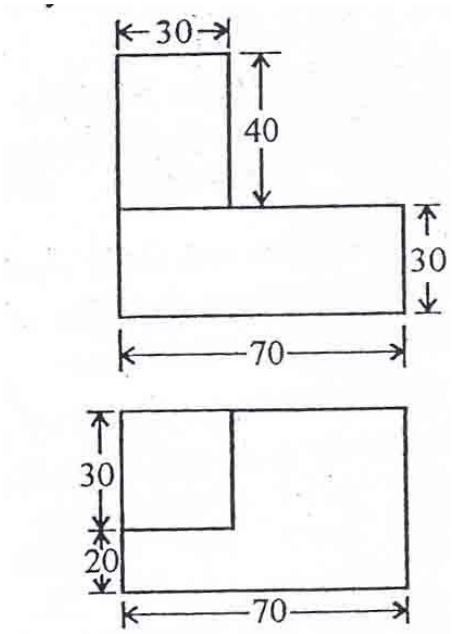


Fig-2

10. Draw the two point perspective view of the model shown in fig3 when its right touches picture plane and its longer side makes an angle of 30^0 with it. The station point is 100 mm in front of the picture plane and exactly opposite to the vertical edge touching the picture plane and the point of the sight is 120mm above the ground.

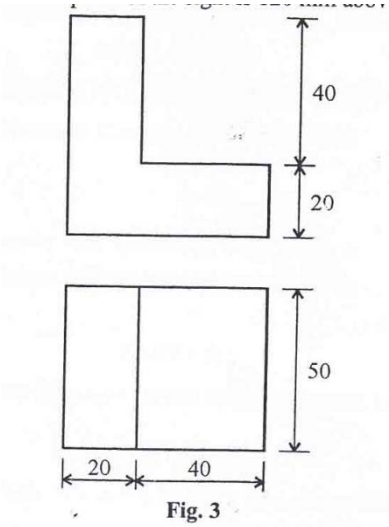


Fig. 3

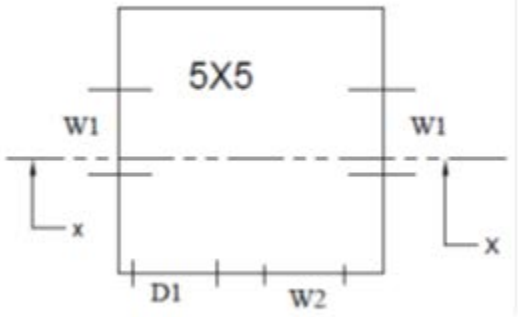
UNIT-V (10 Marks)

1. Show the conventional representation of Building materials in Section (IS: 962)

2. Draw the cross section of wall from foundation to parapet for the given details.

UNIT-VI (35 Marks)

1. The Line Diagram of a Single room building is shown in Fig 1.The Details and specification are as follows.
   (a) Level of Plinth above ground - 0.5m
   (b) Height of ceiling from the floor- 3m
   (c) Burnt Brick Masonry wall Thickness of wall-0.3m
   (d) Doors 1.0mX 2.1m
   (e) Windows 1.2mX1.2m
   (f) RCC Roof 0.15m thick
   (g) Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
   (h) Provide suitable Foundation of Size Stone Masonary



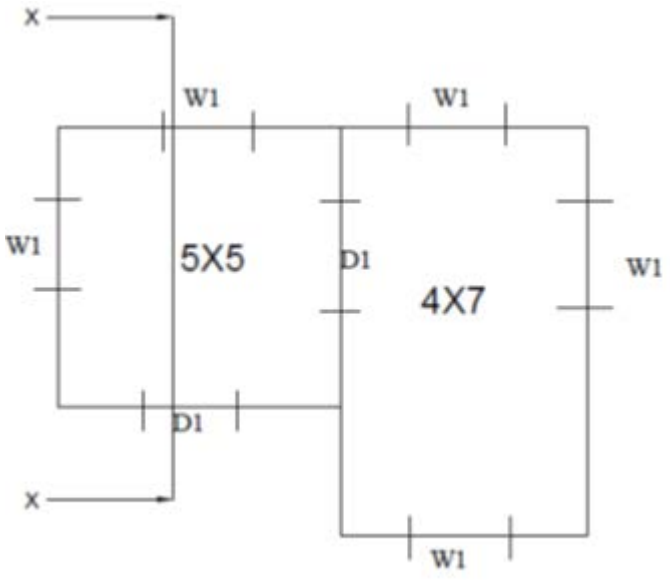
All Dimensions in Metre

.

Draw to a scale of 1:50
   (i) Plan of the Building and
   (ii) Front Elevation of the Building.
   (iii) Section along xx

2. The Line Diagram of a two room building is shown in Fig 2.The Details and specification are as follows.

   (a) Level of Plinth above ground - 0.5m
   (b) Height of ceiling from the floor- 3m
   (c) Burnt Brick Masonry wall Thickness of wall- 0.3m
   (d) Doors 1.0mX 2.1m
   (e) Windows 1.2mX1.2m
   (f) RCC Roof 0.15m thick
   (g) Parapet wall of Burnt Brick Masonry 1m height of 0.2m thick.
   (h) Provide suitable Foundation of Size Stone Masonary



All Dimensions in Metre.

Draw to a scale of 1:50

(i) Plan of the Building and

(ii) Front Elevation of the Building.

(iii) Section along xx

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title	: **APPLIED SCIENCE LAB**	Course Code	: **15SC04P**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme in Hrs (L:T:P)	: **0:2:4**	Credits	: **3** Credits
Type of course	: **Tutorial & Practical**	Total Contact Hours	: **78**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programme	: **Common to all Engineering Diploma Programmes**		

Prerequisite:

Applied Science theory in the current semester.

Course objective:

1. Learn to measure different dimensions of objects accurately using measuring instruments.
2. Enhance the vectorial concepts of concurrent forces.
3. Learn the concepts of properties of fluids.
4. Enhance the practical concept of resonance.

Experiments:

PART- A

1. **Vernier Calipers**:

a) To determine the dimensions of given solid cylinder and hence calculate its volume.
b) To determine the dimensions of given hollow cylinder and hence calculate its volume

Activity: To calculate the density of material of given solid/hollow cylinder knowing its volume and mass.

2. **Screw Gauge**:

a) To determine the thickness of given metal and glass plate.
b) To determine the diameter of given thin wire and hence to calculate its volume.
c) To determine the diameter of given metallic sphere and hence to calculate its volume.

Activity: 1. To calculate volume of such half meter length wire.
2. To calculate volume of such number (50 or 75etc) of spheres.

3. Laws of concurrent forces:

a) Verify the law of parallelogram of forces.
b) Verify the converse law of triangle of forces.
c) Verify Lami's theorem.

Activity: To determine the weight of given body using law of parallelogram of forces.

4. Moment bar:

To verify the conditions of equilibrium of coplanar parallel forces acting on a body.

Activity: To determine the weight of given body using moment bar.

PART-B

5. Viscosity:

a) To determine the co-efficient of viscosity of water by poiseuille's method (for a given radius of capillary tube)

Activity: To plot a graph of **ht** versus **V** and to find ht/**V** from slope.

6. **Sonometer**:

a) To determine the frequency of given tuning fork by comparison method.
b) To determine the frequency of given tuning fork by absolute method.

Activity: 1. Plot a graph of 'n' versus 'l' from the graph, find the frequency unknown Tuning fork
2. Plot a graph of $\sqrt{T}$ versus 'l' from the slope of graph find $\sqrt{T}$/l
3. To calculate linear density 'm' by knowing $\sqrt{T}$/l and 'n'

7. Resonance:

a). To determine the velocity of sound in air at room temperature by using resonance air column apparatus. (for single resonating length)

Activity: 1. To calculate velocity of sound in air at 0^0 C.
2. To determine the unknown frequency of tuning fork.

8. **Surface Tension**:

a) To determine the Surface Tension of water by capillary rise method using Travelling Microscope. (radius of capillary tube is given)

Activity: Calculate radius of the capillary tube by knowing the surface tension of the liquid and height of liquid column in capillary tube.

9. Boyle's law:

a) To verify Boyle's law using Boyle's law apparatus.

Activity: 1.To plot a graph of pressure versus volume
2. To plot a graph of 1/pressure versus volume.

Course outcome:

On successful completion of the course, the student will be able to:

1. Measure the various dimensions of given objects using instruments.
2. Apply the vector concepts in engineering.
3. Apply the acquired knowledge of fluid dynamics in the field of engineering.
4. Apply the concepts of wave motion in engineering.

Mapping Course Outcomes with Program Outcomes:

Course outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
1	S	M							M			
2	S	S							M			
3	S	M							M			
4	S	S							M			

S: Strong relationship **M: Moderate relationship**

Course Assessment and Evaluation:

	What		To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	CIE (Continuous Internal Evaluation)	I A Tests	Students	Two IA tests for Practical (Average of Two Test marks will be computed)	10	Blue Books	1 to 4
		Record Writing		Record Writing (Average of Marks allotted for each expt.)	10	Record Book	1 to 4
		Class room Assignments		Two Assignments (Average of Two Assignments to be computed)	05	Log of Activity	1 to 3
				TOTAL	25		
	SEE (Semester End Examination)	End Exam	Students	End of the Course	50	Answer Scripts at BTE	All the CO's
Indirect Assessment	Student Feedback on course		Students	Middle Of The Course	Feedback forms		1 to 2 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 4 Effectiveness of delivery of instructions and assessment

Note: I.A. test shall be conducted as per SEE scheme of valuation. However the obtained marks shall be reduced to 10 marks. (Any decimals shall be rounded off to next higher digit).

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering and Understanding	15
2	Applying the knowledge acquired from the course	20
3	Analysis	25
4	Evaluation	30
5	Creating new knowledge	10

Reference Books:

1. Practical physics by pro. J.D. Belani and N.J. Belani. Published by Nebhandas Hiranand.
2. Practical physics by C.L. Arora. Published by S. Chand and company.
3. www.jac production.co.za

Model Question Bank:

Course: APPLIED SCIENCE LAB Course Code: **15SC04P**

PART- A

1. Determine the dimensions of given Solid Cylinder using Vernier Caliper and hence calculate its volume.
2. Determine the dimensions of given Hollow Cylinder using Vernier Caliper and hence calculate its volume.
3. Determine the thickness of given metal and glass plate using screw gauge.
4. Determine the diameter of given thin wire using screw gauge and hence, to calculate its volume.
5. Determine the diameter of given metallic sphere using screw gauge and hence, calculate its volume.
6. Verify the law of parallelogram of forces.
7. Verify the converse of triangle law of forces.
8. Verify lami's theorem.
9. Verify the conditions of equilibrium of coplanar parallel forces using Moment bar.

PART- B

10. Determine the coefficient of viscosity of water by Poiseuille's method
    (For a given radius of capillary tube)
11. Determine the frequency of given tuning fork by comparison method using sonometer.
12. Determine the frequency of given tuning fork by absolute method using sonometer.
13. Determine the velocity of sound in air at room temperature by using resonance Air column Apparatus.
14. Determine the Surface Tension of water by capillary rise method.
    (For a given radius of capillary tube)
15. Verify Boyle's law using Boyle's law apparatus.

Scheme of Valuation for SEE (Semester End Examination)

Sl. no.	Performance	Max. Marks
1	Writing Observation, Tabular column, formula.	05x2=10
2	Conduction of experiment.	10x2=20
3	Calculation and Result.	05x2=10
4	Viva Voce.	10
	TOTAL	**50**

Note: The students will submit record books at the time of semester end exam.

Guidelines for Question Paper Setting

The question paper must be prepared by selecting **ONE** experiment from **PART – A** and **ONE** question from **PART – B**.

Specification of the Apparatus Required for Applied Science Lab

The following are the specification of the apparatus required for science lab, and number of apparatus required for the batch of 20 students.

Sl. No.	Name of the Apparatus	Specification	Required Number
1	Vernier calipers	With L.C 0.01cm having Metallic scale marked in cm, with objects :solid cylinder &hollow cylinder	10
2	Screw gauge	U-Shaped metallic frame with L.C 0.01mm with objects :glass plate, metal plate, thin wire and metallic sphere	10
3	Law of concurrent forces apparatus	Vertical Drawing Board fixed with pulleys. Weights 50g each with weight hangers set	10

4	Moment bar	Having two vertical metallic stands, two spring balances measuring up to 500 g . horizontal bar.	10
5	Surface tension apparatus	Traveling microscope, having L.C 0.005cm, both horizontal and vertical movement of telescope, eye piece with fine cross-wire, slow moving stand, beaker, with capillary tube	10
6	Viscosity apparatus	Aspiratory bottle, cork, capillary tube, stopwatch, measuring jar. With stand to keep Aspiratory bottle	10
7	Boyle's law apparatus	*Wide bore glass tube mounted vertically in front of a scale graduated 0 to 60cm* *Zero corresponds to the inside of the closed (top) end of the tube* *Air is confined in the tube by a coloured oil contained in a metal pressure chamber* *Pressure chamber is fitted with a Bourdon type gauge calibrated 0 to 3.5kg cm² (0 to 50 lb/in²) actual pressure* *A valve is fitted to the air inlet tube from the pump* *As the pressure in the oil chamber is increased, oil level and its actual (total) pressure are directly indicated* *Tube is made of extra strong glass and is securely covered with transparent plastic on the front* *Overall height of apparatus approx. 690mm*	05
8	Sonometer	Wooden box fixed with meter scale, pulley, metallic string, weight with weight hanger (500g each)	10
9	Resonance air column apparatus	Consists of a resonance tube brass N.P. 100cms, reservoir brass N.P. 250ml & meter scale both sides millimeters, which are mounted on	10

		wooden polished board. The reservoir is caged in wooden block that has sliding facility.	
10	Electronic balance	0.1g accuracy 500g capacity	01
11	Tuning fork set	Set of eight tuning forks of different frequency blue steel(Ragg's type)	06

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Government of Karnataka
Department of Technical Education, Bengaluru

Course: APPLIED SCIENCE LAB

Course code: 15SC04P

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Mr. R B Pawar	Principal	Govt. Polytechnic, Bijapur
2	Mr. K. Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
3	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
4	Dr. Hanumantha Nayak	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
5	Ms. Bhagirathi B N	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru

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Curriculum Review Committee

	Name	Designation	Institution
1	Mr. K. Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
2	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
3	Smt. Revathi	Selection Grade Lecturer	M.E.I. Polytechnic, Bengaluru

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **SURVEYING PRACTICE - I**		
	Credits (L:T:P) : **0:2:4**	Total Contact Hours: **78**	Course Code: **15CE23P**
	Type of Course: **Practical and Mini-Project**	Credit **: 03**	Core/ Elective: **Core**

Pre requisites: Practical knowledge of Basic Science and Mathematics in Secondary Education

Course Objective:

1. To provide knowledge of basic Principles of surveying.
2. Develop skills in using survey instruments, taking readings and plotting the details

Course Outcomes:

On successful completion of the course, the student will be able to:

Course Outcome	
CO1	Use survey instruments appropriately.
CO2	Understand the basic principles of surveying.
CO3	Conduct the survey, analyze the data, and prepare the drawings.
CO4	Analyse the data from the drawing and estimate the quantities.
CO5	Present a case study using survey data and engage in lifelong learning.

Mapping of COs with Pos

Mapping of COs with Pos		PROGRAMME OUTCOME											
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
Course Outcome	**CO1**	**S**	**S**			**S**				**S**	**S**		
	CO2	**S**											
	CO3	**S**	**S**	**S**	**S**		**M**	**M**	**M**	**S**		**M**	
	CO4	**M**	**M**	**S**	**S**		**S**		**M**	**M**		**M**	
	CO5	**M**	**M**	**S**	**S**	**S**	**S**	**M**	**M**	**M**	**S**	**S**	**S**

S: Strong Relationship M: Moderate Relationship

Course Contents:

UNIT NO.	COURSE CONTENTS	HOURS
1	Chain surveying	24
2	Compass Surveying	21
3	Levelling	33
	Total	78

GRADED EXERCISES

Unit - I

1. Study of instruments required for chain surveying.
2. Ranging and chaining a line
3. Prolongation of a survey line
4. Practice of reciprocal ranging
5. Practice of different methods of Setting out perpendiculars
6. Set out Regular Polygons and compute its area
7. Practice of cross staff survey
8. Conduct traversing and record the data in the Field book
9. Obstacles in chaining

Unit - II

1. Study of prismatic compass and surveyors compass
2. Taking bearings and finding the included angles by using prismatic compass
3. Set out regular andirregular Polygons using prismatic compass
4. Find the distance between two inaccessible points using Compass

Unit - III

1. Study of level and its temporary adjustments
2. Taking level of various points and recording it in a level book
3. Finding the difference in elevation between two points by Simple &Differential Levelling
4. Conduct Fly levelling to establish a Temporary BM and check its accuracy
5. Finding RL of given point by taking Inverted Staff Reading
6. Conduct Longitudinal and cross sectioning for the given alignment and plot it
7. Conduct Block Levelling for an area and plot Contours

SCHEME OF EVALUATION

Serial no	Description	Marks
1	Writing procedure	05
2	Conducting & Performance	20
3	Calculation and results	15
4	Viva-voice	10
	Total	**50**

List of equipment:

SL NO	EQUIPMENTS	QUANTITY
1	Auto / quick setting / Dumpy level with accessories	05
2	Metric chains 30m	05
3	Arrows	50
4	Tape 15m	15
5	Tape 30 m	05
6	Ranging rods	25
7	Cross staff, french cross staff , open cross staff, line ranger, optical square, prism square,	05
8	Prismatic compass	05
9	Surveyor compass	02

Course Delivery: The course will be delivered through lectures, Demonstration and practices

Course Assessment and Evaluation Scheme:

method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE	IA	Students	Two tests (Average of Two tests will be computed)	10	Blue books	1,2,3,4
				Graded exercises (Average of marks allotted for each graded exercise)	10	Record	1 2 3 4
				Mini Project	05	Report	1,2,3,4,5
				Total	**25**		
	SEE	End Exam		End of the course	**50**	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4 Effectiveness of Delivery of instructions & Assessment Methods

TEXT BOOKS

1. Surveying and Levelling Vol- I & II by B C Punmia
2. Surveying and Levelling by T P konetkar & S V Kulkarni
3. Plane Surveying by Dr. Alak De
4. Surveying and Levelling by S SBhavikatti
5. Surveying by Duggal
6. Surveying by R Agor
7. Fundamentals of Surveying by S K Roy
8. Surveying and Levelling by N NBasak
9. Advanced Surveying by R Agor

E-links

1. www.elearning.com/survey
2. http://nptel.ac.in/video.php?subjectId=105104101
3. http://media.sakshat.ac.in/NPTEL-IIT-Videos/
4. http://nptel.iitk.ac.in/courses/Civil_Eng/IIT%20Roorkee/Surveying.htm
5. http://nptel.iitk.ac.in/

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING (General)

THIRD SEMESTER

Scheme of Study and Examination (W.E.F. 2010 - 11)

Q P CODE	Theory Subject	Contact Hours			Exam. Duration	Scheme of Examination			Total Max. Marks	Min Marks for passing (with IA)
						End. Exam		I. A. Marks		
		Theory	Practical	Total		Max. Marks	Min. passing Marks			
9CE31	Strength of Materials	4	-	4	3	100	35	25	125	45
9CE32	Environmental Engineering-I	4	-	4	3	100	35	25	125	45
9CE33	Construction Technology	4	-	4	3	100	35	25	125	45
9CE34	Surveying- II	4	-	4	3	100	35	25	125	45
	Drawing / Practical									
9CE35D	Building Planning & Drawing	-	6	6	4	100	35	25	125	45
9CE36P	Civil Engineering Materials Testing Lab	-	6	6	3	100	50	25	125	60
9CE37P	Surveying Practice- II		6	6	3	100	50	25	125	60
	Total	**16**	**18**	**34**		**700**	**275**	**175**	**875**	**345**

GOVERNMENT OF KARNATAKA
DEPARTMENT OF TECHNICAL EDUCATION

COURSE : DIPLOMA IN CIVIL ENGINEERING/ CIVIL D'SHIP
CLASS : III SEMESTER
SUBJECT : STRENGTH OF MATERIALS
SUBJECT CODE:

No Of Hrs/Week: 04Hrs **Total no of Hrs: 64**

TOPIC ANALYSIS

SL NO	CONTENTS	HOURS ALOTED	WEIGHTAGE OF MARKS
	PART-A		
01	**INTRODUCTION TO ENGINEERING MECHANICS**	3	7
02	**GEOMETRICAL PROPERTIES OF SECTIONS**	8	16
03	**SIMPLE STRESSES AND STRAINS**	12	26
	PART-B		
04	**BENDING MOMENTS AND SHEAR FORCE**	12	32
05	**THEORY OF SIMPLE BENDING**	06	16
	PART-C		
06	**SLOPE AND DEFLECTION OF BEAMS**	04	16
07	**COLUMNS AND STRUTS**	05	16
08	**TORSION**	04	16
09	**SEMINAR/VISIT RELATED TO SUBJECT**	04	-
10	**TESTS & REVISION**	04	-
	TOTAL	**64**	145

GENERAL EDUCATIONAL OBJECTIVES
On completion of the course the students should be able to

1. Understand the concept of mechanism of forcing system.
2. Understand the concept of centre of gravity & moment of inertia.
3. Understand the concept of simple stresses & strains.
4. Understand the concept of bending moment & shear force diagrams.
5. Understand the concept of bending.
6. Understand the concept of slope and deflection of beams.
7. Understand the concept of long and short columns.
8. Understand the concept of torsion.

COURSE CONTENTS

PART A

1.0 INTRODUCTION TO ENGINEERING MECHANICS

1.1 Introduction to Engineering Mechanics.

1.2 Composition & Resolution of forces –Characteristics of a force, system of forces, resultant of force, equilibrium of forces, conditions for equilibrium.

1.3 Moments & their applications – Moments of a force, types of moments, law of moments.

1.4 Parallel force & couples – Classification of parallel forces, analytical method for the finding magnitude and position of resultant parallel forces and simple problems.

2.0 GEOMETRICAL PROPERTIES OF SECTIONS

2.1 Definition of centre of gravity, Moment of inertia, Polar moment of inertia, polar modulus and radius of gyration.

2.2 Theorem of perpendicular axis and parallel axis.

2.3 Moment of inertia. of regular geometrical plane sections (rectangular, triangular and circular sections) – (No derivation).

2.4 Calculation of C.G and M.I about centroidal axis for symmetric, asymmetric , built up sections and cutout sections

3.0 SIMPLE STRESSES AND STRAINS

3.1 Properties of materials – Elasticity, Plasticity, Hardness, Toughness, Brittleness, Ductility, Creep, Fatigue.

3.2 Stress, strain, Elongation, Types of stresses & strains, Elastic limit, Hooke's law - Stress strain diagram – working stress, Yield stress, Ultimate stress & breaking stress, Factor of safety.

3.3 Linear strain, lateral strain, volumetric strain & Poisson's ratio, Elastic constants-Young's modulus, Rigidity modulus & Bulk modulus and their relations (no derivation).

3.4 Bars of varying cross section (Excluding tapering section).

3.5 Composite sections.

3.6 Temperature stresses and strain (simple sections).

3.7 Strain energy, resilience, proof resilience and modulus of resilience, Types of loading. Equation for strain energy stored in a body.

3.8 Simple problems on above topics.

PART-B

4.0 BENDING MOMENT AND SHEAR FORCE

4.1 Define Beam, Types of beams, Bending Moment and shear force,.

4.2 Types of loads: Concentrated, uniformly distributed loads and uniformly varying loads.

4.3 Calculation of B.M and S.F for cantilevers, simply supported and overhanging beams subjected to concentrated and uniformly distributed loads only.

5.0 THEORY OF SIMPLE BENDING

5.1 Bending stress, neutral axis, Theory of simple bending -Equation for simple bending (no derivation)-Assumption.
5.2 Definition of Flexural rigidity, Moment of resistance, Section modulus and Modulus of rupture.
5.3 Simple problems.

PART-C

6.0 SLOPE AND DEFLECTION OF BEAMS (by Moment area method only)

6.1 Introduction -deflection, slope and curvature.
6.2 State and explain Mohr's theorem.
6.3 Slope and Deflection of cantilever with point load at free end and udl.
6.4 Slope and Deflection of simply supported beam with central point load and u d l.
6.5 Simple problems.

7.0 COLUMNS AND STRUTS

7.1 Introduction- columns, struts, effective length of column for different end condition, slender ness ratio, long & short columns and Crippling load
7.2 Euler's equation (no derivation) & assumptions.
7.3 Simple problems.

8.0 TORSION

8.1 Introduction- Twisting moment-Assumptions.
8.2Torsion equation (no derivation), Torsional rigidity, Torsional equation for solid and hollow circular shafts.
8.3 Power transmitted by solid and hollow shafts.
8.4 Simple problems.

SPECIFIC INSTRUCTIONAL OBJECTIVES:

1.0 Understand the concept of engineering mechanics

1.1 Understand the concept of mechanism of forces.

1.2 Concept of characteristics, resultant, equilibrium of forces and conditions of equilibrium.

1.3 Definition of moment and their applications, types of moments and laws of moments.

1.4 Classification of parallel forces, finding magnitude and position of the resultant forces.

2.0 Finding out the centroid and moment of inertia of a geometrical section, compound section by the analytical method.

2.1 Define centre of gravity ,centroid moment of Inertia and radius of gyration.

2.2 State theories of parallel and perpendicular axis

2.3 Determine the centre of gravity of the following sections(no derivation).

a) Rectangular section b) Hollow rectangular sections c) Circular and hollow circular section d) Triangles e) Compound sections like I- section, T-section, Angular section & channel sections.

2.4 Know the Moment of inertia of the basic figures like a) Rectangular section b) Hollow rectangular sections c) Circular and hollow circular section d) Triangles

2.5 Determine M.I of Compound sections like I- section, T-section, Angular section & channel sections only.

3.0 Understand the concepts of properties of materials, stress, strain, modules of elasticity, and significance of the above concepts in Civil Engineering.

3.1Define the mechanical properties of metals like elasticity, plasticity, malleability , brittleness, hardness, ductility, tenacity, fatigue of metals and resilience.

3.2 Define Stress, strain, working stress, ultimate stress, factor of safety, stress- strain diagram.

3.3 Define linear, lateral & volumetric strains and elastic constants. Solve problems involving the relationship between elastic constants.

3.4 Determine stress in bars of varying cross- section subjected to axial loads only at the end.

3.5 Calculate stress and strain in composite sections.

3.6 Calculate stress in simple sections subjected to temperature.

3.7 Define stain energy, Resilience, Modulus of resilience, types of loads.

3.8 Solving simple problems.

4.0 Analyse the variation of bending moment and shear force due to loads

4.1 Differentiate cantilevers, simply supported beams and overhanging beams.

4.2 Understand the different types of loads-Point load and Uniformly distributed load.

4.3 Compute the bending moment and shear force for cantilever , simply supported beam and overhanging beam under: a) Concentrated loads (b) Uniformly distributed load throughout or on part of span. (c) Both uniformly distributed and concentrated loads. Draw the bending moment and shear force diagrams for loaded beams. Indicate location of maximum bending moment and point of contraflexture.

5.0 Apply the theory of simple bending & bending stresses in beams

5.1Define bending stress , neutral axis , Explain the bending equation, stating assumptions of simple bending theory.

5.2 Define Flexural rigidity, Moment of resistance, Section modulus and Modulus of rupture.

5.3 Design a section to carry a specified load given the allowance bending stress. Calculate bending stress or load or span of the beam.

6.0 Calculate the maximum slope & deflection of cantilever and simply supported beams under loading by moment area method.

6.1 Define slope, deflection and curvature.

6.2 Define the concept of Mohr's theorem.

6.3 Calculate the maximum slope and deflections for cantilever beam subjected to a concentrated load at the free end and udl throughout the span.

6.4 Calculate the maximum slope and deflections for simply supported beam subjected to a uniformly distributed load and a central point load.

6.5 Simple problems on cantilever & Simply supported beams carries point loads and udl only.

7.0 Understand the behavior of columns and struts under vertical loads.

7.1 Define column, struts, Effective length for different end conditions, slenderness ratio, Crippling load, Long and short columns..

7.2 State Euler's formula and assumptions made in the Euler's column theory.

7.3 Determine the load carrying capacity of a column.

8.0 Apply the theory of pure torision & shear stresses in circular solid & hollow shafts

8.1 Define Couple, Twisting moment and assumptions made on pure torsion.

8.2 Explain with usual notations of Torsional equation .Definition of Torsional rigidity.

8.3 Write the equation for calculation of power transmitted by the solid and hollow shaft.

8.4 Solving simple problems to find the diameter, power transmitted, Shear stress, in solid and hollow shaft..

BOOKS FOR REFERENCES

1.Strength of materials by Bhavikatti & A.V. Hegede
2.Strength of materials by S.Ramamrutham
3.Strength of materials by H S Vishwanath, Sapna Publications.
4.Mechanics of Structures Vol.I by S.B.Junnarkor
5.Strength of materials by R.S.Khurmi
6. Strength of materials by B.S Basavarajaiah & P. Mahadevappa
7. Strength of materials by R.K.Bansal.
8.Engineering mechanics by R.K. Bansal
9.Introduction to Strength of materials by Prakash Rao.

MODEL QUESTION PAPER

SUBJECT: STRENGTH OF MATERIALS

TIME :3 HOURS **MAX. MARKS: 100**

Instruction: 1.Question No.1 is compulsory.
2.Answer any two full question from each remaining parts.

1.a) Fill in the blanks: 5x1=5

i. The force of resistance per unit area is known as _____.

ii. The maximum B.M. for a cantilever beam occurs at _____.

iii. The moment of inertia of a circular section $I_{xx} = I_{yy}$ is given by the formula_____.

iv. A set of forces whose resultant is zero are called _____.

v. The ratio of effective length to least radius of gyration is called_____.

b) Draw stress strain curve & explain salient points in the curve. 5

PART-A

2.a) Define the following with an example : 3x2=6

(i)Resultant force (ii)Couple (iii) Elasticity

b) A circular solid rod of steel is 25 mm in diameter and 5m in length. It is subjected to an axial pull of 50 kN. If *E* for steel is 200 k N/mm ^{2}, find stress, linear strain, change in length and change-in volume. 9

3.a) Find the horizontal and vertical component of the following forces.

i) 15kN acts at 30^0 to X-axis.

ii) 55kN acts at 60^0 to Y-axis. 5

b)A copper rod 20 mm in diameter is encased in a steel tube 25 mm internal diameter and 30 mm external diameter. Their ends are rigidly connected. The composite bar is 0.5m long and is subjected to an axial pull of 25 kN. If E_s = 210 kN/mm^2 and E_c = 110 kN/mm^2, calculate the stress induced in the rod and the tube. 10

4.a)Locate the centroid of a unequal angle section 100x80x10mm. 6

b)Find the moment of inertia of an I section 120x100x10mm about horizontal & vertical axis passing through the centre of section. 9

PART-B

5.a) What are the various types of statically determinant beams ? Sketch them. 6

b) Construct BMD and SFD for a cantilever beam of span 3.0m carries 5kN and 10kN at 3.0m and 2m from fixed end. In addition 3kN/m udl run between the point loads. 9

6.a) A simply supported beam of span 5m, carries 10kN/m udl run for a length of 4m from left end support. Construct SFD & BMD and also calculate maximum bending moment.6

b) A beam 6.5m long supports at 5m apart and it overhangs 1.5m on right end support. It carries 10kN at right free end and 15kN/m udl run between the supports. Construct SFD & BMD and also calculate maximum BM and point of contraflexture. 9

7.a) Write expression for calculating Section modulus for the following plane figures:
i) Hollow circular section ii) Square section iii) Hollow rectangular section. 6

b) A rectangular beam, simply supported over a span of 4 m is carrying a uniformly distributed load of 50 kN/m. Find the dimensions of the beam, if the depth of the beam section is 2.5 times its width. Take maximum bending stress in the beam section as 60 MPa.

PART-C

8.a)State Mohr's theorem for finding slope and deflection in beams. 4

b) A cantilever beam of span l carries a point load W at its free end. Find the maximum slope and deflection. 5

b)A simply supported beam of 400mm x 600mm , 6 m span, carries a UDL of 10,000 N/m run throughout its span. Calculate the maximum slope and deflection, if $E = 2 \times 10^5$MPa. 6

9.a)Write the effective length of column for different end conditions. 4

b) Define i)Radius of gyration b)Slenderness ration. 4

c)A hollow section of external diameter 60 mm and internal diameter 50mm and 3m long is used as a column. One end is fixed, while the other is hinged. Find the safe compressive load using Euler's formula. Take $E = 2 \times 10^5$ MPa .Factor of safety. 4

10.a) Explain the terms i) Torsional rigidity ii) Polar modulus. 4

b) What are the assumptions made in the theory of pure torsion ? 4

c)A solid shaft of 100 mm diameter is required to transmit 150 kW at 120rpm. If the angle of twist is not to exceed 1°, find the length of the shaft. Take modulus of rigidity for the shaft material a 90 GPa. 7

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Department of Technical Education
DIPLOMA COURSE IN CIVIL ENGINEERING/ CIVIL D'SHIP
Third Semester
Subject: Environmental Engineering - I

Contact Hrs/Week:4 Hrs. **Contact Hrs/Sem:64 Hrs.**

TOPIC ANALYSIS

Chapter No.	Contents	No. of Hrs	Weightage of Marks
	PART - A		
1	Environment and Ecology	02	05
2	Water Requirement	05	12
3	Sources of Water	03	07
4	Intake Works and Conveyance of Water	07	15
5	Quality of Water	05	11
	PART - B		
6	Purification of Water	12	30
7	Distribution Systems	06	20
	PART - C		
8	Appurtenances In Distribution System	04	10
9	Water Supply Arrangement in Buildings	05	15
10	Water Conservation	04	10
11	Water Pollution and Control	04	10
12	Tests	03	--
13	Creativity and Innovation	04	--
	Total	**64**	**145**

DETAILS OF CONTENTS

PART - A

1 Environment and Ecology

1.1 Atmosphere, Lithosphere, Hydrosphere, Biosphere.
1.2 Relation Between Plant, Animals And Environment. Eco System, Man And Ecology.

2 Water Requirement

2.1 Necessity of water supply.
2.2 Methods of population forecasting
2.3 Water Requirements For a) Domestic Purpose b) Industrial Use c) Fire Fighting d) Public Purpose e) Losses
2.4 Per Capita Demand and Factors Affecting it.
Total Quantity of Water Required for a Town

3 Sources of Water

3.1 Surface Sources - Lakes, Streams, Rivers Impounded Reservoirs.

3.2 Underground Sources - Infiltration Galleries, Infiltration Wells, Springs.

3.3 Quality of Underground Water.

4 Intake Works and Conveyance of Water

4.1 Types of intakes - i) Reservoir intake ii) River intake iii) Canal intake

4.2 Conveyance of Water - Open Channels and Pipes.

4.3 Pipe Materials - Cast Iron Pipes, Steel Pipes, Concrete Pipes, Pre-Stressed Concrete Pipes, G.I Pipes, Plastic Pipes, High Density Polythene Pipes, Merits And Demerits of Each Type and Situation in Which they are Used.

4.4 Pipe Joints - Spigot and Socket Joint, Flange Joint, Universal Pipe Joint, Expansion Joint, Flexible Joint, Joint for Concrete pipes.

4.5 Various stages of pipe laying and its testing.

4.6 Pipe corrosion and remedial measures.

5 Quality of water

5.1 Impurities of water - organic and inorganic - classification and examination of water.

5.2 Physical - temperature, colour, turbidity, taste and odour

5.3 Chemical - pH Value, Total Solids, Hardness, Chlorides, Iron and Manganese, Fluoride, Dissolved Oxygen.

5.4 Bacteriological - B-coli, Most Probable Number, Quality Standards for Domestic and Industrial Purpose as per BIS and CPHEEO Std.

6 Purification of Water

6.1 Flow diagram of different units of purification, brief description of constructional details, working and operation of the following units - plain sedimentation, sedimentation with coagulation and filtration (no design)

6.2 Disinfection of Water

6.3 Chemicals required for water treatment, their uses and feeding devices.

6.4 Dosage of alum, bleaching powder and chlorine gas.

7 Distribution systems

7.1 General Requirements, Systems of Distribution - Gravity System, Combined System, Direct Pumping.
7.2 Methods of Supply - Intermittent and Continuous.
7.3 Maintenance of Required Pressure in Distribution Systems.
7.4 Storage - Underground, Ground Level And Overhead Service Reservoirs – Sketch, Necessity and Accessories.
7.5 Types of lay-out : dead end, grid iron, radial and ring systems, their merits and demerits and their suitability.

8 Appurtenances in distribution system

8.1 Use of Sluice Valves, Check Valves, Air Valves, Scour Valves, Zero Velocity Valves, Fire Hydrants, Water Meter.

9 Water Supply arrangement in buildings

9.1 General lay-out of water supply arrangement for single and multi-storied buildings as per I.S code of practice.
9.2 Connections from water main to buildings.
9.3 Water supply fittings - their description and uses, water main, service pipes, supply pipe, distribution pipe, domestic storage tank, stop cock, air gap ferrule goose neck, water tap.
9.4 Hot water supply - electric water heaters and solar water heaters.

10 Water Conservation

10.1 Conservation of rain water, roof water harvesting, recharging of ground water aquifers

11 Water pollution and Control

11.1 Sources of water pollution, types and its effects,.
11.2 Prevention and control measures of water pollution.
11.3 Legislation with regards to water pollution control

Department of Technical Education

DIPLOMA COURSE IN CIVIL ENGINEERING

Third Semester

Subject: EC302 Environment Engineering - I

Contact Hrs/Week:4 Hrs. **Contact Hrs/Sem:64 Hrs.**

GENERAL EDUCATIONAL OBJECTIVES:

Upon the completion of the study of the subject the student should be able to

1 Know the importance of Environment and Ecology, Relation between plant, animals and Environment in Eco system.
2 Know the importance of water supply and its requirements

Methods of population forecasting and per capita demand
3 Select suitable source of water for a water supply scheme.
4 Understand the works involved in the conveyance of water.
5 Analyse the quality of water for different purposes.
6 Familiarize with the various stages of treatment for purification of water.
7 Know the methods of supply of water, storage and types of distribution lay-out.
8 Know the functions of various appurtenances in a distribution system.
9 Know the water supply arrangement in a single and multi-storied buildings.
10 Know the conservation of rain water and Recharging of ground water sources.
11 Know the effect of water pollution, its control methods and legislation

SPECIFIC INSTRUCTIONAL OBJECTIVES:

1 Know the importance of Atmosphere, Bio sphere or an depletion, Deforestation, Green house.

1.1 Relation between plant, animals and Environment.
1.2 Explain briefly the importance of Ecosystem and ecology.

2 Know the necessity of water supply and description of water requirement.

2.1 Necessity and requirement of water
2.2 Describe the method of forecasting population.
2.3 Estimate the requirement of water for various purposes in particular
i) Domestic ii) Industrial purposes iii) Fire fighting iv) Public purpose v) losses
2.4 Describe the method of determining the total quality of water required for a town. List the factors affecting per capita demand

3 Select suitable source of water for a water supply scheme.

3.1 State the salient features of various sources of water i) lakes; ii) rivers; iii) streams; iv) impounded reservoirs.
3.2 Explain with sketches: i) infiltration galleries; ii) shallow and deep wells; spring wells.
3.3 Explain the quality of under ground water.

4 Understand the works involved in the conveyance of water.

4.1 What is an intake. Explain with sketches, reservoir intake, river intake and canal intake.
4.2 List the different methods of conveyance of water.
4.3 Explain different types of pipes used for conveyance of water. Mention their advantages and disadvantages.
4.4 Explain with neat sketches, different types of pipe joints.
4.5 Describe various stages of pipe laying and its testing.
4.6 State the causes of pipe corrosion and remedial measures.

5 Analyse the quality of water for different purposes

5.1 List the Type ,causes and effects of impurities present in water.
5.2 Explain the tests and significance of test of Physical parameters of water
5.3 Explain the tests and significance of test of Chemical parameters of water
5.4 Explain the tests and significance of test of biological parameters of water

6 Familiarise with the various stages of treatment for purification of water.

6.1 Sketch the overall lay-out of water treatment plant indicating different stages.
6.2 Explain with sketches the function, constructional details, working and operations of i) aeration fountain; ii) Flash Mixer; iii) Flocculator; iv) Clarifier;

v) Slow sand filter; vi) Rapid sand filter, vii) Pressure filters viii) chlorinating chamber.

6.3 List the different chemicals used in the treatment of water.

6.4 Explain with sketch the chemical feeding devices.

6.5 Explain the method of determining the dosage of chemicals i) Alum- Jar Test ii) Bleaching powder iii) Chlorine.

7 Know the methods of supply of water, storage and types of distribution system.

7.1 Explain with sketches the different systems of distribution i) Gravity distribution; ii) Combined gravity and pumping system; iii) pumping system.

7.2 Compare intermittent system with continuous system of water supply.

7.3 Explain the methods of maintaining pressure in water distribution system.

7.4 Explain the necessity of service reservoirs.

7.5 Compare underground service reservoirs with overhead service reservoirs.

7.6 Draw the sketches of i) Rectangular overhead service reservoir; ii) Intz tank showing all the accessories.

7.7 Explain with sketches the following systems of lay-outs in distribution system i) Dead end; ii) Grid iron; iii) Radial; iv) Ring.

7.8 List the merits and demerits of different systems of lay-out in a distribution system

7.9 Suggest the suitability of the system of lay-out for a given locality.

8 Know the functions of various appurtenances in a distribution system.

8.1 Explain the functions of the following appurtenances with sketches i) Sluice Valves ii) Check valves or reflex valves; iii) Air valves iv) Drain valves or blow-offs; v) Fire hydrants; vi) water meters; vii) zero velocity value.

9 Know the water supply arrangement in a single and multi-storied buildings.

9.1 Sketch a general lay-out to show suitable water supply buildings with mains.

9.2 Suggest interior water supply arrangements for a single and multi-storied building as per I. S. code.

9.3 Describe the constructional details and uses of following water supply fittings: i) Water main; ii) Service pipe; iii) supply pipe; iv) distribution pipe; v) domestic storage tank; vi) stop cock; vii) Air gap; viii) ferrule; ix) Goose neck; x) Water tap

9.4 Sketch the general lay-out for hot water supply for a domestic building using both electric water heaters and solar water heaters.

10 Know the importance of conservation of Rain water.

10.1 Explain the methods of harvesting of Rain water.

10.2 Explain the methods of Recharging ground aquifer.

11 Know the effects of water pollution, its prevention, control and legislations

11.1 State the causes of water pollution. Sources - Point and Non-point sources, effects on plants and animals

11.2 Discuss the prevention and control of water pollution.

11.3 Water pollution control acts

Referance Books:

1) Water Supply & Sanitary Engineering- by Rangwala
2) Water Supply Engineering Vol-I - by S.K.Garg.
3) Water Supply & Sanitary Engineering- by Birde
4) Environmental Engineering-I By H S Vishwanath. Sapna Publications.
5) Environmental Science and Engg.- Vol-I – by Aloka Debi. (Universities Press)
6) Water Supply Engineering Vol-I - by Gurucharan Singh
7) Environmental Engg.-Vol-I –by P.N. Modi.
8) Water Supply Engg.-Vol-I – by Fair & Geir
9) Text Book of Environmental studies – Erach Bharucha (Universities Press)
10)Water Supply,Waste Disposal and Environmental Pollution Engineering-(khanna publication)a.k.chatterjee

Department of Technical Education
DIPLOMA COURSE IN CIVIL ENGINEERING
Third Semester
Subject: EC302 Environmental Engineering - I

Duration :3 Hours **Max. Marks: 100**

Model Question Paper

1) Question No 1 is compulsory
2) Answer any two full questions from each section

Q No 1. A) Fill in the blanks with appropriate word/s 1x5 =5
i) The Per capita domestic water supply in India is _____lpcd
ii) The permissible value of Turbidity for drinking water supply is _____
iii) _____ is used for extinguishing the fire
iv) _____ impurities are removed from filtration
v) The process of killing the pathogenic bacteria is know as _____
B) Write a note on dosage of coagulant by Jar test apparatus 5

Section - I

Q No 2 a) Explain the relation between plant ,animals and Environment 5
b) Discuss the necessity of water supply 5
c) State any five standards for drinking water. 5
Q No 3 a) List the sources of water. 3
b) The following data have been noted from the census department 7

Sl No.	Year	Population
01	1961	22,500
02	1971	9,000

	03	1981	37,500	
	04	1991	47,000	
	05	2001	57,500	
	06	2011	70,100	

Estimate the population for the year 2021 & 2031 by Arithmetical increase method.

	c)	Explain with a neat sketch the "Infiltration Gallery".	5
Q No 3	a)	List the types of intake works	3
	b)	Explain River Intake with a neat sketch.	7
	c)	Mention the advantages and disadvantages of PVC Pipes	5

Section - II

Q No 4	a)	Draw the flow diagram for the water treatment works.	5
	b)	With neat sketch explain the flash mixer used in the coagulation process	5
	c)	Differentiate between plain sedimentation and sedimentation with coagulation	5
Q No 5	a)	Explain the process of back washing of rapid sand filter.	5
	b)	List the various chemicals used in the process of purification of water.	5
	c)	Differentiate between the intermittent and continuous system of water supply.	5
QNo.6	a)	How to maintain the required pressure in the water distribution system	3
	b)	List the various types of storage reservoirs in the water distribution system. Draw any one type and name the accessories.	5
	c)	List the various types of layout used in the distribution system and explain any one.	7

Section - III

QNo.7	a)	Explain the fire hydrant with a neat sketch.	5
	b)	Write a note on location and functions of sluice valve.	5
	c)	With neat sketch explain the service connection from main pipe.	5
QNo.8	a)	Draw the cross section of two pipe multi-storied building	5
	b)	Draw a layout diagram of solar water heater for a residential building.	5
	c)	What is mean by Rainwater harvesting? Explain briefly.	5
QNo.9	a)	List the various methods of recharging Ground water aquifers. Explain any one.	5
	b)	Write a note on prevention and control of water pollution.	5
	c)	Discus the legislations with respect to water pollution control.	5

Department of Technical Education

DIPLOMA COURSE IN CIVIL ENGINEERING / CIVIL D'SHIP

Third Semester

Subject: Construction Technology

Contact Hrs/Week:4 Hrs. **Contact Hrs/Sem:64 Hrs**

TOPIC ANALYSIS

Sl.No.	TOPICS	No. Of Hours	Weightage of marks
	PART - A		
1	Soil and its Properties	3	8
2	Foundation	8	20
3	Stone & Brick masonry	8	20
	PART -B		
4	Lintels & Arches	3	8
5	Dampness and its Prevention	2	5
6	Doors and Windows	5	12
7	Scaffolding, Shoring & Underpinning	5	12
8	Stairs	5	12
	PART -C		
9	Roofs	5	15
10	Floors	4	10
11	Plastering, Pointing and Painting	4	12
12	Ventilations	2	5
13	Earthquake Resistant Buildings	2	6
14	Test & Revision	4	---
15	Industrial Innovation	4	---
		64	145

GENERAL OBJECTIVES

1. Understand the types of soils & its properties
2. Understand the importance of foundation
3. To Know the importance of Stone & Brick masonry
4. Understand the concept of Lintels & Arches
5. Understand the concept of Dampness and Prevention of dampness
6. Understand the necessity of Doors and Windows
7. Understand the temporary structures like Scaffolding, Shoring and under pinning
8. Understand the geometrical details of Stairs
9. Understand the concept of Roof covering structures
10. Understand the concept of floors and flooring materials
11. Understand the concept of Plastering, Pointing and Painting
12. Understand the concept of ventilations
13. Understand the concept of Earthquake Resistance in Buildings

COURSE CONTENTS

1 Soils and its Properties

1.1 Types of soils and their suitability to construction of the structures.
1.2 Bearing Capacity and determination of safe bearing capacity of the soils by plate load test.
1.3 Method of improving the safe bearing capacity.
1.4 SBC Values for various types of Soils.

2 Foundations

2.1 Definition and purpose of Foundation.
2.2 Know the types of Foundations
i) Shallow foundations: Spread footing, combined footing, Strap footings & Raft foundation.
ii)Deep foundation: Pile foundations-End bearing piles, friction piles.
2.3 Causes for failure of foundation and preventive measures.
2.4 Foundation in Black Cotton Soil.
2.5 Necessity of shoring and strutting in foundation excavation and dewatering.

3 Stone & Brick masonry

3.1 Terms used in stone masonry and brick masonry
3.2 Coursed rubble masonry and Ashlar masonry.
3.3 Points kept in mind while supervising stone masonry work.
3.4 List Bonds used in Brick masonry , Study of English bond & Flemish bond.
3.5 Points kept in mind while supervising brick masonry work.
3.6 Partition walls-bricks, Concrete block, Glass, Plywood and hard board.

4 Lintels & Arches

4.1 Necessity of lintels and arches, sunshades, sun breakers and canopy
4.2 RCC lintels, sun shades, sun breakers.
4.3 Arch-Terms used, Types of arches-Flat, Segmental, Semicircular.

5 Dampness and Prevention of dampness

5.1 Definition and causes of dampness
5.2 Effects of dampness and prevention of dampness
5.3 List the materials used for damp proof course.

6 Doors and Windows

6.1 Definition of doors windows and ventilator and their purpose
6.2 Size of doors, windows & ventilators for different types of building as per I.S.
6.3 Important types of doors, windows and ventilators in general use.
6.4 Fixtures for doors, windows and ventilators.

7 Scaffolding, Shoring and under pinning

7.1 Scaffolding-component parts of scaffolding, Types of scaffolding.
7.2 Use of Steel tube scaffolding.
7.3 Types of shoring-Ranking, Flying & Dead shores.
7.4 Underpinning methods

8 Stairs

8.1Tehnical terms
8.2 Requirements of good stair.
8.3 Classification of stairs, brief description & their suitability.
8.4 Uses of Escalators and lifts.

9 Roof

9.1 Definition of roof and types of roof in general
9,2 Pitched roof basic elements.
9.3 Steel trusses.
9.4 Common types of Roofing materials.
9.5 Flat RCC roof-advantages and disadvantages.
9.6 Weather proof course for flat roofs.

10 Floors

10.1 Definitions of floors and floorings
10.2 Selection of floor material

10.3 Types of floors and their selection

10.4 Laying of Mosaic tile flooring, Ceramic tile flooring and Cement concrete floorings.

11 Plastering, Pointing and Painting

11.1 Object of plastering and requirements of good plaster.

11.2 Method of cement plastering

11.3 Types of plaster finishes-Smooth, sand faced, rough cast, pebble dash, depter, scrapped, textured finish.

11.4 Method of pointing & types of pointing.

11.5 Methods of painting, distempering & varnishing on different surfaces.

12 Ventilations

12.1Definition, Necessity & requirements of ventilation system

12.2Types of ventilation

13 Earthquake Resistant Buildings

13.1 List Earthquake zones in India.

13.2 Precautionary measures to be taken for Earth quake resistant buildings.

Books for reference

1. Construction Technology- H S Vishwanath, Sapna Publications.
2. Building construction—S.C.Rangwala
3. Building construction—B.C.Punmia
4. Building construction—Gurucharan Singh
5. Building construction—Sushil kumar

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SPECIFIC OBJECTIVES

1 Understand the types of soils & its properties

1.1 Understand the suitability of the soil for the construction of the structures.

1.2 Define Bearing Capacity of soil and determination of SBC of soil & know the SBC of different soils.

1.3 Understand the Method of improving the safe bearing capacity.

1.4 Know the SBC Values for various types of Soils.

2 Understand the importance of foundation

2.1 Understand the meaning and purpose of Foundation.

2.2 Defining of shallow an deep foundation. Understanding different types of shallow and deep foundations.

2.3 Understand the Causes for failure of foundation and adopting preventive measures.

2.4 Know the method of foundation in Black Cotton Soil.

2.5 Understand the necessity of shoring and strutting in foundation excavation and dewatering.

3 To Know the importance of Stone & Brick masonry

3.1Understand the different terms that are used in the construction of stone masonry and brick masonry

Understand the method of constructing Coursed rubble masonry and ashlar masonry.

Understand the method of supervising stone masonry work.

Know the different bonds used in Brick masonry , Study of English bond & Flemish bond (1 brick and 1 ½ brick thick walls only)..

Understand the method of supervising brick masonry work.

Understand the method constructing Partition walls-bricks, Concrete block, Glass, Plywood and hard board.

4 Understand the concept of Lintels & Arches

4.1 Definition & Necessity of lintels and arches, sunshades, sun breakers and canopy

4.2 Understand the construction details RCC lintels, sun shades, sun breakers.

4.3 Know the terms used in arches , Types of arches-Flat, Segmental, Semicircular.

5 Understand the concept of Dampness and Prevention of dampness

5.1 Definition and understand the major causes of dampness

5.2 Understand the Effects of dampness in building and prevention of dampness

5.3 Know the different materials used for damp proof course.

6 Understand the necessity of Doors and Windows

6.1 Understand the details of doors windows and ventilator and their purpose

6.2 Know the standard size of doors, windows & ventilators as per I.S.

6.3Understand the uses and constructional details of types of doors, windows and ventilators in general use.

6.4 Know the fixtures used for construction of doors, windows and ventilators.

7 Understand the temporary structures like Scaffolding, Shoring and under pinning

7.1 Definition of Scaffolding, component parts of scaffolding, Constructional details of different types of scaffolding.

7.2 Know the use of Steel tube scaffolding.

7.3 Understand the definition and types of shoring.

7.4 Understand the concept of underpinning and its methods

8 Understand the geometrical details of Stairs

8.1 Know the technical terms used in stairs with sketches.

8.2 Understand requirements of ideal stair.

8.3 Understand the arrangement of different methods of stairs & their usage in buildings.

8.4 Understand the necessity of Escalators and lifts in buildings.

9 Understand the concept of Roof covering structures

9.1 Know the definition of roof and different types of roofs used in buildings.

9.2 Understand the concept of pitched roof and its elements.
9.3 Know the different types of Steel trusses used for building construction.
9.4 Know the common types of Roofing materials used in the construction
9.5 Understand the Concept of Flat RCC roof and list advantages and disadvantages over pitched roof.
9.6 Know the concept of Weather proof course and water proofing flat roofs.

10 Understand the concept of floors and flooring materials

10.1 Know the meaning of floors and flooring materials.
10.2 Understand the requirements of ideal floor material.
10.3 Know the different types of floors and selection of different flooring materials.
10.4 Know the method adopted for laying of Mosaic tile flooring, Ceramic tile flooring and Cement concrete floorings.

11 Understand the concept of Plastering, Pointing and Painting

11.1 Know the object of plastering and requirements of good plaster.
11.2 Know the method adopted for cement plastering.
11.3 Understand the different types of plaster finishes.
11.4 Know the meaning of pointing and their suitability & its types.
11.5 Know the Method of painting, distempering & varnishing on different surfaces.

12 Understand the concept of ventilations

12.1 Know the meaning, purpose & use of ventilation systems in building.
12.2 Understand the different types of ventilations adopted in building.

13 Understand the concept of Earthquake Resistance in Buildings

13.1 Know the earthquake zones in India.
13.1 Understand the precautionary measures to be taken for Earth quake resistant in residential buildings.

Department of Technical Education

DIPLOMA COURSE IN CIVIL ENGINEERING

Third Semester

Subject: Construction Technology

Time:3 Hrs. **Max.Marks:100**

MODEL QUESTION PAPER

Instruction: 1.Question No.1 is compulsory.
2.Answer any two full question from each remaining parts.

1. a) Fill in the blanks. 5

i)Bearing capacity of ordinary soil_____.

ii) In _____ bond consists of alternate header and stretcher courses.

iii) _____ is the structure used to support masonry above opening.

iv) Door suitable for air conditioned room _____

v) _____ is the temporary structure used to support unsafe structure.

b)List the points kept in mind while supervising brick masonry work. 5

PART-A

2. a)Define SBC of soil. 2

b)Briefly explain different methods of improving SBC of soil. 6

c)What do you understand by a ‘ shallow foundation’ ? draw sketches to show various types of shallow foundation. 7

3. a)Explain the situations in which the pile foundation is preferred? 5

b)Explain with sketch End bearing pile & Friction piles. 5

c)List the causes for foundation failure. 5

4.a)Draw typical sketches, showing the following, constructed of stone masonry: 6

i) Corbel ii) Jambs iii)Coping

b)Differentiate between English bond and Flemish bond. 4

c)Explain with neat sketch Glass sheet partition wall with wooden frame work. 5

PART-B

5. a) Draw a neat sketch of an arch and show on it various technical terms used in its construction. 6

b)Define DPC? List the materials used for Damp proof course. 5
c)Define the following terms: 4
i)Style ii)Transom iii)Rebate iv)Horn

6.a)Explain with neat sketch i)Louvered door ii) Bay window. 8
b)What do you understand by scaffolding? What are the component parts of scaffold? 7

7.a) Explain how you would make a 1.1m wide opening for a door in an existing brick wall of 30cm thick. 5
b)State the circumstances under which you use the following types of stairs
i)Dog legged stair ii)Open newel stair iii)Half turn geometrical stair. 6
c)Explain with help of sketches, the following terms: 4
i)Nosing ii)Winders

PART-C

8.a)Compare merits and demerits of flat and pitched roof. 5
b)Explain method of providing water proof terracing on R.C.C roof slab. 5
c)List any five common type of roof covering materials. 5

9.a)Explain the procedure of constructing the Mosaic tiled flooring. 5
b)Explain with reasons what type of floor finishing will be required for
i)Dancing hall ii) Library 5
c)Explain the method of pointing. 5

10.a)What are the requirements of good plaster? 5
b)Explain in brief various systems of mechanical ventilation. 5
c) What are the precautionary measures adopted while constructing masonry walls to reduce effect of earthquake? 5

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Government of Karnataka
Department of Technical Education

DIPLOMA COURSE IN CIVIL ENGINEERING/ CIVIL D'SHIP

Third Semester

Subject: Surveying - II

Contact Hrs/Week:4 Hrs **Contact Hrs/Sem:64 Hrs.**

Chapter No:	Contents	No. of Hours	Weightage of Marks in Exam
	SECTION-I		
1	Levelling - Application	10	25
2	Contouring	8	20
	SECTION-II		
3	Areas & Volumes	4	10
4	Principles of Theodolite surveying	10	25
5	Permanent Adjustment of theodolite	2	5
	SECTION-III		
6	Theodolite traversing	18	45
7	Miscellaneous Instruments	5	15
8	Seminars / Field visit / Innovations	4	--
	Tests	3	--
	TOTAL	**64**	**145**

DETAILS OF CONTENTS

SECTION - I

1 Levelling - Application

1.1 Different types of levelling - fly levelling, check levelling, profile levelling, cross sectioning.

1.2 Plotting of longitudinal and cross section.

1.3 Errors in levelling and precautions to minimise them.

1.4 Setting grade stakes and setting out grades for sewers and connected problems.

2 **Contouring**

2.1 Concepts of contour and terms used in contouring, characteristics of contour, uses of contours.

2.2 Methods of contouring.

2.3 Interpolation - arithmetical method only.

2.4 Calculation of Capacity of Reservoirs - simple problems

SECTION -II

3 Areas & Volumes

3.1 Computation of Area of Irregular figures using Trapezoidal & Simpson's rule - problems.

3.2 Volumes of Irregular solids- using Trapezoidal & Prismoidal Rule - Problems on Embankment & Cutting - Cross sectioning on Level section & Two level sections - simple problems.

4 Principles of Theodolite surveying

4.1 Component parts, different terms.

4.2 Fundamental lines of a Theodolite and their relationships

4.3 Temporary adjustment of Theodolite.

4.4 Measurement of horizontal angles by repetition and reiteration method.

4.5 Measurement of deflection angle.

4.6 Measurement of vertical angles.

4.7 Errors in theodolite work.

5 Permanent adjustment of theodolite

5.1 Test & Adjustment of Plate Level.
5.2 Test & Adjustment of Line of Sight.
5.3 Test & Adjustment of Horizontal Axis .
5.4 Test & Adjustment of Altitude Level.

SECTION-III

6. Theodolite traversing

6.1 Traversing with theodolite by included angle method & deflection angel method,

6.2 Checks for closed and open traverse.

6.3 Plotting the traverse by coordinate method.

6.4 Traverse computation-latitude, departure, closing error, balancing the traverse by Bowditch’s rule and Transit rule.

6.5 Problems on omitted measurements.

6.6 Area of a closed traverse.

7 Miscellaneous Instruments

i) Abney level ii) Ceylon ghat tracer iii) Pentagraph iv) Planimeter
(Mechanical and digital)

7 Seminars / Field visit / Innovations

REFERENCES

1. Surveying-2 By H S Vishwanath, Sapna Publications.
2. Surveying By Venkataramaiah, universities press
3. Surveying & Levelling Part I & Part – II , T.P.Kanetkar & S.V.Kulakarni, Pune Vidyarthi Griha Prakashan
4. Surveying & Levelling Part I & Part – II , Dr. B.C.Punmia, Laxmi Publications
5. Surveying & Levelling , N.N. Basak, Tata Mc Graw-Hill
6. Surveying & Levelling Part I & Part – II , S.K.Duggal, Tata Mc Graw-Hill
7. Text book of Surveying , S.K.Hussain & M.S. Nagaraj, S.Chand & Company
8. Plane Surveying, A.M.Chandra, New Age International Publishers.
9. Plane Surveying By Alak De S. Chand & Company, New Delhi.

GENERAL EDUCATIONAL OBJECTIVES:

Upon the completion of the study of the subject the student should be able to

1. Understand to application of levelling and plotting the Longitude and cross sections.
2. Understand the concept of contouring and know the methods of computation of Volume of reservoirs.
3. Know the methods of finding Areas and Volumes of earthwork.
4. Understand the principles theodolite of surveying.
5. Know the test and permanent adjustment of theodolite.
6. Understand the method of conducting traversing.
7. Know the construction and uses of miscellaneous instruments.

SPECIFIC INSTRUCTIONAL OBJECTIVES:

Upon the completion of the study of the subject the student should be able to:

1. Explain the different types of levelling fly levelling, check levelling, profile levelling

1.1 Understand method of plotting Longitudinal section and Cross section.
1.2 Understand the errors in levelling and precautions in minimize them.
1.3 Explain the procedure of setting grades for servers and solve simple problems

2. Understand the concepts of contouring - Know the terms used in contouring - characteristics of contours and their uses.

2.1 Explain the methods of contouring.

2.2 Know the method of interpolation by arithmetic method.
2.3 Know the trapezoidal rule for computation of Capacity of Reservoirs and solve simple problems

3. Understand the concepts of Areas and Volumes

3.1 Know the Trapezoidal Rule and Simpson's Rule to find area of irregular figures. Solve Simple problems

3.2 Know the Trapezoidal Rule and Prismoidal Rule to find Volume of earth work-cross sectioning – Level sections and Two level sections.- Solve simple problems.

4. **Understand the principles of theodolite surveying.**

4.1 Define common terms used in theodolite surveying.
4.2 Explain the different component parts of transit
4.3 Know the fundamental lines of transit and to relationship between them.
4.4 Understand the temporary adjustments of a theodolite.
4.5 Know the measurement of horizontal and vertical angles by repetition and Reiteration methods.

5. Understand the Permanent Adjustments of Theodolite

5.1 Know the method of testing & adjustment of Plate Level.
5.2 Know the method of testing & adjustment of Line of Sight.
5.3 Know the method of testing & adjustment of Horizontal Axis .
5.4 Know the method of testing & adjustment of Altitude Level.

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6. Understand the method of conducting traversing.

a. Explain the method of conducting traverse surveying in the field using a Theodolite.
b. Explain the method of checking closed and open traverse.
c. Compute the co ordinates of the station from the given field notes.
d. Compute the latitudes and departures of lines, error of closure, relative error of closure. Balance the traverse by Bowditch's method and transit rule.
e. Calculate the omitted measurements like, i) length and bearing of one side; ii) length of one side and bearing of another side; iii) length of two sides

iv) Bearing of two sides.

f. Calculate the area of a closed traverse by i)departure and total latitudes, ii)total coordinates, iii)DMD method.

8. Know the construction and uses of the following miscellaneous instruments.

i) Abney level
ii) Ceylon ghat tracer
iii) Pentagraph
iv) Planimeter (Mechanical & Digital)

MODEL QUESTION PAPER

Time : 3 Hrs] [Max marks : 100

Note: Question No.1 is Compulsory. Answer any Two full questions in each sections

Q1.

A) Fill in the Blanks with suitable words 1 x 5= 5

1. The instrument used for calculating area of a map is _____

2. The Vertical distance between any two consecutive contours is called _____

3. To apply Simpson's rule the number of ordinates must be _____

4. Canal alignment is an example of _____ traverse.

5. The telescope is said to be _____ when its vertical circle is to its left and bubble of the telescope is up.

B) Write a short note on Pentagraph**.**

SECTION – I

Q2.

a) Explain the method of plotting Longitudinal Sectioning. 5

b) In fly levelling from BM of R.L.145.605 , the following readings were observed

Back sight: 1.545 2.695 1.425 2.925

Fore Sight: 0.575 1.235 0.595

From the last position of the instruments 6 pegs at 20m interval are to set out at an uniformly rising gradient of 1 in 50, The first peg is to have a RL of 144.00 find the staff reading and RL's of the pegs. 10

Q3.

a) Write any five Characteristics of Contours. 5

b) The contractor is asked to set out a sewer grade from the following data. Find the height of the boning rod and height of Sight rail at A,B and C.

	A	B	C	D
GL	170.52	169.45	168.95	168.75
Invert	167.30	166.90	166.90	166.50

Sewer gradient is 1 in 150 falling from A to D at an interval of 60m. The height of sight rail at D is 1.75m. 10

Q4.

a) What are the objects of using Contour Maps. 4

b) Explain briefly the interpolation of Contours 4

c) The areas within contour lines at site of a reservoir and the face of the proposed dam are as follows.

Contours	Area m^2
101	1000
102	12800
103	95200
104	147600
105	872500
106	1350000
107	1985000
108	2286000
109	2512000

7

SECTION – II

Q5.

a) List the fundamental lines of Theodolite and state the relationships between them. 5

b) A road of constant RL 160.00 run from North to South. The ground from East to West is horizontal. The ground levels along the centre line of road are as follows.

Chaniage	0	30	60	90	120	150	180
RL	157.6	158.2	158.8	157.9	158.5	159.1	159.4

Find the volume of the embankment by i) Trapezoidal Rule
ii) Prismoidal Rule
for a road of 8m wide at formation with side slope 1.5 : 1 10

Q6.

a) Define the following i) Axis of Level tube ii) Swinging iii) Transiting iv) Telescope Normal 8

b) Explain briefly the Temporary adjustment of Theodolite. 7

Q7.

a) How are Vertical Angles are measured by using a Theodolite. 4

b) List out the errors in Theodolite Surveying. 4

c) Draw a neat sketch showing essential components of Theodolite. 7

SECTION – III

Q8.

a) What is error of closure? How it is balanced graphically ? 6

b) The following table gives the latitudes and departures of the sides of a closed traverse ABCD. Compute its areas. 9

Line	Latitude in m		Departure in m	
	North	South	East	West
AB	241.80		124.00	
BC		245.10	205.70	

CD		155.90		90.00
DA	186.20			239.70

Q9.

a) Write a note on Bow ditch's rule and Transit Rule. 5

b) The following lengths and bearings were recorded in running a traverse ABCDE. The length and bearing of EA have been omitted. Calculate the length and bearing of line EA.

Line	Length (m)	Bearing	
AB	217.5	120^0 15'	
BC	318.0	62^0 30'	
CD	375.0	322^0 24 '	
DE	283.5	$335^0$18'	
EA	?	?	10

Q10.

a) Explain the method of conducting the Closed Traverse by using Deflection angles. 5

b) Explain the method of Prolongation of Straight line using Theodolite. 5

c) Write a note on Ceylon Ghat Tracer. 5

Department of Technical Education
DIPLOMA COURSE IN CIVIL ENGINEERING/ CIVIL D'SHIP
Third Semester
Subject: Building Planning & Drawing

Chapter No.	Contents	No. of Hours
1	Introduction	3
2	Site plan	6
3	Building Drawings	45
4	Building Service Drawings.	18
5	Planning of Residential Building	18
6	Seminars/Visits	6
	Total	96

1 Introduction

1.1 Drawing standards and practices as per IS 962-1989. 3
1.2 IS 962-1989 code of practice for architectures and building drawings.

2 Site plans

2.1 Introduction to Local authority Building Bye-Laws 3
2.2 Preparation of site plan as per given setbacks / FAR 3

3 Building drawings

Draw the Plan, Elevation and Sectional views of the following from Given Line diagram:

3.1 Single Room Building 3
3.2 Residential Building 3
3.3 Residential Building with Pitched roof 6
3.4 Residential Building with stairs 6
3.5 Residential Building with stair case 6
3.6 School Building 3
3.7 Hostel building 3

3.8	Health / Dispensary building	3
3.9	Small workshop building	3
3.10	Restaurant / Canteen building	3
3.11	Single Storey Residential building	6
		45

4 Building Basic Services

4.1	Preparation of Drawings for Septic tank & Soak pit .	3
4.2	Preparation of water supply Layout for residential building.	3
4.3	Preparation of Sanitary Layout for residential building.	3
4.4	Preparation of Electrical Layout for residential building.	3
4.5	Preparation of Shallow Well Rain Water Harvesting Method for Building	3
4.6	Preparation of Percolation Pit(Recharge) Rain Water Harvesting Methods	3
		18

5 Planning of Residential Building

5.1	Preparation of Line diagram for residential Building from the given areas	6
5.2	Preparation of Plan for a residential Building from the given carpet areas	9
5.3	Positioning & Scheduling of Openings (door, windows & Ventilators)	3
		15

6 Seminars / Visits

6.1	Innovative Ideas regarding Building Planning Criteria	
6.2	Seminars on Need based Planning from Professionals	6
6.2	Visit to Innovative Buildings	

Books of Reference:

1 Building drawing -Shah, Kale and Patki
2 Civil Engineering Drawing & home planning-B. P. Verma
3 Civil Engineering Drawing -Gurucharan Singh
4 A Text book of Draughtsman Civil (Theory and Practical) R. S. Malik and G. S. Meo
5 Civil Engineering Drawing and Design - D. N. Ghose (CBS Publishers

GENERAL EDUCATIONAL OBJECTIVES:

Upon the completion of the study of the subject, the student should be able to

1 Know the drawing standards and practices as per IS-962-1989 and code of practice for architectures and building drawing.
2 Given the line diagram and detailed specifications, know how to draw the plan elevation and sectional view of buildings.

3 Understand the drawings pertaining to Electrical, Water supply, Sanitary and Rain water harvesting.
4 Understand drawings of various types of roofs
5 Understand the planning and drawing of different types of buildings.
6 Know the methods of preparing working drawing for staircases and Single Storeyed buildings.
7 Understand different types of Openings - Doors, Windows & Ventilators
8 Conceptualization of Advanced Building Structures
9 Understand the innovative ideas of Advanced Building Planning

SPECIFIC INSTRUCTIONAL OBJECTIVES:

Upon completion of the course, the student should be able to:

1.0 Know the drawing standards and practices as per IS 962-1989 and code of practice for architectural and building drawings.

1.1 Mention the drawing standards as per IS.IS 962-1989

2.0 Given the line diagram and detailed specifications, knows how to draw the plan, elevation and sectional views of buildings.

2.1 Know the local authority Rules, Regulations and Bye Laws of Buildings
2.2 Given the size of site, draw the site plan as per local authority Bye Laws
2.3 Know the FAR from the Site Plan

3.0 Given the line diagram of the plan, draw the detailed plan for residential building, school, hostel, dispensary, workshop and restaurant.

3.1 Draw the Plan & front elevation for the above buildings.
3.2 Draw the sectional views along shown section line of the above building.
3.3 Draw the sectional views along shown section line of the pitched roof building.

4.0 Understand Building services drawings.

4.1 Draw the water supply layout plan indicating necessary fixtures, given the site plan and plan of the building.
4.2 Draw the sanitary layout plan indicating the sanitary fixtures, given the necessary details.
4.3 Draw the plan and sectional elevation of a septic tank given the details.
4.4 Draw the layout plan of water connection works like underground sump and overhead tank and water supply system given details.
4.6 Incorporate the Electrical Layout diagram in plan of Building.
4.3 Draw the plan and sectional elevation of a Shallow well / Percolation pit of Rain water harvesting.

5.0 Planning of Residential Building

5.1 Understand the components arrangement of Residential Building
5.2 Understand the Opening requirements, Positioning and scheduling
5.3 Draw the single line diagram of residential Building from the given room sizes

5.4 Draw the Plan of residential Building from the given carpet area

6.0 Seminars / Visits

6.1 Arrange Seminars on Innovative Ideas regarding Building Planning Criteria
6.2 Collection of information from Internet regarding Innovative Ideas
6.3 Seminars on Need based Planning from Professionals
6.4 Field Visit to Innovative Buildings

Third Semester
Subject: Building Planning & Drawing

Model Question Paper

Duration : 4 Hours **Max. Marks 100**

Note: Answer all full questions.

Part - A

Q.1 Draw the site plan to a scale of 1:200. Apply local building Bye-laws

Site No.		100	
Site Dimension		9 x 12 m	
Orientation			
	East	30 m Road	
	West	Site No 205	
	North	Site No 101	
	South	Site No 99	**10**
Building Coverage		75%	

2. The line diagram shown in the figure for a proposed Residential Building with clear dimensions. Draw to a scale of 1:50 the following views

a) Plan **20**
b) Section on AA **20**
c) Front Elevation **10**

Construction details & Specifications are as follows

Foundation : 900mm wide & 1000mm deep with Concrete bed 1:4:8 200mm thick and Two courses of size stone masonry in CM 1:8, 400mm depth of each course

Basement : Dressed size stone masonry in CM 1:6, 450mm wide 600mm depth includes 150mm PCC 1:3:6

Super structure :

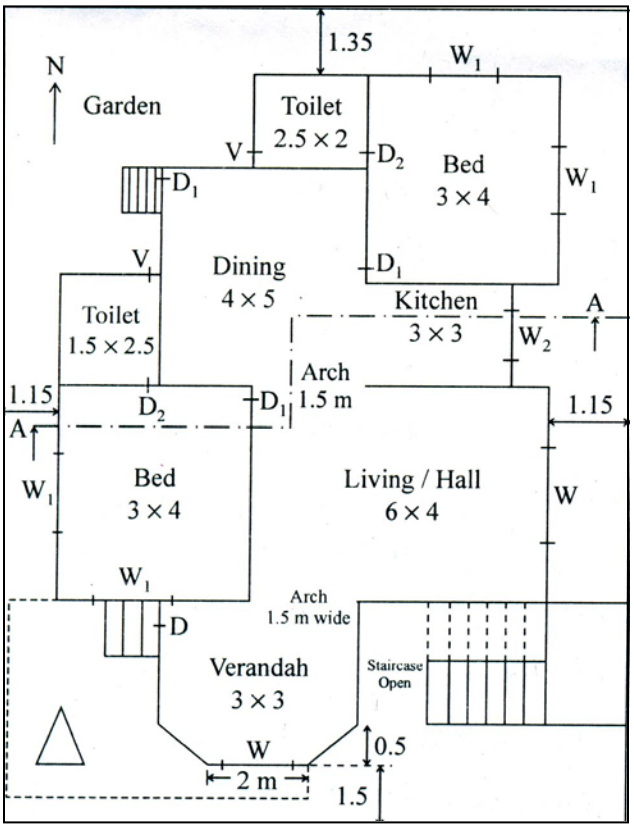
a) BBM in CM 1:6 of 230mm thick for all walls
b) Sill 100mm thick of PCC 1:3:6

c) RCC Lintel 200mm thick of CC 1:2:4
d) RCC Chejja 600mm wide, 150mm thick at support and 50mm thick at end
e) RCC roof slab 150mm thick of CC 1:2:4 at 3000mm ceiling height
f) WPC 100mm thick average
g) Granite flooring 20mm thick over a CC 1:4:8 bed of 100mm thick
h) BBM in CM 1:6 Parapet wall of 150mm thick, 600mm height

Steps : Provide Suitable rise & tread

Schedule of Openings for Doors, Windows and Ventilators

Opening	Size
D	1100 x 2100 mm
D1	1000 x 2100 mm
D2	900 x 2100mm
W	1800 x 1200 mm
W1	1500 x 1200 mm
W2	1200 x 750 mm
V	900 x 600 mm



3. Draw the water supply & sanitary layout to the above building Plan

OR

Draw the Plan & Sectional view of a shallow well of Rain water Harvesting

20

4. Prepare & Draw line diagram to a scale of 1:100 for a residential building, from the given requirements. Provide suitable size & Positions of Openings

Verandah	2.7 x 3.0 m
Hall	7.0 x 4.0 m
Room	4.0 x 3.0 m
Bath room	2.0 x 2.5 m
WC	1.4 x 1.2 m

20

Department of Technical Education
DIPLOMA IN CIVIL ENGINEERING**/** CIVIL D'SHIP
Third Semester
Subject: Material & Soil Testing Laboratory

Contact Hrs/Week/Batch : 6 Hrs. **Contact Hrs/Sem: 96 Hrs.**
No. of Students/Batch 20

Sl. No:	Contents	No. of Hours
	PART - A	
1	Tests on Cement	12
2	Tests on Aggregate	18
3	Tests on Concrete	18
	PART - B	
4	Tests on Road Materials	9
5	Tests on Building Materials	6
6	Tests on Soils	18
7	Seminar/Visits..	9
8	Tests	6
	Total	**96**

PART A

1 Tests on Cement as per IS code

1.1	Determination of Fineness by Surface area (Blaine air Permeability app.)	3
1.2	Determination of Specific gravity	3
1.3	Normal Consistency	3
1.4	Initial setting time	
1.5	Test on Grade of Cement (Mortar Cube)	3
		12

2 Tests on Aggregate as per IS code

2.1	Specific gravity of Fine Aggregate	3
2.2	Sieve Analysis of Fine Aggregate for Gradation	3
2.3	Bulking of sand.	3
2.4	Specific gravity of Coarse Aggregate	3
2.5	Sieve Analysis of Coarse Aggregate for Gradation	3
2.6	Bulk Density(loose) of Coarse Aggregate	3
		18

3	**Tests on cement concrete as per IS code**		
	3.1	Slump test	3
	3.2	Compaction factor test	3
	3.3	Casting Concrete cubes and cylinders.	3
	3.4	Compressive strength of concrete cubes and cylinders.	3
	3.5	Split Tensile Test on concrete Cylinder	3
			15
		PART B	
4	**Tests on Road Materials as per MORTH Specifications**		
	4.1	Sieve Analysis of Road aggregate for Gradation	3
	4.2	Abrasion test on road aggregates by Los Angeles Abrasion Testing Machine	3
	4.3	Impact test on road aggregates.	3
			9
5	**Tests on Building Materials as per IS Code**		
	5.1	Compression test on bricks.	
	5.2	Water absorption test on bricks	3
	5.3	Tensile test on steel	
	5.3	Modulus of Rupture test on wooden beam (Demo only).	3
	5.4	Compressive strength of Solid / Hollow concrete Blocks.	3
			9
6	**Tests on Soils as IS code**		
	6.1	Grain Size analysis of soils	3
	6.2	Extraction of disturbed and undisturbed soil samples	3
	6.3	Tests on Moisture content of soil (Oven drying method)	3
	6.4	Field Density of Soil By Core cutter	3
	6.5	Standard Proctor Compaction Test on soil	3
	6.6	Atterberg limits	
		a) Liquid limit	
		b) Plastic limit	3
			18
7	**Seminar/Visits..**		
	7.1	Test Report formats and reading Specifications	6
	7.2	Writing reports	6
	7.3	Innovative Testing methods and equipments	6
			18

References

1. Concrete Technology By MS Shetty (S. Chand Publication 16 Edition)

2. IS Codes

IS 8112:1989 -43 Grade OPC Specification

IS 12269:1987 -53 Grade OPC Specification

IS 1489(PART -I) :1991- Portland Pozolona Cement Specification

IS 383:1970 – Specification for Coarse & fine Aggregate for Concrete

IS 456 :2000 – Pain & RCC Code of Practice

IS 1786:1985 – Specification for HYSD Steel bars & wires for RCC

IS 2185 PART-I :1979 – Specification for Concrete Masonry Units Hollow & Solid Concrete Blocks

IS 1077 :1992 – Common Burnt Clay Building Bricks Specifications

IS 2720 Part III – Determination of water contents of Soil

IS 2720 Part IV – Grain size analysis of Soil

IS 2720 Part V– Determination of Liquid limits & Plastic Limits of Soil

3. Material Testing Lab Manual – Gambir

4. Soil Testing Manual – HD Charan & KS Grover

5. MORTH (Ministry Of Road Transport and Highways) Specifications

Department of Technical Education
DIPLOMA IN CIVIL ENGINEERING
Third Semester
Subject: Material & Soil Testing Laboratory

Scheme of Examination

In the examination, the students have to be given
One question from Part A and One question from Part B

1	Writing Procedure for Two Question (10+10)	20
2	Conduction of One Experiment	20
3	Tabulation/Calculation	30

4	Result / Conclusion		5
5	Viva		20
6	Record		5
		Total	**100**

Department of Technical Education
DIPLOMA IN CIVIL ENGINEERING
Third Semester
Subject: Material & Soil Testing Laboratory

List of Equipements and Apparatus

Sl.No	Name of Equipments and Apparatus	No
1	Blaine's permeability Apparatus	6
2	Density/specific Gravity Bottle	6
3	Vicat Apparatus with Accessories	6
4	Mortar cube Moulds 50mm2 (7.06x7.06)	6
5	Pycnometer	6
6	Sieve10, 4.75, 2.36, 1.18mm, 600,300,150micron with lid & Pan(Concrete Fine agg.)	2 sets
7	Measuring Jars of 1000, 500, 100, 10ml	3
8	Mechanical sieve Shaker for the above set of sieves	1
9	Sieve 80, 40, 20, 4.75 mm with Lid & Pan(Coarse Agg.)	2sets
10	Measuring Cylinder(metal) 15 l, 250mm dia and 300mm height	3
11	Mechanical sieve Shaker for the above set of sieves	1
12	Slump Cone with accessories	3
13	Compaction factor testing machine	3
14	Concrete cube moulds150x150x150mm	6
15	Concrete cylindrical moulds150mm dia, 300mm height	3
16	Compression Testing Machine of 200 tonne capacity	1
17	Universal Testing Machine of 40 tonne capacity	1

18	Sieve 125, 90, 63, 45, 22.4, 13.2, 11.2 mm with Lid & Pan(Road aggregate)	2sets
19	Mechanical sieve Shaker for the above set of sieves	1
20	Los angels abrasion testing machine with charges	1
21	Impact testing machine with 12.5mm & 10mm Sieve with lid & pan	1
22	Digital weighing Balance 12 kg capacity with minimum 1 gm accuracy	3
23	Hot air Oven	1
24	Steel containers	10
25	Core cutter with dolly	3
26	Standard proctor compaction apparatus	2
27	Atterberg limits apparatus	2
28	Sieve100,63,40,20,,10,4.75,2 ,1 mm &600,425,212,150,75 micron with lid & pan (Soil test)	2

Government of Karnataka
Department of Technical Education

DIPLOMA COURSE IN CIVIL ENGINEERING/ CIVIL D'SHIP

Third Semester

Subject: Surveying Practice – II

Contact Hrs/Week: 6 Hrs **Contact Hrs/Sem:96Hrs.**

Chapter No.	**Contents**	**Contact Hours**
1.	Leveling Application	24
2.	Contouring	15
3.	Theodolite surveying	15
4.	Theodolite Traversing	21
5.	Miscellaneous Instruments	
6.	Innovations/Field visits/seminars	6
	Tests	6
	Total	96

GRADED EXERCISES

1. Determination of R.L of TBM from given B.M. by Fly levelling 3

2 .Finding R.L of Chejja or Canopy with respect to RL of given B.M 6

3.Longitudinal and cross sections for a road 6
.

4.Plotting the above longitudinal and cross-sectioning. 3
work

5.Taking the levels of an excavated portion and calculating the earth 6
work

6.Locating the contour points by Radial method 3

7.Conducting block levels of an area 6

8.Plotting and drawing contour lines of the above 6 & 7 6

9.Study of parts of transit theodolite and temporary adjustments 3

10. Reading horizontal and vertical angles 3

11.Measurement of horizontal angle by repetition method. 3

12.Measurement of horizontal angle by reiteration method. 3

13.Measurement of vertical angle.	3
14. Prolonging a straight line and ranging	3
15 Open traversing using theodolite and plotting	6
16. Conducting a closed traverse of a given area and balancing it by (I) Bow ditch's Rules	6
ii) Transit Rules	6
17. Finding the area of a given map/sketch using planimeter	6
18. Determine the gradient of a road using Ceylon ghat tracer	3
Revisions	6
Tests	6

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REFERENCES

1. Surveying & Levelling Part I & Part – II , T.P.Kanetkar & S.V.Kulakarni, Pune Vidyarthi Griha Prakashan
2. Surveying & Levelling Part I & Part – II , Dr. B.C.Punmia, Laxmi Publications
3. Surveying & Levelling , N.N. Basak, Tata Mc Graw-Hill
4. Surveying & Levelling Part I & Part – II , S.K.Duggal, Tata Mc Graw-Hill
5. Text book of Surveying , S.K.Hussain & M.S. Nagaraj, S.Chand & Company
6. Plane Surveying, A.M.Chandra, New Age International Publishers.

OBJECTIVES

Upon completion of the study of the subject the student should be able to : -

1) Use Dumpy level or Tilting level to determine the RL of shown points and to obtain Profile & Transverse level of Ground
2) Determine the Contour lines of the Ground
3) Study of Theodolite and use of instrument
4) Use the transit Theodolite to carryout open and closed traverse work.
5) Use of Minor Instrument like Ceylon Ghat Tracer and Planimeter.

SCHEME OF EXAMINATION FOR PRACTICAL EXAMINATION

SURVEYING PRACTICE-II

1. Writing procedure for given experiment ------- 15 marks
2. Conducting of Experiment on field & Observation of reading and entry---------- 30 marks
3. Calculations---------- 20 marks
4. Results---------- 10 marks
5. Oral---------- 20 marks
6. Record---------- 05 marks

TOTAL 100 marks

LIST OF EQUIPMENTS REQUIRED FOR SURVEYING PRACTICE – II & III

NOTE:

- ONE BATCH SHOULD CONSISTS OF **15 TO 20** STUDENTS
- ONE GROUP CONSISTS OF **5** STUDENTS
- THERE MAY BE **3 TO 4** GROUPS IN A BATCH

SL NO	EQUIPMENTS	QUANTITY
1	AUTO / QUICK SETTING LEVEL WITH ACCESSORIES	05
2	THEODOLITE WITH ACCESSORIES	05
3	METRIC CHAINS 20M	03
4	ARROWS	15
5	TAPE 15M	05
6	TAPE 30 M	05
7	RANGING RODS	10
8	CROSS STAFF, FRENCH CROSS STAFF , OPEN CROSS STAFF	02 EACH
9	DIGITAL PLANIMETER	01
10	CEYLONE GHAT TRACER	01
11	ELECTRONIC THEODOLITE WITH ACCESSORIES	01
12	ELECTRONIC DISTO METER(EDM) WITH ACCESSORIES	01
13	G.P.S INSTRUMENT	02
14	TOTAL STATION WITH ACCESORIES	01

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING (General)

FOURTH SEMESTER

Scheme of Study and Examination (W.E.F. 2010 - 11)

Q P CODE	Theory Subject	Contact Hours			Exam. Duration	Scheme of Examination			Total Max. Marks	Min Marks for passing (with IA)
						End. Exam		*I. A. Marks		
		Theory	Practical	Total		Max. Marks	Min. Marks for passing			
9CE41	Hydraulics	4	-	4	3	100	35	25	125	45
9CE42	Environmental Engineering-II	4	-	4	3	100	35	25	125	45
9CE43	Water Resources Engineering	4	-	4	3	100	35	25	125	45
9CE44	Surveying-III	4	-	4	3	100	35	25	125	45
	Drawing /Practical									
9CE45P	Hydraulics & Environmental Lab	-	6	6	3	100	50	25	125	60
9CE46P	Building Drawing using CAD	-	6	6	3	100	50	25	125	60
9CE47P	Surveying Practice-III	-	6	6	3	100	50	25	125	60
	Total	**16**	**18**	**34**		**700**	**290**	**175**	**875**	**360**

Department of Technical Education
DIPLOMA IN CIVIL ENGINEERING/ CIVIL D'SHIP
FOURTH SEMESTER CIVIL ENGINEERING
SUBJECT: HYDRAULICS

Contact Hrs/Week: 4 Hrs. **Contact Hrs/Sem:64 Hrs**.

TOPICS

CHAPTER NO	CONTENTS	NO OF HOURS	MARKS WEIGHTAGE IN EXAM
	PART-A		
1	**Fundamentals of Hydraulics**	**05**	**12**
2	**Total Pressure and centre of pressure**	**06**	**15**
3	**Flow of fluids**	**08**	**20**
	PART-B		
4	**Flow through orifices and mouthpieces**	**08**	**20**
5	**Flow over notches**	**05**	**14**
6	**Flow over weirs**	**05**	**14**
	PART-C		
7	**Flow through channels**	**07**	**20**
8	**Flow through Pipes**	**06**	**15**
9	**Pumps and turbines**	**05**	**15**
10	**Seminars, field/technical visit, inventions/innovations, demonstrations, workshops etc**	**05**	**-----**
11	**Tests and revision**	**04**	**----**
		64	**145**

FOURTH SEMESTER CIVIL ENGINEERING
SUBJECT: HYDRAULICS

DETAILS OF CONTENTS

1. **FUNDAMENTALS OF HYDRAULICS**

Fluid, classification and properties of fluids

Pressure and its measurements: Definition of Hydrostatic pressure, atmospheric pressure, gauge pressure, absolute pressure, vaccum pressure, intensity of pressure and pressure head

Measurement of pressure: Manometer, U-tube , differential manometer, simple problems

2. TOTAL PRESSURE AND CENTRE OF PRESSURE

Total pressure and centre of pressure on vertical planes like, triangular , rectangular and circular plane surfaces (simple problems)

Practical applications of centre of pressure, sluice gates (only theory)

3. FLOW OF FLUIDS

Types of flow, stream line , turbulent, steady and unsteady, uniform and non uniform

Discharge and continuity equation- simple problems

Energies in fluid motion- potential, kinetic and pressure head

Bernoulli's theorem(without proof) –simple problems

Horizontal venturimeter, theory and simple problems

4. FLOW THROUGH ORIFICES AND MOUTHPIECES

Definition and types of orifices, vena contracta, hydraulic co-efficients and their relationship (only theory)

Flow through rectangular and circular orifice (simple problems without derivation)

Flow through submerged and partially submerged orifices

Mouth pieces- different types and their uses, convergent, divergent and Borda's mouth piece.

5. FLOW OVER NOTCHES

Definition of notch, and its types, discharge calculation for rectangular, triangular and trapezoidal notch (simple problems without derivation)

6. FLOW OVER WEIRS

Definition of weir, discharge over rectangular and cippolitte weir (simple problems without derivation)

Types of weirs and their uses (only theory)

7. FLOW THROUGH CHANNELS

Definition and classification of channels

Discharge through channels using Chezy's and Manning's formula(no derivation – simple problems only)

Most economical sections for rectangular and trapezoidal channels

8. FLOW THROUGH PIPES

Loss of fluid friction

Types of losses, major and minor losses

Darcy's formula for head loss due to friction(simple problems, on major and minor losses)

Hydraulic gradient and total energy line

Flow through single pipe

Flow from one reservoir to another reservoir through single pipe

Water hammer, surge tanks (only theory)

9. **PUMPS AND TURBINES**

Working principle of reciprocating, centrifugal and deep well pumps

Maintenance of pumps

Turbine, types and its working principle of Pelton and Francis turbine

GENERAL EDUCATIONAL OBJECTIVES:

Upon completion of the study of the subject the student should be able to

1. Comprehend the fluid pressure and its measurement
2. Know the importance of total pressure and centre of pressure
3. Comprehend the general principles of the flow of a fluid and energies of fluid
4. Understand the principles of flow through orifices and mouth pieces
5. Determine the discharge for different types of notches.
6. Determine the discharge for different types of weirs
7. Understand the terms and principles of flow through channels of most economical sections
8. Understand the terms and principles of flow through pipes.
9. Understand the working principles of pumps and turbines

SPECIFIC INSTRUCTIONAL OBJECTIVES:

1.0 Comprehend the fluid pressure and its measurement.

1.1 Know the definition of fluid, its classification and important properties and their SI units (simple problems)

1.2 Understand the definition of Hydrostatic pressure, atmospheric pressure, gauge pressure, absolute pressure, vaccum pressure, intensity of pressure and pressure head

1.3 Measurement of pressure using simple manometer and differential manometer, simple problems on them

2.0 Know the importance of total pressure and centre of pressure

2.1 Understand the concept of total pressure and centre of pressure on vertical planes like, triangular , rectangular and circular plane surfaces

2.2 Simple problems on the above
2.3 Know the practical applications of center of pressure (sluice gates)

3.0 Comprehend the general principles of the flow of a fluid and energies of fluid

3.1 Definition of various types of fluid flow. stream line , turbulent, steady and unsteady,
uniform and non uniform
3.2 Establish the equation of continuity of flow.(simple problems)
3.3 Know the type of energies of fluid in motion.(potential, kinetic and pressure head)
3.4 State Bernoulli's theorem for total energy and its equation(simple problems)
3.6 Application of Bernoulli's equation for horizontal venturimeter(Theory equation and
simple problems).

4.0 Understand the principles of flow through orifices and mouth pieces.

4.1 Know the definition of orifice and Classify the different types of orifices
4.2 Define the terms Vena contracta , hydraulic coefficients and their relationships
4.3 Understand the flow through rectangular and circular orifice and simple problems
4.4 Understand the concept flow through submerged and partially submerged orifice.
4.5 List the various types of mouthpieces., differentiate between internal and external
mouth piece

5.0 Determine the discharge for different types of notches.

5.1 Definition and types of notches
5.2 Know the Formula for discharge over rectangular notch, trapezoidal notch and triangular notches.(simple problems)

6.0 Determine the discharge for different types of weirs

6.1 Definition and type of weirs
6.2 State the formula for discharge over a rectangular weir and cippolette weir(simple problems)
6.3 Francis formula for the discharge over a rectangular weir(simple problems)

7.0 Understand the terms and principles of flow through channels of most economical sections

.

7.1 Define the terms: wetted perimeter and hydraulic mean depth.
7.2 Knowledge of Chezy's formula for discharge through open channel.
7.3 Calculate the discharge through a rectangular and trapezoidal channel using Chezy's formula.
7.4 State Manning's formulae for discharge through open channel.

7.5 Calculate the discharge through rectangular and trapezoidal channels using above formulae.
7.6 Explain the most economical cross section of a channel.
7.7 State the conditions for most economical section of a rectangular and trapezoidal channel.
7.8 Calculate the discharge for most economical section of rectangular and trapezoidal channels from the given parameter.
7.9 Calculate the max. velocity and max. discharge in a channel of circular section
7.10 Explain the terms - specific energy, critical depth, critical velocity for non-uniform flow.
7.11 Explain the hydraulic jump and its applications.

8.0 Understand the terms and principles of flow through pipes.

8.1 State the law's of fluid friction for uniform flow.
8.2 To know the types of losses of flow in a pipe –major and minor losses
8.3 Know and apply Darcy's formula for head loss due to friction in a pipe flow from given parameters.
8.4 Define and Sketch the hydraulic gradient and total energy lines.
8.5 Calculate the discharge from one reservoir to another reservoir through a single pipeline.
8.6 Explain the effect of water hammer.
8.7 Outline the use of surge tank

.

9.0 Understand the working principles of pumps and turbines

.

9.1 Explain the working principles of a reciprocating pump, centrifugal pump and deep well pump-theory and sketch
9.2 Explain the maintenance of pumps
9.3 Define turbine , classification of turbines, differentiate between impulse and reaction turbine and its working principle

REFERENCE BOOKS

1. Hydraulics and Fluid Mechanics - Dr. P.N.Modi and Dr S.M.Seth (Standard Book House, Delhi - 6)
2. Hydraulics By H S Vishwanath, Sapna Publications.
3. Hydraulics, Fluid Mechanics and Hydraulic Machines R S Khurmi (S Chand and Company, Ramnagar New Delhi - 110 055)
4. Hydraulics and Fluid Mechanics - Dr. Jagadish Lal
5. Hydraulics and Fluid Mechanics - Abdulla Sheriff
6. Hydraulics and Hydraulic Machinery V. Thanikachelam T.T.T.I Madras - 600 113
7. Hydraulics, Fluid Mechanics and Fluid Machines Bansal A R (Laxmi publication, New Delhi- 110 002)
8. Hydraulics, Fluid Mechanics and Fluid Machines - S.Ramamrutham

DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN CIVIL ENGINEERING(D'SHIP) FOURTH SEMESTER
SUBJECT: HYDRAULICS
MODEL QUESTION PAPER

Duration : 3 Hours Max. Marks: 100

Instructions: 1. SECTION-I is compulsory.
2. Answer any two full questions from the remaining sections

SECTION-I

Q1	**(a)**	Fill in the blanks	1 x 5=05
	(i)	……. is an instrument used to determine fluid pressure	
	(ii)	The relationship between three hydraulic co-efficient is given by ……	
	(iii)	……. is an hydraulic device used to convert mechanical energy to hydraulic energy	
	(iv)	The condition for orifice to be large is ……	
	(v)	…… is used to determine discharge flowing through a pipeline	
	(b)	What are manometers? List and explain any one type	05

SECTION-II

Q2	**(a)**	Define the following i) specific gravity ii) specific weigh iii) viscosity iv) surface tension v)capillarity	05
	(b)	Determine pressure of a liquid of specific gravity 1.25 at a depth 10m below its free surface.	05
	(c)	Define total pressure and centre of pressure	05
Q3	**(a)**	A circular plate of diameter 3m is immersed in water in such a way that its centre is at a depth of 5m below the free surface. Determine the total pressure and centre of pressure exerted by the liquid on the plate	07
	(b)	What are sluice gates? Explain its practical application	03
	(c)	Differentiate between a) steady flow and unsteady flow b) uniform and non uniform flow	05
Q4	**(a)**	What are the limitations of Bernoulli's theorem	03
	(b)	A circular pipe tapered in section is 100mm diameter at one end which is 2m above datum and 250mm diameter at other end which is 6m above datum. The pressure and velocity of water flowing at lower end is 200 KN?m2 and 10m/sec respectively. Determine the pressure at the other end	06

	(c)	A venturimeter 200 X 100 mm is used to determine discharge of water flowing through a pipe. The U-Tube differential mercury manometer fitted shows a differential reading of 40 mm. Determine the discharge of water flowing through the pipe	06

SECTION-III

Q5	**(a)**	What are orifices? Mention its different types and explain any one type	05
	(b)	An orifice of 20mm diameter is provided to determine discharge of water flowing through the tank. The depth of water is 4m above the centre of the orifice. Determine discharge of water flowing through the orifice	06
	(c)	Differentiate between submerged and partially submerged orifice	04
Q6	**(a)**	What are mouth pieces? Mention its different types and explain Borda's mouth piece	05
	(b)	Determine discharge through a rectangular notch having breadth 100mm and depth of flow over the crest of the notch being 28mm. The co-efficient of discharge being 0.6	06
	(c)	Mention the advantages of V-notch over rectangular notch	04
Q7	**(a)**	Mention different types of weirs? Explain their practical application	04
	(b)	A rectangular weir is used to determine a discharge of 3m/sec. The maximum depth of flow over the weir is being 100mm. Determine the breadth of the weir to allow the above discharge. Take Cd of the weir as 0.6	07
	(c)	Mention the difference between notch and weir	03

SECTION-IV

Q8	**(a)**	Define most economical section	04
	(b)	Design most economical rectangular section to carry a discharge of 10m3/sec given Chezy's constant 55 and bed slope 1 in 1500	08
	(c)	Define hydraulic gradient line and total energy line	03
Q9	**(a)**	An earthen channel with a 3m wide base and sied slopes 1:1 carries water with a depth of 1m. The bed slopes is 1 in 1600. Estimate the discharge. Take value of N in Manning's formula as 0.04	08
	(b)	A reservoir has been built 4km away from a college campus having 5000 inhabitants. Water is to be supplied from the reservoir to the campus. It is estimated that each inhabitant will consume 200 liters of water per day and that half of the daily supply is pumped within 10 hours. Calculate the size of the supply main, if the loss of head due to friction in pipeline is 20m. Assume co-	07

efficient of friction for the pipeline as 0.008

Q10	**(a)**	Find the loss of head due to friction in a pipe of 500mm diameter and 1.5km long. The velocity of water in the pipe is 1meter per sec. take co efficient of friction as 0.005	05
	(b)	Explain the working principle of reciprocating pump	05
	(c)	Differentiate between impulse and reaction turbine	05

Department of Technical Education

DIPLOMA IN CIVIL ENGINEERING/ CIVIL D'SHIP

Fourth Semester

Subject: Environmental Engineering - II

Contact Hrs/Week: 4 Hrs. Contact Hrs/Sem:64 Hrs.

TOPIC ANALYSIS

Chapter No:	Contents	No. of Hours	Weightage of marks
	PART - A		
1	Introduction to Sanitary Engineering	02	05
2	Quantity of Sewage	03	08
3	Characteristics and Analysis of sewage	05	12
4	Sewerage Systems	03	08
5	Surface and Storm Water Drainage	04	12
	PART - B		
6	Sewerage Appurtenances	05	15
7	Sewerage Treatment and Disposal	13	30
8	Solid Waste Disposal	04	10
	PART - C		
9	Sanitation In Buildings and Sanitary Fittings	04	10
10	Rural Water Supply and Sanitation	05	15
11	Air and Noise Pollution	08	20
12	Tests	03	--
13	Creativity and Innovation	05	--
	Total	64	145

DETAILS OF CONTENTS

PART - A

1 Introduction to Sanitary Engineering

1.1 Definition of sullage, sewage, sewerage, sewer, refuge, garbage.

1.2 Aims and objectives of sewerage work, systems of refuge disposal and water carriage systems.

2 Quantity of Sewage

2.1 Domestic and industrial sewage, volume of domestic sewage, variability of flow, limiting velocities of sewer.

2.2 Simple problems on design of sewers.

3 Characteristics and Analysis of Sewage

3.1 Strength of Sewage, Sampling of Sewage to analyse for Physical, Chemical and Biological Parameters.

3.2 Analysis of Sewage - Significance of the following Tests for i) Solids ii) Dissolved Oxygen iii) B.O.D iv) C.O.D v) pH value vi) Chlorides and vii) Residual chlorine.

4 Sewerage Systems

4.1 Types of Sewerage System and their Suitability - Separate, Combined and Partially Separate Systems.

4.2 Brief Description and Suitability of the following Types of Sewers - Stoneware, Cast Iron, Cement Concrete, AC Pipes, Pre-Cast Sewers and

laying of sewers.

5 Surface and Storm Water Drainage

5.1 Determination of Storm Water Flow, Run-Off, Co-Efficient, Time of Concentration, Empirical Formulae for Run-Off.

5.2 Simple Problems on Design of Storm Water Sewers.

5.3 Surface Drains - Requirements, Shapes, Laying and Construction. (No Design)

PART - B

6 Sewerage Appurtenances

6.1 Brief description, Location, Function and Construction of i) Manholes ii) Drop Manholes iii) Inlets iv) Catch Basins, v) Traps vi) Flushing Tanks vii) Regulators.

7 Sewerage Treatment and Disposal

7.1 Preliminary Treatment - Brief Description and Functions of - i) Screens ii) Skimming Tanks iii) Grit Chambers.

7.2 Brief Description and Function of the Sedimentation and Septic Tanks.

7.3 Secondary Treatment - Brief Description of
i) Trickling Filters ii) Activated Sludge Process iii) Sludge Digestion iv) Sludge Drying v) Sludge Disposal.

7.4 Sewage Disposal- Dilution, Disposal on Lands, Oxidation Ponds, Oxidation Ditches, Aerobic Lagoons, Anaerobic Lagoons, Biological Disc.

7.5 Recycle of wastewater.

8 Solid Waste Disposal

8.1 Segregation, Collection, Methods of Disposal - Uncontrolled Dumping, Sanitary Land Fill, Incineration, Composting-Vermiculture.

8.2 Reuse of Solid Waste.

PART - C

9 Sanitation in Buildings and Sanitary Fittings

9.1 Importance and Requirement of Building Drainage, General Lay-out of Sanitary Fittings and House Drainage Arrangements, for Single and Multi-Storied Buildings as Per B.I.S Code of Practice.

9.2 Sanitary Fittings: Water Closets, Flushing Cisterns, Urinals, Inspection Chambers, Traps, Anti-syphonage. Inspection, Testing and Maintenance of sanitary fittings.

10 Rural Water Supply and Sanitation

10.1 Disinfection of Well Water.

10.2 Rural Sanitation and Sanitary Latrines, Brief Description of Operational Details of Bio-Gas Plants Using Cow Dung, Night Soil and Agricultural Waste.

11 Air and Noise Pollution

11.1 Air Pollution -Definition, Causes and Classification of Air Pollutants, Effects of Pollution on Human Beings, Animals and Plants.

11.2 Effects of Air Pollution – Acid rain, Global warming, Ozone depletion, Green house effect, Corrosion of Metals, Tarnishing of Paints.

11.3 Prevention and control of Air Pollution - List of Air Pollution Control Equipments and legislation.

11.4 Noise- Definition, Effects on Human Life And Control.

11.5 Legislations with respect to Air and Noise pollution

Department of Technical Education

DIPLOMA IN CIVIL ENGINEERING

Fourth Semester

Subject: Environmental Engineering - II

Contact Hrs/Week: 4 Hrs. Contact Hrs/Sem:64 Hrs.

GENERAL EDUCATIONAL OBJECTIVES:

Up on the completion of the study of the subject, the student should be able to :

1. Know the importance of sanitation, various terms and systems of refuge and refuge disposal.
2. Compute the volume of sewage from different sources and understand the principles of designing a sewage.
3. Analyse the sewage for physical, chemical and biological characteristics and different tests conducted for analysis.
4. Know the types of sewerage systems and their suitability, types of sewers and stages involved in laying of sewers.
5. Estimate the quantity of surface and storm water.
6. Understand location and function of various types of sewer appurtenances with brief Constructional details.
7. Know the methods of primary, secondary and chemical treatments of sewage and its disposal.
8. Familiarise with the methods of solid waste disposal.
9. Know the sanitation single and multi-storied buildings including various sanitary Fittings and their maintenance.
10. To be familiar with Rural water supply and sanitation.
11. Know the causes, types, effects and control of Air and Noise pollution.

SPECIFIC INSTRUCTIONAL OBJECTIVES:

1. Know the importance of sanitation , various terms and systems of refuge and refuge disposal.
   - 1.1 To know the various terms used in sanitation
   - 1.2 Know the aims and objectives of sewerage work, system of refuge disposal – water carriage system
2. Compute the volume of sewage from different sources and understand the principles of designing a sewage.
   - 2.1 Know the variability of flow under different conditions and limiting velocity of sewer.
   - 2.2 Explain the principles of designs of sewers with simple problems
3. Analyse the sewage for physical, chemical and biological characteristics and different tests conducted for analysis.
   - 3.1 Define strength of sewage, methods of sampling of sewage.
   - 3.2 State the significance of the following terms in sewage analysis and its limits.
     (i) Solids (ii) Dissolved oxygen (iii) B.O.D. (iv) C.O.D. (v) pH value
     (vi) Chlorides (vii) Residual chlorine

4 Know the types of sewage systems , the choice of sewage and various stages involved in laying of sewers.

- 4.1 Know the different types of sewerage systems and state the suitability of each type of sewerage system for the given condition.
- 4.2 Explain the various types of sewers, stone ware, cast - iron, cement concrete AC pipes, pre-cast sewers and cast in situ sewers and laying.

5 Estimate the Quantity of surface and storm water drainage.

- 5.1 Calculate the storm water flow using empirical formula for run- off.
- 5.2 Design the storm water sewers.
- 5.3 Explain different shapes of surface drains and their functions.

6 Understand location and function of various types of sewer appurtenances with brief constructional details

- 6.1 Know the description, location function and construction of various types of sewer appurtenances (i) Manholes (ii) Drop manholes (iii) Inlets (iv) Catch basins (v) Traps (vi) Flushing tanks (vii) Regulators.

7 Know the methods of primary and secondary treatments of sewage and its disposal.

- 7.1 State the functions of (i) Screens (ii) Skimming tanks (iii) Grit chamber
- 7.2 Briefly describe the functions of sedimentation tanks and septic tank.
- 7.3 Describe the process of secondary treatment of sewerage (i) Tricking fitters (ii) Activated Sludge process (iii) Sludge digestion (iv) Sludge drying (vi) Sludge disposal.
- 7.4 Explain the sewage disposal by dilution, disposal on lands , oxidation ponds, Oxidation ditches, aerobic lagoons, anaerobic lagoons, biological disc.
- 7.5 Recycle of Wastewater.

8 Familiarise with the methods of solid waste disposal.

- 8.1 Know the segregation, Collection of solid waste.
- 8.2 Know the methods of solid waste disposal - uncontrolled dumping , sanitary land fill, incineration, composting-vermiculture

9 Know the sanitation single and multi-storied buildings including various sanitary fittings and their maintenance.

- 9.1 State the importance and requirements of building drainage. Describe the layout of sanitary fittings and house drainage arrangements for building (Plan and section for Single and multi-storied)
- 9.2 Inspection, testing and maintenance of different sanitary fittings - water closets , flushing cisterns, urinals, inspection chambers, traps, anti-syphonage

10 Be familiar with Rural water supply and sanitation.

- 10.1 Know the disinfection of well water
- 10.2 Familiar with rural sanitation and sanitary latrines. Describe briefly the operational details of bio- gas plants using cow- dung, night soil and agricultural wastes

11 Know the causes , types and effects of Air and Noise pollution.

11.1 Define Air Pollution and classification of air pollutants.
Describe the causes and effects of air pollution- Acid rain, Global warming, Ozone depletion,
11.2 Green house effect, corrosion of metals , tarnishing of paints.
11.3 Know the prevention and control of air pollution-control equipment, settling chambers, cyclone fitters, scrubbers, electrostatic precipitators. Legislation.
11.4 Know the noise pollution and effects on human life and control.
Know the legislation with respect to Air and Noise pollution
11.5

Text Books: Reference Books:

1) Water Supply & Sanitary Engineering- by Rangwala
2) Sewerage and Sewage Treatment Vol-II - by S.K.Garg.
3) Water Supply & Sanitary Engineering- by Birde
4) Environmental Engineering –2 By H S Vishwanath, Sapna Publications.
5) Environmental Science and Engg.- Vol-I – by Aloka Debi. (Universities Press)
6) Sanitary Engineering Vol-II - by Gurucharan Singh
7) Sewerage and Sewage Treatment Vol-II.– by Fair & Geir
8) Text Book of Environmental studies – Erach Bharucha (Universities Press)
9)Water Supply,Waste Disposal and Environmental Pollution Engineering-(khanna publication)a.k.chatterjee

Department of Technical Education

DIPLOMA IN CIVIL ENGINEERING

Fourth Semester

Subject: CE402 Environmental Engineering - II

Duration : 3 hours Max. Marks: 100

Model Question Paper

Note: 1. Question No 1 is compulsory.
2. Answer any two full questions from each of the sections.

Q.1. a) Fill in the blanks with appropriate word/s 1x5 = 05

i The permissible value of domestic waste water BOD is _____

ii The Waste from bath room and kitchen is termed as _____

iii _____are used to remove the Oil and Grease from waste water

iv _____ are used at places where there is maximum change in gradient

v _____ is used to burn the solid waste in a closed chamber

	b)	Draw a neat sketch of Manhole and label the various parts	5
		Section - I	
Q.2	a)	Define the following terms 1. Sewer, 2.Invert, 3.Refuse 4.Garbage 5.Sewerage System.	5
	b)	What are the factors that affect the rate of flow of sewage ?	3
	c)	Determine the diameter of a circular sewer to carry sewage of 100 litres/sec when it flows half full with a slope of 1in 350 using manning's formula	7
Q.3	a)	Name the three sewerage system used to convey the sewage.	3
	b)	Explain various types of waste water sampling methods	5
	c)	List the various test to be conducted for sewage and their significance	7
Q.4	a)	What are the requirements of an ideal surface drain ?	3
	b)	List the advantages and disadvantages of CI sewers.	5
	c)	Calculate the quantity of storm water in catchment area of a city with following data Area = 30,000 hectares Intensity of rain fall 15mm/hour Average permeability 0.5 factor	7
		Section - II	
Q.5	a)	Explain with neat sketch catch basins	5
	b)	What are Traps? Explain it functions	5
	c)	Explain the construction of Drop manhole	5
Q.6	a)	Explain with sketch trickling filter.	7
	b)	Mention the advantages of activated sludge process.	5
	c)	List the methods of sludge disposal.	3
Q7	a)	Write a note on recycle of waste water.	5
	b)	What are the principles and requirement of house drainage?	5
	c)	List the methods of solid disposal.	5
		SECTION III	
Q.8	a)	Write a note on disinfection of well water.	5
	b)	With neat sketch explain working of bio-gas plant.	7
	c)	List the various sanitary fittings adopted for the house drainage.	3
Q.9	a)	List the methods of sludge disposal.	5
	b)	Explain the method of incineration process.	5
	c)	Name the equipments used for controlling the air pollution.	5
Q.10	a)	What are the effects of air pollution on human beings?	5
	b)	Write a note on acid rain.	5
	c)	Discuss the effects of noise pollution on human being.	5

Department of Technical Education
DIPLOMA IN CIVIL ENGINEERING
FOURTH SEMESTER CIVIL ENGINEERING/ CIVIL D'SHIP
SUBJECT: WATER RESOURCES ENGG

Contact Hrs/Week: 4 Hrs. **Contact Hrs/Sem:64 Hrs.**

CHAPTER NO	CONTENTS	NO OF HOURS	MARKS WEIGHTAGE IN EXAM
	PART-A		
1	Introduction to water resources engineering	02	05
2	Hydrology	06	17
3	Irrigation water requirements for crops	04	12
4	Irrigation system and methods of irrigation	06	16
	PART-B		
5	Reservoirs and Dams	12	30
6	Distribution works	06	16
	PART-C		
7	Cross drainage works	04	10
8	Diversion and river training works	06	15
9	Ground water engineering	04	12
10	Water resource management	05	12
10	Seminars, field/technical visit, inventions/innovations, demonstrations, workshops etc	05	----
11	Tests and revision	04	----
		64	145

FOURTH SEMESTER CIVIL ENGINEERING
SUBJECT: WATER RESOURCES ENGINEERING

DETAILS OF CONTENTS

PART-A

1. INTRODUCTION TO WATER RESOURCES ENGINEERING

Introduction and objects of water resource development, world water resources, water resources of India and Karnataka

Advantages and disadvantages of irrigation

2. HYDROLOGY

Introduction and importance of hydrology

Hydrologic cycle

Precipitation and its types

Rainfall and its distribution

Measurement of rainfall , rain gauges types (Simon's rain gauge and floating type rain gauge).

Mean annual rainfall and method of computation of average rainfall , (simple problems)

Water losses

Run-off and its measurements (no problems), factors affecting run-off

3. IRRIGATION WATER REQUIREMENT OF CROPS

Quality of irrigation water

Base period, duty, delta and their relationship (simple problems)

Crop seasons – Rabi and Kharif

Factors affecting duty, methods of improving duty

Irrigation efficiency

4. IRRIGATION SYSTEM AND METHODS OF IRRIGATION

Introduction to irrigation systems and methods of irrigation

Gravity irrigation, lift irrigation, well irrigation tank irrigation and tube well irrigation

Subsurface irrigation, surface irrigation, sprinkler irrigation, drip irrigation , advantages and disadvantages of various methods

Tube wells , open wells and their types

PART-B

5. **RESERVOIRS AND DAMS**

Introduction , site selection for reservoirs and dams
Earthen dams, gravity dams
Typical cross section of a gravity dam and earthen dam
Forces acting on gravity dams
Spillways and spillway gates
Reservoir sedimentation
Maintenance and restoration of tanks

6. **DISTRIBUTION WORKS**

Canal and its classification
Different methods of canal alignment
Layout of canal system
Canal lining , types
Canal drops, sluices and escapes
Maintenance of canals

PART-C

7. **CROSS DRAINAGE WORKS**

Definitions functions and necessity of cross drainage works
Selection of site for cross drainage works
Types of cross drainage works, aqueduct , siphon , super passage, level crossing, inlet and outlet

8. **DIVERSION AND RIVER TRAINIG WORKS**

Definition of various diversion head works
Location , layout and components of diversion head works
Weirs, barrage and their differences
Body wall of a weir, divide wall- sketches and description
Approach channel , canal head regulator, Fish ladder
Marginal bunds, guide banks, weir protection works
Definition , importance and necessity of river training works

9. **GROUND WATER ENGINEERING**

Introduction , occurrence of ground water, importance
Aquifer, aquiclude, aquitard , aquifuge
Definition of porosity, ground water yield, specific yield, specific retention, permeability, transmissibility
Types of aquifers
Measurement of yield, methods of measurement
Artificial recharge of ground water and its methods
Ground water pollution
protection of wells

10. **WATER RESOURCE MANAGEMETN**

water conservation- rain water conservation, rain water harvesting

Methods of rain water harvesting

Flood water management, water quality management, fresh water management , waste water management and ground water management

Cloud seeding- definition , technique of operation

Watershed management and its importance

REFERENCE BOOKS

1. Irrigation and water power engineering-by B.C.Punmia, Pande, B.B.Lal Lakshmi Publications, 7/21, Ansari Raod, Daryaganj, New Delhi - 110 002.
2. Water Resource Engineering By H S Vishwanath, Sapna Publications.
3. Principles and practice of irrigation engineering S.K.Sharma (S.Chand and company Pvt. Ltd. Ramnagar, New Delhi - 110 055
4. Irrigation and Hydraulic structures S.K.Garg (Khanna Publishers, Delhi)
5. Irrigation Engineering - voi I, II and III K.R. Sharma
6. Theory and design of irrigation structures Varshney, S.C., Gupta And R.L.Gupta
7. A text book of irrigation engineering and Hydraulics structures R.K.Sharma (Oxford - IBH publishing Co.,)
8. Ground water- H.M.Raghunath, New age international publisher
9. Hydrology – Principles, Analysis and design, New age international publisher

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Department of Technical Education
DIPLOMA IN CIVIL ENGINEERING
FOURTH SEMESTER
SUBJECT: WATER RESOURCES ENGINEERING

Contact Hrs/Week: 4 Hrs. **Contact Hrs/Sem:64**

GENERAL EDUCATIONAL OBJECTIVES:

Upon the completion of the study of the subject the student should be able to:

1. Know the importance of water resources and irrigation in India
2. Understand the concept of hydrology and its components
3. Estimate the water requirements of different crops and duty of water
4. Understand the various systems and methods of irrigation.
5. Understand the various types of dams, and their constructional aspects
6. Understand the methods of canal alignment, distribution systems and maintenance of canals
7. Know the various types of cross drainage works and their importance
8. Understand the functions of various components of diversion and river training works
9. Know the importance of ground water and various parameters of ground water engineering
10. Understand the importance of water conservation and water management

SPECIFIC INSTRUCTIONAL OBJECTIVES:

1.0 Know the importance of water resources and irrigation in India

1.1 Objects of water resource development and irrigation
1.2 World water resources.
1.3 Water resources projects of India and Karnataka
1.4 List the advantages and disadvantages of irrigation.

2.0 Understand the concept of hydrology and its components

2.1 Definition of Hydrology and its importance and scope
2.2 Concept of Hydrologic cycle and its components and process
2.3 Definition of precipitation and forms of precipitation.
2.4 Definition of Rainfall interception, infiltration , depression storage and overland flow
2.5 Measurement of rainfall using rain gauges, non recording rain gauges(symon's rain gauge), recording type rain gauge (floating type rain gauge used by Indian Meteorological Dept)
2.6 Definition of Mean annual rainfall and method of computation of average rainfall , By arithmetic average method and Thiessen polygon method(simple Problems)
2.7 Water losses due to evaporation, infiltration , transpiration and evapo- transpiration
2.8 Components of runoff , list the methods of estimating of runoff (no problems)
2.9 List the various factors affecting runoff

3.0 Estimate the water requirements of different crops and duty of water

.

3.1 Quality of irrigation water and the impurities of irrigation.
3.2 Definition of crop period or base period , duty and delta of a crop.
3.3 Crop seasons in India , definition of rabi and Kharif season and crops grown
3.3 Duty of water , relationship between duty and delta – simple problems
3.4 List the factors on which duty depends.
3.5 Brief explanation of various methods of improving duty
3.6 Definition of irrigation efficiency and kinds of irrigation efficiency and their definition

4.0 Understand the various systems and methods of irrigation

4.1 List the different types of irrigation systems and methods of irrigation
4.2 Brief explanation of gravity irrigation, lift irrigation ,well irrigation, tank irrigation and tube well irrigation their advantages and disadvantages
4.3 Definition and brief explanation of Sub surface irrigation and surface irrigation- sprinkler irrigation and drip irrigation their advantages and disadvantages
4.4 Types and construction of open wells, various types of tube wells.

5.0 Understand the various types of dams, and their constructional aspects

5.1 List the types of reservoirs and dams
5.2 Factors governing the selection of dam site.
5.3 Explain brief with sketches the construction of earthen and gravity dams
5.4 Forces acting on dams- water pressure, uplift pressure, earthquake pressure, silt pressure, wave pressure , weight of dam and combination of forces
5.5 Definition ,types of spillways and spillway gates.
5.6 Reservoir sedimentation- definition and ill effects of sedimentation in reservoirs
5.7 Explain the maintenance aspect of a tank and method of restoring an old tank

.

6.0 Understand the methods of canal alignment, distribution systems and maintenance of canals

6.1 Definition and classification of canals.
6.2 List the various methods of canal alignment with brief explanation
6.3 Explain the layout of canal system
6.4 Explain the various methods of canal lining
6.5 Explain with sketches of canal drop, canal sluice and canal escape .
6.6 Explain the maintenance aspect of canals

7.0 Know the various types of cross drainage works and their importance

7.1 Definition and necessity of cross drainage work sand their function
7.2 Factors affecting the selection of site for cross drainage works.
7.3 Explain aqueduct, Canal siphon, super passage, level crossing inlet and outlets with sketches

8.0 Understand the functions of various components of diversion and river training

works

.

8.1 Definition of various diversion head works.
8.2 Explain with sketches the various components of diversion head works.
8.3 Explain the construction of the body wall of a weir and divide wall
8.4 Explain approach channel, canal head regulator and fish ladder with sketches.
8.5 Definition of river training works, their importance and necessity .
8.6 Sketch and explain marginal bunds, guide banks and weir protection works

9.0 Know the importance of ground water and various parameters of ground water engineering

.

9.1 Introduction , Occurrence of ground water – saturate zone , aerated zone
9.2 Define aquifer, aquitard, aquiclude and aquifuge.
9.3 Define aquifer properties like porosity, specific yield , specific retention , permeability , water table ,co-efficient of permeability and transmissibility
9.4 Types of aquifers – confined and unconfined aquifers
9.5 Define yield of a well and list the methods of measurement of yield of a well
9.6 Define recharge and artificial recharge of ground water and methods of artificial recharge
9.7 Explain causes of ground water pollution.
9.8 Explain protection of wells ,

10.0 Understand the importance of water conservation and water management

10.1 Introduction to rainwater conservation and rain water harvesting
10.2 Explain the small scale and small tank harvesting and urban rainwater harvesting
Explain flood water management , water quality management, fresh water management , waste water management and ground water management
Definition and techniques of cloud seeding
Definition of watershed management and its importance

DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN CIVIL ENGINEERING
FOURTH SEMESTER
SUBJECT: WATER RESOURCES ENGINEERING

MODEL QUESTION PAPER

Duration : 3 Hours Max. Marks: 100

Instructions: 1. SECTION-I is compulsory.
2. Answer any two full questions from the remaining sections

SECTION-I

Q1	**(a)**	Fill in the blanks	1 x 5=05
	(i)		
	(ii)		
	(iii)		
	(iv)		
	(v)		
	(b)	Write short notes on ground water management	05

SECTION-II

Q2	**(a)**	Name the major water resources projects in India and Karnataka.	05
	(b)	Write the advantages and disadvantages of drip irrigation.	05
	(c)	What are the factors affecting duty	05
Q3	**(a)**	Explain various processes of hydrologic cycle with a neat sketch	10
	(b)	Define 1)infiltration 2) runoff	05
Q4	**(a)**	What are the advantages and disadvantages of irrigation	08
	(b)	Explain sprinkler irrigation and drip irrigation	07

SECTION-III

Q5	**(a)**	Draw the typical cross section of a gravity dam and mention its components	05
	(b)	What is a spillway? List and explain any one type of spillway	05

	(c)	Write short notes on reservoir sedimentation	05
Q6	**(a)**	Mention the various forces acting on a gravity dam	05
	(b)	Explain earthen dam with a neat sketch	06
	(c)	Write short note on maintenance of tanks	04
Q7	**(a)**	Define canal alignment and explain any one of them	07
	(b)	Define canal lining and state the objects of canal lining	05
	(c)	State the purpose of canal drop, canal sluice and canal escape	03

SECTION-IV

Q8	**(a)**	Define cross drainage works ? Explain their necessity	05
	(b)	With a neat sketch explain canal aqueduct	05
	(c)	What are diversion head works? explain the difference between weir and barrages	05
Q9	**(a)**	Draw the typical layout of diversion head works and locate its components	10
	(b)	Explain confined and unconfined aquifer	05
Q10	**(a)**	Explain porosity and specific yield	05
	(b)	Explain the importance of rainwater conservation and rainwater harvesting	06
	(c)	Define cloud seeding and watershed management	04

Government of Karnataka
Department of Technical Education

DIPLOMA COURSE IN CIVIL ENGINEERING/ CIVIL D'SHIP

Fourth Semester

Subject: Surveying - III

Contact Hrs/Week:4 Hrs **Contact Hrs/Sem:64 Hrs.**

Chapter No.	Contents	Contact Hours	Weigthage of marks in Exam
	SECTION-I		
1	Trigonometrical Levelling	6	15
2	Tacheometry	12	35
	SECTION-II		
3	Setting out Curves	20	50
	SECTION-III		
4	Modern Surveying	18	45
5	Seminar / Demonstration / Field Visits	5	---
6	Tests	3	---
	Total	64	145

DETAILS OF CONTENT

SECTION-I

1. Trigonometrical levelling

1.1 Elevations and distances of objects - base accessible and inaccessible single plane and double plane method

2 Tacheometry

2.1 Principles of Tacheometry- stadia Tacheometry with staff held vertical and with line of collimation horizontal or inclined elevations and distances of staff stations -Tacheometry tables

2.2 Tangential Tacheometry – Finding the elevation – Direct reading tachometers.

SECTION-II

3 Curves

3.1 Types of curves – Horizontal and vertical curves.

3.2 Types of horizontal curves-simple, compound, reverse and transition curves.

3.3 Designation of simple curve-degree and radius of curve, relationship between degree and radius of curve.

3.4 Elements of a simple circular curve – problems.

3.5 Preparation of curve table and setting out of curves by chain & tape and

instrument method; (i) off sets from long chord (ii) Successive bisection of arcs (iii) Offsets from the tangents (iv) off sets from chords produced (v) Rankine's method

3.6 Obstacle in curve ranging – point of intersection inaccessible.

3.7 Definition and elements of a compound curve.

3.8 Setting out Compound curve and simple problems

3.9 Definition and elements of a reverse curve.

3.10 Transition curves – definition, requirements and length of transition curve.

3.11 Functions of Transition curves.

SECTION-III

4 Modern surveying

4.1 Remote sensing - definition - history of developments

Electro-Magnetic-Radiation (EMR), EMR interaction with atmosphere and earth materials.

Platforms - sensors - Data transmission and storage - Application in civil engg.

4.2 Global Positioning System (GPS) - Fundamentals, GPS receivers, GPS observations, transformation of GPS results, working principles of GPS navigator

4.3 Geographical Information System (GIS) - Maps, Types of Maps, Development of GIS, Components of GIS, Ordinary Mapping to GIS, Comparison of GIS with CAD and other Systems. Fields of application - Natural resources, Agriculture, Soil, Water resources Waste land Management, Social resources and Cadastral records.

4.4 Modern Surveying Instruments

Principles and uses of (i) Electronic Theodolite (ii) EDM (iii) Total station, Maintenance of Total station.

5 Seminar / Demonstration / Field Visits

Reference books:

1. Surveying Vol - I, II, III - Dr. B.C . Punmia
Laxmi publications, Delhi-6

2. Surveying-3 By H S Vishwanath, Sapna Publications.

3. A text book of surveying & leveling - T.P.Kanetkar and S.V.kulkarni

Griha Prakashana, Poona

4. A text book of surveying & leveling - R.Agor

Khanna Publishers, Delhi -6

5. Surveying & leveling -Hussain and N 5.

6. Surveying & leveling –Rangwalaagaraj

Charotar Publishers, Poona

7. Higher Surveying -A.M.Chandra

New age International Publications

8. Satish Gopi, R. Sati Kumar & N. Madhu, Adavance Surveying(Total Station, GIS, Remote Sensing) Pearson Education, Chennai

9. Learning Material Development Project NITTTR, Taramani, Chennai. CD Programme for Exercise for GPS & GIS

10. Geographical information Science By Narayana Panigrahi, Universities Press Pvt. Ltd., Hyderbad

11. Text Book of Surveying By Venkataramaiah universities press

12. Plane Surveying By Alak De S. Chand & Company, New Delhi.

13. Fundamental of Remote Sensing By George Joseph, Universities Press Pvt. Ltd., Hyderbad

GENERAL EDUCATIONAL OBJECTIVES:

Upon the completion of the study of the subject the student should be able to

1. Understand the principles of Trigonometrically Levelling.
2. Understanding the principles of Tacheometry to find the elevations and distances of stations.
3. Understand the method of setting out curves.
4. Understand the principles of modern surveying such as Remote sensing, GPS and GIS.

Specific Instructional Objectives:

Upon the completion of the study of the subject the student should be able to:

1. Understand the principles of trigonometrically levelling.

1.1 Calculate the height of the object whose base is inaccessible (single plane method) and instrument stations are not in the same vertical plane (Double plane method.) as the detached object.

2. Understand the principles of Tacheometry

2.1 Understand the principle of tacheometry to find the elevations and distances of station.
2.2 Explain the principles of stadia tacheometry.
2.3 Find elevations and distance of stations by stadia observations.
2.4 Compute the difference in elevation and horizontal distances from given field notes using stadia tacheometry.
2.5 Explain the principle of tangential tacheometry.
2.6 Solve problems in tacheometry.

3. Understand the method of setting out simple curves.

3.1 Know the different types of curves – Horizontal and vertical curves.

3.2 Understand the types of horizontal curves-simple, compound, reverse and transition curves.

3.3 Know how to Designate of simple curve-degree and radius of curve & relationship between them.

3.4 Know the elements of simple curve & simple problems on elements of a simple curve.

3.5 Prepare the curve tables for different methods of setting curves.

3.6 Explain the procedure for setting out a simple curve by linear and angular methods.

3.7 Solve the problems for setting out curves by chain and tape and angular method.

3.8 Solve the problems on a simple curve when the point of intersection is inaccessible.

3.9 State the definition and elements of a compound curve.

3.10 Explain procedure of setting out a compound curve.

3.11 State the definition and elements of a Reverse curve.

3.12 State the definition of Transition curve.

3.13 Know the requirements of Transition curve.

3.14 Explain procedure for finding length of Transition curve for roads by any one method.

3.15 Know the functions of Transition curves.

3 Understand the principles of modern surveying

3.1 Understand the principles of Remote sensing.
3.2 Explain Electro magnetic radiation (E M R), E M R interaction with atmosphere and earth materials.
3.3 Understand platforms, servers, Data transmission and storage application in Civil Engineering.
3.4 Understand the fundamentals of Global positioning system (G P S), G P S receivers, G P S observations, transformation of G P S results, working principles of G P S navigator.
3.5 Understanding the fundamentals of GIS.

3.6 Know Maps and types of Maps.
3.7 Know the difference between GIS and CAD.
3.8 Explain the field applications of GIS such as Natural resources, Agriculture, Soil, Water resources, Waste land Management, Social resources and Cadastral records.
3.9 Understand the principles of modern surveying instruments.
3.10 State the principles and uses of the Electronic theodolites and Total station.
3.11 Explain the working principles of a total station.
3.12 Understand the maintenance of the EDM instruments and Total stations.

Government of Karnataka
Department of Technical Education

DIPLOMA COURSE IN CIVIL ENGINEERING

Fourth Semester

Subject: Surveying - III

Contact Hrs/Week:4 Hrs **Contact Hrs/Sem:64 Hrs.**

MODEL QUESTION PAPER

Time : 3 Hrs] [Max marks : 100

Note: Question No.1 is Compulsory. Answer any Two full questions in each sections

Q1.

A) Fill in the Blanks with suitable words. 1 X 5 = 5

1. Instrument stations are not in the same vertical plane are called _____ method.
2. Chaining is completely eliminated in _____ survey.
3. The distance between the intersection point and the apex is called as _____
4. Two or more arcs of different radii meeting at common tangent point constitute a _____ curve.
5. In ideal transition curve is one in which transition curve should be _____ at both of its ends.

B) List the advantageous of Tacheometric Survey. 5

SECTION-I

Q2.

a) Differentiate between Single Plane method and Double Plane Method. 5

b) Determine the elevation of the top of the Aerial Pole. The following observations were made. 10

Inst. Station	Reading on B.M	Angle of Elevation to Aerial Pole	Remarks

A	1.377	11^0 53’	RL of BM = 30.150 m
B	1.263	8^0 5’	

Stataion A and B and the top of the Aerial Pole are in the same vertical plane. Find the elevation of the top of the Aerial Pole, if the distance between A and B is 30.00m

Q3.

a) Explain the principle of Stadia method of Tacheometry. 5

b) Determine the gradient from point A to point B from the following observations with Tacheometer fitted with an analytic lens. The constant of the instrument is 100 and staff was held vertically.

Instr. Station	Staff Point	Bearing	Vertical Angle	Staff Reading		
P	A	134^0	$+10^0$ 32’	1.360	1.925	2.470
	B	224^0	$+5^0$ 6’	1.065	1.885	2.705

10

Q4

a) Explain the following i) Analytic Lens

ii) Fixed Hair Method. 5

b) The following notes refer to a line levelled tracheometrically with an analytic tacheometer having multiplying constant of 100.

Inst. Station.	Height of Axis	Staff Station	Vertical Angle	Hair Reading		
P	1.5 m	BM	$-6^0$12’	0.963	1.515	2.067
P	1.5 m	Q	$+7^0$5’	0.819	1.341	1.863
Q	1.6 m	R	$+12^0$27’	1.860	2.445	3.030

RL of BM 460.500m the staff being held vertically. Computer the horizontal distances PQ and QR and Reduced levels of P, Q and R. 10

SECTION-II

Q5.

a) Write a note on Classification of Curves. 5

b) Two Tangents intersect at Chainage 59+60. The deflection angle being 50º30’. Calculate the necessary data for setting out a curve of 15 Chain radius to connect the two tangents if it is intended to set out the curve by Offset from chords. Take Peg interval equal to 100 links. Length of Chain=20 m. 10

Q6.

a) What are the elements of the Compound Curve. 5

b) Two Straights BA and AC intersect at Chainage 1190m. The delection angle being 36º . Calculate all the data necessary for setting of a curve with a radius of 300m by deflection angle method. The peg interval is 30m. 10

Q7.

a) What area the requirements of a Transition Curve. 5

b) Explain the length of a Transition curve by any one method. 5
c) List the functions of Transition curve. 5

SECTION-III

Q8.
a) What is meant by Remote Sensing and list its application in Civil engg. ? 5
b) Write a short note on Electro Magnetic Radiation.(EMR). 5
c) Explain briefly about GPS receivers. 5
Q9.
a) Explain the Working principles of GPS. 5
b) Write about the Fundamentals of Geographical Information System(GIS) 5
c) List the field applications of GIS. 5
Q10.
a) List the types and accessories of EDM. 5
b) Write a short note on Electronic Theodolite. 5
c) Explain the working principles of Total Station. 5

DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN CIVIL ENGINEERING/ CIVIL D'SHIP
FOURTH SEMESTER CIVIL ENGG

SUBJECT: HYDRAULICS , ENVIRONMENTAL AND PLUMBING LAB

CONTACT HRS/WEEK:6 HRS. **CONTACT HRS/SEM: 96 HRS.**

GRADED EXERCISES	CONTENTS	NO OF HOURS
1	Tests on Water, Sewage and Industrial Waste water	36
2	Experiments on Notches, Orifices	24
3	Pumps.	06
4	Plumbing	12
5	Industrial Visits	12
6	Tests and revision	6
	TOTAL	**96**

ENVIRONMENTAL ENGINEERING LAB

1 Collection of Water Samples
2 Collection of Industrial Samples.
3 Determination of Turbidity of Water
4 Determination of Colour of Water
5 Determination of Suspended Solids
6 Determination of Total Solids
7 Determination of Dissolved Solids
8 Determination of hardness- total hardness
   - Ca & Mg hardness
   - Permanent hardness
9 Determination of pH Value (pH meter method & pH paper)
10 Determination of Alkalinity & acidity
11 Determination of Chlorides
12 Determination of Nitrates

HYDRAULICS LAB

1 Use of Piezometer, U - Tube
2 Use of Manometer and Pressure Gauge
3 Determination of Coefficient of discharge for Rectangular Notch
4 Determination of Coefficient of discharge for Triangular Notch
5 Determination of Coefficient of discharge for Venturimeter

6 Determination of Coefficient of discharge, Coefficient of contraction, and Coefficient of velocity for Circular Orifice
7 Determination of Loss of Head due to Friction in Pipe line
8 Determination of Efficiency of Centrifugal Pump

PLUMBING LAB

1 Identifying Pipe fittings used in water supply and Sanitary Wares.
2 (with actual models displayed on board- Examination Viva voce only)
3 Cutting, Threading and Joining of G.I. pipes/ Cutting and Pasting of PVC pipes using Solvents.
4 Making a Bathroom connection from an existing Water supply Main (making Indents, drawing a neat sketch of the connection with details).
5 Making Suction and Delivery pipe connections to a centrifugal pump (making Indents, drawing a neat sketch of the connection with details).

INDUSTRIAL VISITS WITH FEEDBACK

1 Visit to Water Treatment Plant
2 Visit to Sewerage Treatment Plant
3 Visit to Industrial Waste Treatment Plant
4 Visit to a HOUSING Colony and Study of Water Supply and Sewerage System

Revision & Test **6 hours**

Reference Books :

1. Hydraulic Lab Manual Compiled - T.T.T.I. - Chennai – 113.
2. Ghosh and Talapohia - Experimental Hydraulic - Khanna Publishers - New Delhi
3. Central Public Health Engg Organisation(CPHEO) water supply Manual
4. National environmental engineering Institute (NEERI) water supply manual
5. Water supply engineering by-Birdie
6. Water supply and sewage disposal by – S.K.Garg

SCHEME OF EVALUATION FOR EXAMINATION

1	One experiment/ exercise from Hydraulics lab(Procedure-10, Conduction-15, Calculation-10)	35
2	One experiment/ exercise from Environment lab(Procedure-10, Conduction-15, Calculation-10)	35
3	Identifying Pipe fittings used in water supply and Sanitary Wares. (with actual models displayed on board)	10
4	Viva –voce on all of the above	15
5	Record	05
	Total	**100**

LIST OF EQUIPMENTS REQUIRED HYDRAULICS LAB

1. Apparatus for determining co-efficient of discharge Venturimeter - 1 set
2. Apparatus for determining hydraulic coefficients of Orifice - 1set
3.Apparatus for determining the Pipe Friction - 1 set
4. Apparatus for determining co-efficient of discharge of Rectangular- 1 set
5.Apparatus for determining co-efficient of discharge of V Notch-1set
6. Centrifugal Pump Test Rig - 1 set

LIST OF EQUIPMENTS REQUIRED FOR PLUMBING LAB

1. Pipe fitting Display board (GI/PVC) – Consisting of all Fittings, Pipes, Specials & Valves of different sizes in sufficient quantity. - 1 No.
2. Sanitary fitting display board - Consisting of Bath tubs, Flushing cisterns, Sinks, Drinking fountain, Wash basin, Urinals and Water closets of different sizes in sufficient quantity. - 1 No.
3. Tools required for Cutting, Threading and Making Bath room connection & Suction and Delivery Pipe Connections -

- Pipe Vice : Size 50 mm
- Chain Pipe Vice
- Bench Vice : Size 100 mm / 150mm
- Pipe Die sets of sizes ½” to 2”
- Adjustable Hacksaw frame with Blades 10” or 12”
- Three wheel pipe cutter 2”
- Pipe wrench 12”, 14”, 18” & 24”
- GI pipes with Specials of different sizes in sufficient quantity
- PVC pipes with Specials of different sizes in sufficient quantity

Government of Karnataka
Department of Technical Education

DIPLOMA COURSE IN CIVIL ENGINEERING/ CIVIL D'SHIP

Fourth Semester

Subject: Surveying Practice - III

Contact Hrs/Week:6 Hrs **Contact Hrs/Sem:96Hrs.**

Chapter No.	**Contents**	**Contact Hours**
1	Trigonometrical Levelling	15
2	Tacheometry	18
3	Setting out Curves	24
4	Modern Surveying	24
5	Intensive survey Project	9
6	Tests	6
	Total	96

GRADED EXCERCISES

1 Trigonometrical Levelling

1.Height of inaccessible object with instrument at different levels 3

2 .Determination of height of an object whose base is accessible (Single plane method) 6

3. Height of inaccessible object with instrument station not in same vertical plane (Double plane method) 6

2. Tacheometry

4 Determination of Stadia Constants. 3

5 Determine Horizontal distance by horizontal sight only 3

6 .Determine Horizontal distance and Elevation with staff held Vertical by Stadia method 6

7 .Determine Horizontal distance and Elevation with staff held Vertical by Tangential method(All Three cases) 6

2 Setting Out Curves

8 Setting out simple curve by offsets from long Chord 3

9 Setting out simple curve by offsets from tangents 3

10 Setting out simple curve by offsets from chords produced (Deflection distances) 6

11. Setting out simple curve by Rankine's method of Tangential angle (Deflection distances) 6

12 Setting out of compound curves given two radii and deflection angles 6

4 Modern Surveying

13 Establishing the position of Stations using GPS Navigator 3

14 Study of the Electronic Theodolite, and its operations 3

15 Reading horizontal & vertical angle 3

16 Measurement of Horizontal angles by repetition method 3
17 Study of E.D. M. and its operations 3
18 Study of components parts of Total Station 3
19 Measurement of Horizontal and vertical angles usingTotal Stations 3
5 Intensive survey Project (25% Weightage given in IA marks) 9
(One Full day is required for carrying out Project Work)
Prepare Mini Project Report using different methods of Surveying and Instruments. Examples:

a) Dividing the area into plots using town planning rules, and plot it
b) Layout Plan of Existing Campus
c) Contour Map of Existing Campus etc…

OBJECTIVES

1) Upon completion of the study of the subject the student should be able to : -
2) Use Transit Theodolite to carryout heights and distances of elevated objects
3) Use Tacheometry details for the curve table
4) Prepare the required details for the curves table.
5) Set out simple curves using chain & tape and theodolite
6) Study the Modern Survey Instruments such as GPS, Electronic Theodolite, EDM and Total station

SCHEME OF EXAMINATION FOR PRACTICAL EXAMINATION

SURVEYING PRACTICE-III

1. Writing procedure for given experiment ------- 15 marks
2. Conducting of Experiment on field & Observation of reading and entry---------- 30 marks
3. Calculations---------- 20 marks
4. Results---------- 10 marks
5. Oral---------- 20 marks
6. Record---------- 05 marks

TOTAL 100 marks

LIST OF EQUIPMENTS REQUIRED FOR

SURVEYING PRACTICE – II & III

NOTE:

- ONE BATCH SHOULD CONSISTS OF **15 TO 20** STUDENTS
- ONE GROUP CONSISTS OF **5** STUDENTS
- THERE MAY BE **3 TO 4** GROUPS IN A BATCH

SL NO	EQUIPMENTS	QUANTITY
1	AUTO / QUICK SETTING LEVEL WITH ACCESSORIES	05
2	THEODOLITE WITH ACCESSORIES	05
3	METRIC CHAINS 20M	03
4	ARROWS	15
5	TAPE 15M	05
6	TAPE 30 M	05
7	RANGING RODS	10
8	CROSS STAFF, FRENCH CROSS STAFF , OPEN CROSS STAFF	02 EACH
9	DIGITAL PLANIMETER	01
10	CEYLONE GHAT TRACER	01
11	ELECTRONIC THEODOLITE WITH ACCESSORIES	01
12	ELECTRONIC DISTO METER(EDM) WITH ACCESSORIES	01
13	G.P.S INSTRUMENT	02
14	TOTAL STATION WITH ACCESORIES	01

Reference books

1. Surveying Vol - I, II, III - Dr. B.C . Punmia
   Laxmi publications, Delhi-6
2. A text book of surveying & leveling - T.P.Kanetkar and S.V.kulkarni
   Griha Prakashana, Poona
3. A text book of surveying & leveling - R.Agor
   Khanna Publishers, Delhi -6
4. Surveying & leveling -Hussain and N 5.
5. Surveying & leveling –Rangwalaagaraj
   Charotar Publishers, Poona
6. Higher Surveying -A.M.Chandra
   New age International Publications
7. Satish Gopi, R. Sati Kumar & N. Madhu, Adavance Surveying(Total Station, GIS, Remote Sensing) Pearson Education, Chennai
8. Learning Material Development Project NITTTR, Taramani, Chennai.

CD Programme for Exercise for GPS & GIS
9. Geographical information Science By Narayana Panigrahi, Univercity Press Pvt. Ltd., Hyderbad

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING/ CIVIL D'SHIP

SUBJECT: BUILDING DRAWING USING CAD

SEMESTER : IV

CONTACT HOURS/WEEK: 06 **CONTACT HOURS: 96**

Chapter. No.	Contents	No.of Hrs
A.	Preparation of Building Drawings	45
B.	Preparation of working / Service Drawings	21
C.	Develop 3D Modeling of simple Building	18
D.	Innovations & Seminars	06
E.	Tests	06
	Total	**96**

DETAILS OF CONTENTS

A Preparation of Building Drawings

1. Given the line diagram, draw the plan, Section and elevation of a Residential Building.
2. Given the line diagram, draw the plan, Section and elevation of a Residential Building with Stairs
3. Given the line diagram, draw the plan, Section and elevation of a Residential Building with Pitched roof
4. Given the line diagram, draw the plan, Section and elevation of a Primary Health Centre
5. Given the line diagram, draw the plan, Section and elevation of a Restaurant / Canteen
6. Given the line diagram, draw the plan, Section and elevation of a Primary School
7. Given the line diagram, draw the plan, Section and elevation of a Small Workshop with North Light Roof Truss.
8. Given the line diagram, draw the plan, Section and elevation of a Single Storey Framed Structure Building

B Preparation of Service / Working Drawings.

1 Preparation of Site Plan and setting out of centre line Plan
2 Preparation of Electrical / Water supply & sanitary Layout for residential building
3 Preparation of working drawing of Bath room / Kitchen (Showing details of Furniture and Fixtures)
4 Preparation of working drawing of a Door / Window (Showing details of Fixtures)
5 Preparation of detailed plan and section of a Dog legged Stair case
6 Preparation of Plan and Section of a Manhole
7 Preparation of Plan and Section of a Septic tank & Soak pit

C Develop 3D Modeling of simple Building

1. Develop 3D Model of a Single Room from the given line diagram
2. Develop 3D View of a Single Bed Room Residential Building from the given line diagram

D Innovations & Seminars

1. Develop Animation Model for small Building
2. Seminars on innovative CAD packages
3. Digitizing of existing Drawings

Scheme of Examination

a. Record	**05**
b. Viva	**10**
c. Drawings - Plan & Elevation OR Plan & Section	**50**
d. Working/Services drawing OR 3D Model	**20**
e. Layout of View ports to Paper space	**10**
f. Print out to Scale	**05**
Total	**100**

SUBJECT: BUILDING DRAWING USING CAD

SEMESTER : IV

List of Equipments/Software

1. Computer 4GB RAM / 250 GB HDD/DVD/KBD/Mouse/17” LCD monitor 20 No
2. Plotter A0 size 02 No
3. UPS – 5KVA 01 No
4. CAD Package 20 user
5. Architecture Package 20 user
6. 3D modeling Package 20 user
7. Digitizer 01 No

Reference Book:

1. CAD in Civil Engineering – By D S Rajendra Prasad. **Sapna Publications.**

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING (General)

FIFTH SEMESTER

Scheme of study and Examination (W.E.F 2011-12)

Sl No.	Theory Subject	QP Code	Contact Hours			Exam. Duration	Scheme of Examination			Total Max. Marks	Min Marks for passing (with IA)
							End. Exam		I. A. Marks		
			Theory	Pract	Total		Max. Marks	Min. Marks for passing			
1	Concrete Technology & R.C.C.	9CE51	4	-	4	3	100	35	25	125	45
2	Highway, Bridge & Airport Engineering	9CE52	4	-	4	3	100	35	25	125	45
3	Estimating & Costing-I	9CE53	4	-	4	3	100	35	25	125	45
4	**Elective**(Opt any one)										
i	Town Planning.	9CE54EA									
ii	Advanced Construction Technology.	9CE54EB									
iii	Repairs & Maintenance of civil works.	9CE54EC									
iv	Geo-Technical Engineering.	9CE54ED									
v	Solid Waste Management.	9CE54EE	4	-	4	3	100	35	25	125	45
	Drawing /Practical										
5	Irrigation & Bridge Drawing	9CE55D	-	6	6	4	100	35	25	125	45
6	Computer Applications Lab	9CE56P	-	6	6	3	100	50	25	125	60
7	CASP	9CE57P	-	6	6	3	50	25	75	125	60
8	Project Work*	9CE58P	-	3	3	-	-	-	**25**	-	-
	Total		**16**	**18**	**37**		**650**		**250**	**875**	**345**

***Project Work Examination will be at the end of 6th Semester**

Department of Technical Education, Karnataka

DIPLOMA IN CIVIL ENGINEERING

FIFTH SEMESTER

Subject::CONCRETE TECHNOLOGY & RCC

Contact Hrs/Week:4 Hrs. Contact Hrs/Sem: 64 Hrs.

TOPIC ANALYSIS

Chapter No.	Contents	No. of Hours	Weight age of Marks
	PART-A		
1.	Introduction to Concrete Technology & RCC	10	20
2.	Pre-Stressed Concrete	03	05
3.	Introduction to Limit State Design	02	05
	PART-B		
4.	Analysis & Design of Singly reinforced beams	10	30
5.	Analysis & Design of Doubly reinforced beams	06	15
	PART-C		
6.	Analysis of T Beams	04	15
7.	Design of Slabs	10	30
	PART-D		
8.	Analysis & Design of Columns & footings	08	20
9.	Design of Dog-legged Staircase	04	10
10.	Seminar and Innovative Practices	04	
	Tests	03	
	Total=	64	150

DETAILS OF CONTENTS

1 **Introduction to Concrete Technology & RCC**

- 1.1 Concrete - its ingredients.
- 1.2 Water cement ratio & its significance.
- 1.3 Properties of Fresh & Hardened concrete.
- 1.4 Concept of Design mix.
- 1.5 Methods of curing-Membrane curing, steam curing, Using curing chemicals.
- 1.6 Admixtures- necessity, types-mineral and chemical
- 1.7 Special concrete -High performance concrete, Self compacting concrete, Fiber reinforced concrete, High volume fly ash concrete, Foam concrete & Ready mix concrete, Geo-Polymer concrete.

2. Pre-Stressed Concrete

- 2.1 Introduction to pre stressing
- 2.2 High strength concrete and steel systems of pre stressing
- 2.3 Types of pre stressing – pre tensioning, post tensioning.
- 2.4 Advantages and disadvantages of pre stressing
- 2.5 Comparison of pre stressed concrete with reinforced cement concrete.

3 Introduction to Limit State Design

- 3.1 Introduction to limit state design.

3.2 Limit state of collapse, serviceability, durability, characteristic strength of materials & factored load.

3.3 Partial safety factors, limit state of collapse in flexure, stress-strain curves for steel and concrete, stress block.

3.4 Assumptions made in the limit state design in flexure.

4 Analysis and Design of Singly reinforced beams

4.1 Singly reinforced sections-depth of neutral axis and Moment of Resistance

4.2 Balanced, under reinforced and over reinforced sections.

4.3 Analysis of singly reinforced sections (different cases).

4.4 R.C. beams subjected to shear and Diagonal Tension.

4.5 Design the Shear Reinforcement for the given rectangular section.

4.6 Design of Singly Reinforced rectangular beams for flexure and shear.

4.7 Design of lintels- for uniformly distributed load & triangular loads.

5 Analysis & Design of Doubly reinforced beams

5.1 Doubly reinforced sections-depth of neutral axis and Moment of resistance

5.2 Analysis of doubly reinforced sections (Calculating Moment of resistance).

5.3 Design of doubly reinforced beams.

6 Analysis of T Beams

6.1 T- beams – Depth of neutral axis, effective flange width.

6.2 Analysis of T beams (Calculating Moment of resistance).

7 Design of Slabs

7.1 Classification of slabs

7.2 Design of one way slab

7.3 Design of sun shade and cantilever slabs

7.4 Design of two way slabs using moment coefficients

8 Analysis & Design of Columns and footings

8.1 Analysis of short columns. Simple problems to find Safe axial load & Area of longitudinal reinforcement for given axial load.

8.2 Design of axially loaded short columns - problems(square, circular & rectangular only)

8.3 Design of isolated footings - rectangular and square footings

9 Design of Dog legged Staircase

10.1 Loads on staircase and standard dimensions of staircase

10.2 Design of dog-legged staircase(spanning longitudinally only-waist slab type)

10 Seminar and Innovative Practices

Environmental impact assessment. Durability of reinforced concrete- Corrosion of reinforcement, Cover, Quality control. Concrete waste and its reuse.

NOTE:

- **IS 456-2000 & SP16 is permitted in the examination.**
- **Student can use SP 16 charts or IS 456:2000 for all designs.**

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REFERENCES

1. Design of reinforced concrete structures by P.C. Varghees
2. Text book of concrete technology and RCC By H S Vishwanath, Sapna Publications
3. Reinforced Concrete -Limit state design by Ashok K Jain
4. Design of Reinforced Concrete Structures by S Ramamrutham & R Narayan
5. Theory & design of RCC Structures by Gurucharan Singh
6. Design of reinforced concrete structures by Krishna raju
7. Reinforced Concrete Structures by B C Punmia
8. Treasure of RCC Designs by Sushil Kumar S
9. Concrete technology & R.C.C by H.S.Vishwanath
10. Concrete Technology by Gambhir
11. Concrete Technology by M S Shetty
12. Limit state design of concrete structural elements -TTTI(NITTTR), Chennai
13. SP-16 Design aid for IS 456-2000, SP-23 Hand book on concrete mixes
14. IS 875-1987 Loading standards, SP-34 Detailing of RC Structures

General Education Objectives

Upon the completion of the study of the subject, the student should be able to

1 Understand the concrete admixtures & method of obtaining special concrete
2 Know the fundamentals of pre stressed concrete.
3 Understand the concept of limit state design
4 Understand the method of analysis & design of singly Reinforced beams
5 Understand the method of analysis & design of doubly reinforced beams
6 Understand the method of analysis of T beam sections
7 Understand the method of Designing the Slabs by Limit state method
8 Understand the method of Designing the Axially loaded columns by Limit state method
9 Understand the method of Designing the Dog legged stair case by Limit state method

Specific Instructional objectives

Upon completion of the study of the subject, the student should be able to

1 Understand the concrete admixtures & method of obtaining special concrete
1.1 Know the ingredients of concrete & its function.
1.2 Understand Water Cement Ratio and their influence on Cement Concrete.
1.3 List the properties of Fresh & Hardened concrete.
1.4 Understand the concept of design mix.
1.5 Know the methods of curing
1.6 List types of admixtures & its necessity. Know purpose & functions of water reducing agents, air entraining agents, integral water proofing compounds, Accelerator and retarded.
1.7 Know the uses and advantages of special concretes

2 Know the fundamentals of pre stressed concrete.
2.1 Know the concept of pre stressing.
2.2 State the desirable characteristics of materials [concrete and steel] used for pre stressing.

2.3 Explain the concept of pre tensioning and Post tensioning method..
2.4 Understand the advantages and disadvantages of pre stressing
2.5 Know the difference between pre stressed concrete with reinforced cement concrete.
3 Understand the concept of limit state design
3.1 Understand the concept of limit state design.
3.2 Know the terms Limit state of collapse, serviceability, durability, characteristic strength & loads.
3.3 Understand the terms Partial safety factors, limit state of collapse in flexure.
3.4 List the assumptions made in the limit state design.
4 Understand the method of analysis & design of singly Reinforced beams.
4.1 Explain depth of neutral axis, lever arm, and Moment of Resistance(M.R).
4.2 Explain the M.R of a balanced, Under reinforced and Over reinforced RC Section
4.3 Analyze a Singly Reinforced beam and find the i) M.R from given data ii)Calculating area of steel and cross section of beam required from the given data
4.4 Explain the behavior of R.C. beams subjected to shear and Diagonal Tension.
4.5 Design the Shear Reinforcement for the given rectangular section as per I.S. code.
4.6 Design a Singly reinforced rectangular beam for the given load.
4.7 Design a. lintel for the given span and other details.
5 Understand the method of analysis & design of doubly reinforced beams
5.1 State the situations under which a Doubly reinforced section is provided.
5.2 Analyze a D.R beam and find the M.R from given data.
5.3 Design a D.R beam from the given data
6 Understand the method of analysis of T beam sections
6.1 Explain the dimensions of a T beam , Neutral Axis for different cases. (with in flange & below flange).
6.2 Analyze a T beam and find the M.R from given data
7 Understand the method of Designing the Slabs by Limit state method
7.1 Understand the concept of one way & two way slab.
7.2 Design a one way slab from the given data
7.3 Design of sun shade and cantilever slabs from given data.
7.4 Design a two way slab from the given data with corners are not held down and four edges discontinuous conditions. (table 26 & 27 of IS 456-2000).
8 Understand the method of Designing the Axially loaded columns by Limit state method
8.1 Understand the method of finding ultimate load, safe load, area of longitudinal & traverse reinforcement.
8.2 Design an axially loaded short column(Square, Rectangular & Circular with lateral ties) from the given data as per I.S. 456-2000.
8.2 Design a Square & Rectangular isolated Footing for a Square & Rectangular column(without central band)
9 Understand the method of Designing the Dog legged stair case by Limit state method
9.1 State the terms used in stairs and staircases.
9.2 Design a flight of doglegged staircase spanning longitudinally for the given data.
10 Seminar and Innovative Practices
Understand the environmental impact on concrete structures & latest practices in concrete technology & RCC.

MODEL QUESTION PAPER
CONCRETE TECHNOLOGY AND RCC

Instructions:
i) answer any Two full questions from each part.
ii) Use of IS 456-2000 & Design Aid SP 16 is permitted.

PART-A

1. a)Define water cement ratio. How it effects strength of concrete? 05
   b) Explain briefly membrane curing? 05
2. a)Define admixtures. Explain any one admixture used for preparing concrete mix.05
   b) Write short note on Self compacting concrete.05
3.a)What are the advantages and disadvantages of pre stressed concrete.05.
  b)What serviceability requirements are satisfied by designing an RC structures based on limit state?05

PART-B

4.a) A singly reinforced beam under the action of working loads is subjected to a bending moment of 45kN.m. If the beam is 250mm wide, find the effective depth and the reinforcement required. Use M20 concrete and Fe415 steel.06
b)Design an RCC lintel over a 2.75m wide window opening. The lintel carries 225mm thick brick wall. Use M15 concrete and fe250 bars. Assume load coming on the lintel as equilateral and bearing=200mm. Weight of brick masonry=19.2kN/cum.09
5.Design a singly reinforced beam with the following data:
  Clear span: 5m(Simply supported)
  Live load: 18kN/m
  Bearing:200mm
Use M20 concrete & Fe 415 steel. 15
6.a) List the conditions under which the beam is designed as a doubly reinforced. 03
b) Determine the reinforcement for a beam of size 230mm x600mm with an effective cover 40mm is to carry 40kN/m. Use M20 concrete and Fe425 steel. Effective span=6m. 12

PART-C

7.a) Define T-beam. Explain when you will design T-beam as rectangular beam. 04
b)Calculate the ultimate moment of resistance of a T-beam using following data:
Width of flange=1500mm
Depth of flange=100mm
Overall depth of beam=600mm
Width of rib=300mm
Area of tension steel=2455mm^2
Effective cover=40mm
Use M15 concrete and Fe 415 steel. 11
8.a) Distinguish between one way and two way slab.4

b) Design a cantilever chejja beyond 230mm x 230mm lintel. The projection of chejja is 1.20m. The live load on chejja is 600N/m^2 and surface finish is 400N/m^2. Use M20 concrete and Fe415 steel. 11

9.Design a two way slab for a room of inside dimension 4.0mx5.0m. Assume a live load of 3kN/m^2 and a finish of 1kN/m^2. Sketch the reinforcement details.

PART-D

10.Design a circular column subjected to axial load of 1000kN. Use M20 concrete and Fe500 steel.

10marks

11.Design a square footing to carry a column load of 1200kN from 450mm square column. The bearing capacity of soil is 200kN/m^2. Use M20 Concrete and Fe415 steel. 10 marks

12.Design a waist slab of dog legged staircase for the following data:
Live load=5kN/m^2
Finish load=1kN/m^2
Length of flight=3.0m in addition to landing width of 1.50m
Rise=150mm, thread=300mm
Use M20 concrete and Fe 415 steel. 10 marks

DIPLOMA IN CIVIL ENGINEERING

Fifth Semester

Subject: Highway, Bridge and Airport Engineering

Contact Hrs/Week: 4Hrs. Contact Hrs/Sem: 64 Hrs.

Major Topics

Chapter	Content	No. of Hours	Weight age of Marks in Exam
	PART-A (Highways)		
1.	Introduction to Highway Engineering	2	6
2.	Alignment and surveys of roads	4	12
3.	Geometrics of roads	7	20
4	Soil and soil stabilsation	3	8
5.	Highway pavements	7	20
6.	Road Drainage	2	6
7.	Road Arboriculture	2	6
8.	Traffic Engineering	4	12
	PART-B (Bridges)		
9.	Introduction to Bridge Engineering	3	5
10	Bridge foundation	3	5
11	Bridge Sub-structures & Superstructures	5	12
12	Highway Bridges	4	8
	PART-C (Airports)		
13	Introduction to Airport Engineering	3	10
14	Components of an Airport	5	12
15	Airport lightings	3	8
	Seminars / Field visit / Innovations	4	
	TESTS	3	
	Total	64 hrs	150 Marks

Course Contents

PART-A (Highways)

1. Introduction to Highway Engineering 2

a. Importance of Transportation

b. Classification of roads as per IRC

c. vision 2020-N-S , E-W corridor, golden quadrilateral

2. Alignment and surveys of roads. 4

a. Factors to be considered for road alignment

b. Engineering surveys to be conducted for road alignment

c. Traffic Surveys

d. Road Project report

3. Geometrics of roads 7

a. Cross section of a road

b. Camber and recommended values for different types of roads

c. Gradient-types allowable values
d. Super elevation, methods of providing super elevation
e. Widening of road on curve
f Sight distance
h. Curves Horizontal Curves, Vertical Curves (no Design)
i. Necessity of transition curve

4. Soil and soil stabilization 3
Sub grade soil, desirable properties.
Soil stabilization objects, and methods, geo grids, geo synthetics fibers

5. Highway pavements 7
Objectives of pavements
Types of pavement
Flexible pavements-construction and maintenance
Rigid pavements- advantages construction and importance of joints
Over lays- types, brief description
Comparisons of flexible and rigid payments.

6. Road Drainage 2
Surface and subsurface drainage systems

7. Road Arboriculture 2
Objects
Planning, Plantation of trees, care of trees

8. Traffic Engineering 4
Brief Description of the following with sketches:
I). Road Junction,
ii) Traffic island
ii) Pedestrian crossing
iv) Traffic Signals - types
v) Traffic study
vi) Road Signals
vii) Parking systems
viii) Causes and prevention of accident

PART-B (Bridges)

9. Introduction - Bridge Engineering 3
Elements of Bridges
Selection of site for a bridge
Types of bridges-scour-afflux -waterway

10 Bridge foundation 3
Types of Bridge Foundation adopted – well Foundation- caisson's Foundation and Coffer dams

11 Bridge Sub-structures & Superstructure 5
Piers, types
Abutments, types
Wing walls, types
Bridge Bearings- Types
Application of IRC loading in design of bridges.
Approaches

12	Highway Bridges Steel bridges – girder bridges, suspension bridges- brief description with sketches RCC bridges – cantilever bridges ,T-beam and deck slab bridges- brief description with sketches Pre stressed concrete bridges-advantages-types-Flyovers, Underpasses etc	4

PART-C (Airports)

13	Introduction to Airport Engineering Types of Airport, Location and orientation of an airport Airport Terminology	3
14	Components of an Airport Runways, run way markings brief description Taxiways, brief description Aprons, brief description Airport layout	5
15	Airport lightings Lighting of approaches, runways, taxiways, landing area	3

Reference Books :

1. Highway Bridge and Airport Engineering By H S Vishwanath, Sapna Publications.
2. A text book of transportation engineering - N.L. Arora
3. Highway engineering - S.K. Khanna & Justo
4. Transportation Engineering Vol.1 , Vol. 2 - Vazrani and chandola
5. Roads, railways, bridges and tunnel engineering -B.L. Gupta and Amit Gupta
6. Roads, railways, bridges and tunnel engineering - Ahuja and Birdi
7. Highway Engineering-T.D. Ahuja
8. Highway Engineering - Gurucharan Singh
9. Basics of Highway Engineering S.P. Bindra
10. Bridge Engineering - S.P. Bindra

General Educational Objectives

Upon Completion of study of the subject the student should be able to

1. Know the importance of road, and its classification
2. Understand the aspects about alignment of roads
3. Understand the various aspects of geometry of roads
4. Know the soil properties and its stabilization in construction.
5. Know the various types of Highway pavements.
6. Know the aspects about road drainage
7. Know the Objects of road arboriculture
8. Understand the objects and aspects of traffic engineering
9. Understand the various elements of bridges.
10. Know the necessity, function and types of bridge foundation
11. Know the elementary bridge sub-structure and super structure components.
12. Know the elementary aspects of permanent bridges
13. Know the elementary aspects of Airport Engineering

14. Know the elementary aspects of components of an airport
15. Know the elementary aspects of airport lighting

Specific Instructional Objectives

Upon Completion of study of the subject the student should be able to
1 Know the importance of roads
1.1Know the role of transportation on economic activity and transport, social aspects and rural development
1.2Know the Historical Development of highways
1.3List the I.R.C. Classification of roads in India
1.4 know the vision 2020 of India - N-S , E-W corridor, golden quadrilateral road
2 Understand the aspects about alignment of road surveys.
2.1 Explain the basic requirements of an ideal alignments
2.2 List the factors to be considered for road alignment
2.3 Explain all the engineering surveys to be conducted for road alignments
2.4 Understand detailed study of the traffic anticipated over the proposed road.
2.5 Explain the necessity and aspects of highway project report.
3 Understand the various aspect of geometry of roads
3.1 Explain all the aspects of cross section, camber, gradient, super elevation
3.2 Explain the necessity of widening of roads in curves
3.3 Explain the details of sight distance
3.4 Explain the need of horizontal , vertical and transition curves,
4 Study of soil and soil stabilization
4.1 Study sub-grade soil as an internal part of road pavement
4.2 Explain the desirable properties of soil sub grade
4.3 Explain Soil stabilization – objects, methods - geo grids, geo synthetics fibers etc.
5 Know the various types of Highway pavements.
5.1 Know the objectives of pavements.
5.2 Know the types of Pavements – Flexible, Rigid and Overlays.
5.3 Know Flexible pavements - W.M.M, Bituminous roads- construction & maintenance.
5.4 Know Rigid pavements – Advantages, construction methods, importance of joints.
5.5 Know the Over lays- types
5.6 Know the comparisons of flexible and rigid payments
6. Know the aspects about road drainage
6.1 Explain the important highway drainages
6.2 Explain the requirements of highway drainage systems
6.3 Explain the surface drainage system with sketches
6.4 Explain the sub-surface drainage system with sketches
7 Know the objects of road arboriculture
7.1 Explain the objectives of road side arboriculture
7.2 Explain care of trees
8 Understand the objects and aspects of traffic engineering
8.1 Explain the scope of Traffic engineering
8.2 Describe with sketches the various traffic engineering works meant for ensuring road safety.
8.3 Explain the detail traffic study

8.4 Explain different types of parking systems
8.5 Explain causes and preventing measures of accident
9 Understand the various elements of bridges.
9.1 Explain the importance of bridge & its elements.
9.2 Know the method of selecting a site for a bridge.
9.3 Explain types of bridges
9.4 Explain scour, afflux and water way
10 Know the necessity, function and types of bridge foundation
10.1 List the function of bridge foundation
10.2 Explain various types of bridge foundation and their suitability
11 Know the elementary bridge sub-structure and super structure components.
11.1 Explain pier- types, function
11.2 Explain abutment – types, function
11.4 Explain wing wall - types -function
11.4 List the functions of bridge bearings
11.5 List the different types of bearings with sketches
11.6 Explain approach -function -types of approaches
12. Know the elementary aspects of permanent bridges
12.1 List difference between temporary and Highway bridges
12.2 List with sketches of steel bridges - girder bridges, suspension bridges
12.3 List with sketches of RCC bridges - cantilever bridges, T-beam and deck slab bridges
12.4 Explain P.S.C. Bridge – advantages, types – Flyovers, Underpasses
13 Know the elementary aspects of Airport Engineering
13.1 Define various terms used in airport engineering
13.2 List the types of airports
13.3 Explain location and orientation of an airport
14 Know the elementary aspects of components of an airport
14.1 Describe briefly with sketches the functions of runways, taxiways and aprons
14.2 Explain various Runway markings.
14.3 Sketch the general layout of an airport
15 Know elementary aspects airport lighting
15.1 State the methods of airport lightings for approaches, runways, taxiways and landing areas

DIPLOMA IN CIVIL ENGINEERING
Fifth Semester
Subject: Highway, Bridge and Airport Engineering

Model Question Paper

Time: 3 Hrs] [Max marks : 100

Note: Question No.1 is Compulsory.
Answer any two full questions in each sections

Q1.
A) Fill in the Blanks with suitable words 1 x 5= 5
i)
ii)

iii)
iv)
v)
B) Write a short note on road Arboriculture. 5

SECTION-I

Q2.
a) List the IRC Classification of roads 5
b) List the factors to be considered for road alignment 5
c) Explain the engineering surveys to be conducted for road alignments 5
Q3.
a) What is camber? List the types of camber and explain any one type 5
b) Explain sight distance and its significance in roads 5
c) List the necessities of widening of roads in curves 5
Q4.
a) Write a short note on Geo-Synthetic fibers in embankment of roads. 5
b) List the objectives of Highway Pavements. 5
c) Compare the Flexible and Rigid Pavements. 5

SECTION-II

Q5.
a) Explain Sub surface drainage system with neat sketches 5
b) Explain Traffic Islands with sketch. 5
c) List the causes for accidents 5
Q6.
a) List factors to be considered for selecting a site for a Bridge. 5
b) Classify the different types of bridges 5
c) List the advantages of Flyovers 5
Q7.
a) Explain the method of construction of well foundation to the bridge structure. 5
b) Explain types of abutments with sketches. 5
c) Define Bridge bearings and mention its functions. 5

SECTION-III

Q8.
a) State the main objectives of road side arboriculture? 5
b) Explain the need of transition curves in highways 5
c) Write importance of joints in rigid pavements. 5
Q9.
a) What are the factors to be considered during location and orientation of an airports. 5
b) Explain functions of Taxiways. 5
c) Explain use of Runway markings in Airports. 5
Q10.

a) Sketch the general layout of an Airport. 5
b) Explain about lighting of approaches in Airport. 5
c) Write a short note on Lightings in Runways. 5

Department of Technical Education, Karnataka

DIPLOMA IN CIVIL ENGINEERING

FIFTH SEMESTER

Subject:: ESTIMATING & COSTING - I

Contact Hrs/Week:4 Hrs. Contact Hrs/Sem:64 Hrs.

MAJOR TOPICS

Chapter No:	Contents	No. of Hours	Weightage of marks
	PART - A		
1	Introduction to Estimation	3	15
2	Specifications	7	15
3	Analysis of rates	15	30
	PART - B		
4	Detailed and abstract estimate	32	85
5	Seminar & Innovative Practice	04	
	Tests	3	
		Total= 64	145

DETAILS OF CONTENTS

PART - A

1 Introduction to Estimation

1.1 Introduction to estimating: Different items of works and types of estimates

1.2 Units of measurements and units of payment of different items of work.

1.3 Different methods of taking out quantities - centre line method and long short wall method.

2 Specifications

2.1 Detailed specifications for

i) Earthwork in foundation

ii) Cement concrete (CC1:3:6) in foundation

iii) Brick masonry

iv) Course rubble stone masonry

v) R.C.C Work

vi) Plastering in Cement mortar

vii) Pointing with cement mortar

viii) Cement concrete flooring

ix) Granite / Vitrified / Marble flooring

x) Distempering

xi) Exterior painting (Cement)

xii) Woodwork for windows and doors

xiii) Painting woodwork and steel

3 Analysis of Rates

3.1 Analysis of rates for the following items of work

i) Earthwork excavation and filling
ii) Cement concrete (CC 1:3:6) bed in foundation
iii) Brick masonry in C.M for superstructure
iv) Hollow concrete / solid concrete blocks masonry in C.M
v) Coursed rubble stone masonry in C.M
vi) Plastering with cement mortar
vii) Pointing with cement mortar
viii) Painting the old and new wood work
ix) Painting the old and new steel work
x) Cement concrete flooring
xi) Granite / Vitrified // Marble flooring
xii) Paneled and glazed doors and windows
xiii) R.C.C roofing slab
xiv) Distempering
xv) Corrugated galvanized iron sheet roofing

PART - B

4 Detailed and abstract estimate

4.1 Prepare the detailed estimate and abstract estimated cost of

i) 2BHK Residential building - Ground floor with flat RCC roof
ii) An elementary school/Primary health centre building Ground floor with flat RCC roof.
iii) A canteen building with Ground floor with flat/pitched RCC roof.
iv) A small workshop building with RCC columns and footing with steel truss with suitable roof material.

5 Seminar & Innovative Practice

Detailed and abstract estimate of Rain water harvesting

Prepare the detailed estimate of rain water harvesting for one block of your Institution. (or estimating any other site oriented civil engineering work)

(Assignment is given and evaluate along with test)

General educational objectives

At the end of the course of study, the student should able to:

1 Understand different types of approximate method of estimate of buildings
2 Understand specifications for the various items of works in building
3 Analyse rates for different items in Civil Engineering works
4 Estimate the costs of construction for building.

Specific instructional objectives

1.1 Understand different types of approximate estimates of building

1.2 Preliminary or approximate estimate, plinth area estimate, cubical content estimate, approximate quantity method estimate, item rate estimate, revised

estimate, annual repair or maintenance estimate.

2 Understanding the specifications for various items of work in building

2.1 Write the specifications for earthwork in foundation

2.2 Write the specifications for cement concrete for different proportion in foundation

2.3 Write the specifications for brick work.

2.4 Write the specifications for Ashlar masonry

2.5 Write the specifications for Course rubble stone masonry

2.6 Write the specifications for RCC roof slab.

2.7 Write the specifications for plastering with cement mortar.

2.8 Write the specifications for pointing with cement mortar.

2.9 Write the specifications for i) Cement concrete ii) vitrified flooring iii) marble flooring.

2.10 Write specification for Distempering.

2.11 Write specification for exterior cement based painting.

2.12 Write specification for wood work for windows and doors.

3 Analyse rates for different items in Civil Engineering works.

3.1 Prepare data sheet for i) Earth work excavation ii) Earth work filling.

3.2 Prepare data sheet for cement concrete bed in foundation.

3.3 Prepare data sheet for brick masonry in cement mortar for super structure.

3.4 Prepare data sheet for i)Hallow block masonry ii) Solid block masonry in cement mortar for super structure.

3.5 Prepare data sheet for coursed rubble masonry in CM 1:6

3.6 Prepare data sheet for 12mm thick plastering with CM 1:6

3.7 Prepare data sheet for pointing with cement mortar 1:2

3.8 Prepare data sheet for painting i) old wood work ii) New wood work

3.9 Prepare data sheet for painting i) old steel work and ii) New steel work.

3.10 Prepare data sheet for 75mm thick C.C flooring.

3.11 Prepare data sheet for i) Granite flooring, ii)Ceramic flooring iii)Marble flooring

3.12 Prepare data sheet for i) 40mm thick paneled door of teak wood, ii) 40mm glazed window of teakwood.

3.13 Prepare data sheet for RCC roofing slab 1:2:4

3.14 Prepare data sheet for distempering two coats.

3.15 Prepare data sheet for galvanized corrugated iron sheet roofing.

4 Estimate the costs of construction of buildings.

4.1 Compute the quantities of various items of buildings given the detailed drawings and specifications.

4.2 Express the quantities of various items of buildings given the detailed drawings and specifications.

4.3 Workout the cost for each items of works in a building with reference to quantity and schedule of rates.

4.4 workout the cost for each items of work for calculated quantity and schedule of rates.

4.5 Prepare the detailed estimate and abstract estimated cost for building showing detailed specifications for each item of work

i) Residential building, single storied with flat RCC roof.
ii) An elementary school building single storied with flat RCC roof.
iii) A Primary health centre single storied with RCC roof.
iv) A canteen building with single storied RCC roof
v) A small work shop building with RCC columns and AC sheet roofing with steel truss.

REFERENCE BOOKS

1. Estimating and costing By B. N. Dutta.
2. Estimating and costing-I - By H.S.Vishwanath. Sapna Publications.
3 Estimating and costing -By M. Chakraborti.
4 Estimating and costing -By S. C. Rangwala.
5 Estimating and costing -By G. S. Birdie.
6 Estimating and costing -By V. N. Vazirani and S.P.Chandola.

MODEL QUESTION PAPER
ESTIMATING AND COSTING-I

Time:3hours Max.marks:100
Instruction: Answer all the question

1. Answer any two of the following
   a) What is necessity of preparation of estimate ? **5**
   b) Explain the method of taking out the quantities by long wall & shortwall method and centre line method. **5**
   c) Write the units of measurements of the following items: **5**
      i) Brick masonry
      ii) RCC roof
      iii) Outside plastering
      iv) Painting to doors & windows
      v) Weather proof course.

2. Write specifications for the any two following items of work: **5 x 2=10**
a) Bed concrete in C.C 1:3:6 for foundation.
b) Plastering in C.M1:6 for internal walls.
c) Granite flooring over 2.5cm thick C.C. 1:2:4 bed.

3. Workout the rate analysis for any two items: **10x2=20**
. a) Work out the cost for construction of column size 300x400mm, length 3.2m in R.C.C 1:1 ½:3.
b) 12mm thick plastering in C.M 1:6.
c)Fully paneled teak wood door of size 1.0m x 2.1m.

4. Estimate the cost for residential building shown in fig.1 by using local prevailing rates for any two items of the work: **30**
a).Earthwork excavation in foundation.

b) Size stone masonry in C.M 1:6 for foundation.
c) I class Burnt brick masonry in C.M 1:5 for superstructure.

5. Estimate the cost for residential building shown in fig.1 by using local prevailing rates for any three items of the work: **30**

a) Interior plastering in C.M 1:6.
b) Enamel painting to doors and windows.
c) Flooring
   i) Marble flooring, except bath room and WC..
   ii) Ceramic flooring for bath room and WC.
d) Snowcem for external walls

(Note: Drawing enclosed along with question paper should properly be dimensioned and clearly visible. Preferably it should be redrawn & No photo copy is allowed from text books)

DIPLOMA IN CIVIL ENGINEERING
TOWN PLANNING
VI Semester

SUB CODE:
Contact Hrs/week- 4hrs **Contact Hrs/sem-64hrs**

TOPIC ANALYSIS

Sl.No.	Topics	No of hrs	Marks Weightage
1	Introduction	7	18
2	Town planning surveys	5	13
3	Zoning	4	11
4	Forms of planning	4	11
5	Housing	4	11
6	Recreation measures & Landscaping	8	21
7	Public building	4	11
8	Slums	4	11
9	Industries	4	11
10	Master plan	3	08
11	Building Bye laws	3	08
12	Elements of architecture	5	13
13	Innovation and Seminars	6	--
	Tests	3	--
	Total	64	145

Course Contents

1 Introduction

Objects of town planning, principles of town planning
Origin and growth of towns – development of towns
Types of town planning, Modern town planning in India
Socio – Economic aspects of town planning

2 Town planning surveys

Data's to be collected in different types of
town planning surveys

3 Zoning

Definition – objects and aspects of zoning

4 Forms of planning

Types of planning, - Urban planning, Rural planning,
Regional planning.
Regional planning – concept of region, planning types and
necessity of regional, Urban & Rural planning.
Operation involved.

5 Housing

Requirements of houses – classification of residential building
Design of residential areas in cities, Housing in villages

6 Recreation measures & Landscaping

Parks, Playgrounds, boulevards and their space standards
Landscape architecture – Description – objectives
Classifications - Elements of landscaping and conventions in
Landscaping for different elements. Landscape sketches for
a) Residential Building b) Public Buildings, c) Industrial Buildings

7 **Public buildings**
Classification – location, Design Principles of public building,
Grouping of public buildings

8 Slums
Causes and Effects of Slum growth,
Slum clearance methods

9 Industries
Effects of Industries on towns and cities, regulation of their location

10 Master Plan
Meaning – Definition – objects and necessity of master plan
Data and Drawing required for master planning

11 Building Bye- Laws
Objects of building bye-laws, important aspects of
building bye-laws for a typical town.

12 Elements of Architecture
Introduction
Meaning of Architecture - scope and functions of architecture
Principles, qualities and factors of architecture

REFERENCE:

1. Fundamentals of Town Planning by G.K. Hiraskar
2. Urban and Regional Planning by K.S. RameGowda
3. Town Planning by S.C.Rangawala
4. Urban Pattern by Galien
5. Urban Pattern by Simen
6. The Karnataka and Country planning Act 1961, GOI 1965.

General Educational Objectives

Upon completion of the study of the subject the student should be able to

1 Know the necessity and principles of town planning
2 Know the various town planning to be conducted and drawing to be prepared
3 Understand the principle of zoning
4 Understand the various forms of town planning
5 Understand design principles for residential areas in cities and villages
6 Understand location of recreation centers,
7 Know the planning and designing of landscape for a residential and public buildings
8 Analysis causes and effects of slums in a town.
9 Know the effects of industries in town planning
10 Know the important aspects of building bye-laws for a typical town
11 Know the application principles and qualities and factors of architecture in planning and designing of a residential and public buildings
12 Know the stages of development of architecture & moldings.

Specific Instructional Objectives

Upon completion of the study of the subject the student should be able to

1.1 Explain the principles and objects of town planning
1.2 Explain the nature of growth of towns in Karnataka
1.3 State principles of town planning as per Manasara -
Patric Geddes - Ebenez Howerd, Le- corbusier

1.4	Describe modern town planning
2	Town planning surveys
2.1	List the various types of surveys to be conducted for town planning project
2.2	List the data's to be required in different types of surveys
3	Zoning
3.1	Define zoning, state the objects and aspects of zoning
4	Explain various forms of town planning
5	Understand design principles for residential areas in cities and towns
5.1	Compare the design principles for residential areas in cities and towns with those in towns
6	Know Recreation measures & land scaping
6.1	State the criteria for the location and design of parks and play ground
6.2	Draw a typical layout of park
6.3	Suggest the location of playgrounds and parks for a town
6.4	Explain the objects of landscaping
6.5	List the elements of landscaping
6.6	Draw the landscaping drawing for residential & public building
6.7	Color & convention of land scape drawings
7	public buildings
7.1	Explain the requirements of public buildings
7.2	List the need of specific public buildings
7.3	Discuss about location of public buildings in Town planning surveys
8	Slums
8.1	Explain the origin, effects and methods of Elimination of slums.
9	Industries
9.1	Discuss the role of industries in town planning
9.2	Know Specific need of space & location of industries
10	Master Plan
10.1	List the data to be collected and drawings to be prepared for master plan
10.2	Prepare a master plan for a town with assumed data
11	Building bye-laws
11.1	State the important aspects of building bye-laws for a typical Town
11.2	State the building byelaws for design of residential area
11.3	State the building byelaws for design of industrial and public Buildings
12	Architecture
12.1	Define architect and architecture
12.2	Explain the principles, qualities and factors of architecture with example
12.3	Apply the factors of architectures in planning in buildings

DIPLOMA IN CIVIL ENGINEERING
SUB: Town Planning
VI Semester

SUB CODE:

Model Question Paper

TIME: 3 hours **MAX. MARKS:100**

Instructions: Question No 1 is Compulsory and Answer any Two full Questions from each section I,II and III.

1 a)	Fill up the blanks i ii iii iv v	5
1b)	Write short note on Slum clearance	5

Section I

2	a)Mention the principles of town planning ?	7
	b) State the methods of grouping of public buildings	8
3	a) Define zoning. State the objects of Zoning	7
	b) Explain any one i) Urban planning ii) Regional planning	8
4	a) Explain the different methods of regional survey	8
	b) Explain the design of housing in Villages	7

Section II

5	a) Explain briefly the space standards for parks and playgrounds	5
	b) What are the factors to be considered for an ideal site for a residential building	5
	c) Mention the Elements of landscaping	5
6	a) Describe lands scape architecture for urban planning	5
	b) Mention the causes of slum growth	5
	c) Give a land scaping for an industrial building	5
7	a) State the location of Industries in town planning	7
	b) State the bye-laws related to industries	8

Section III

8	a) Define Boulevards, What is its Significance	6
	b) Define master plan & explain the necessity of a mater plan	9
9	a) Explain briefly Building bye-laws	7
	b) Explain color and convention of landscape drawings	8
10	a) Define an Architecture and mention its functions	7
	b) List the scope of architecture and brief them.	8

GOVERNMENT OF KARNATAKA
DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA IN CIVIL ENGINEERING

Fifth Semester

Subject: Advanced Construction Technology

Sub. Code:

Contact Hrs/Week:4 Hrs. Contact Hrs/Sem:64 Hrs.

TOPIC ANALYSIS

Sl No	Contents	Hours Aloted	Weightage Of Marks
	SECTION-I		
1	**Concrete mix Design**	07	22
2	**Special Concrete**	03	10
3	**Concreting under special conditions**	03	10
4	**Handling and Transporting of Concrete**	04	12
	SECTION-II		
5	**Building Services**	18	42
	SECTION-III		
6	**Construction and earth moving equipments**	17	37
7	**Prefabricated structures**	04	12
8	**Seminar/Visit Related To Subject**	04	-
9	**Tests & Revision**	04	-
	TOTAL	**64**	145

COURSE CONTENTS
SECTION-I

1. Concrete mix Design

a) Introduction b) Properties of Concrete c) Data or input required for mix design.
d) Nominal mix concrete e) Methods of proportioning concrete mix –
B.S. method, BIS method and ACI method. Problems on above methods
Minimum cement content for various grades of concrete.

2.Special Concrete

a) Ferro Cement Concrete
b) Fiber reinforced concrete and its types
c) Light Weight concrete
d) Polymer Concrete and its types
e) Foam concrete
f) High strength concrete

3.Concreting under special conditions

a) Introduction
b) Cold weather concreting
c) Hot weather concreting
d) Under water concreting
e) Concreting in Alkali Soils

4. Handling and Transporting of concrete

a) Methods of handling and transporting concreting

i) Hand buggies
ii) Power driven buggies
iii) Belt conveyers
iv) Concrete pumps

SECTION-II

5. Building Services

(a) Acoustics of buildings
(b) Sound insulation of buildings
(c) Ventilation of buildings
(d) Air-conditioning of buildings
(e) Mechanical services – Lifts, Elevators, Escalators

SECTION-III

6.Construction and earth moving equipments;

a) Planning and selection of construction equipments
b) Study on earth moving equipments like drag line, tractor, bulldozer, Power showel
c) Study and uses of compacting equipments like tamping rollers,
Smooth wheel rollers, Pneumatic tired rollers and vibrating compactors
d) Owning and operating cost – problems

SECTION-IV

7. Pre-Fabrication

a) Introduction to pre-fabrication
b) Types of prefabrication
c) Comparison of prefabrication and monolithic construction methods
d) Advantages and disadvantages of pre-fabrication
e) Merits of partial fabrication in Indian conditions

Reference Books

a) Building Technology by –TTTI Chennai-113
b) A Text book of R.C.C by – A.K. Jain Chand & Bro publishers
c) Construction equipments by –Singh
d) Building Environment - By D.Ajitha Simha
e) Building Technology – N BN Sreenivasulu
f) Building Construction-S.P. Arora and S.P. Bindra
g) Construction planning & equipment – Peurify
h) Construction equipments& its management-By S.C.Sharma-Khanna Publishers
i) Special structural concretes by Dr.Rafat Siddique-Galgotia Publications.
j) Services in building complex & high rise buildings – V.K.Jain

General Educational Objectives

Upon completion of the study of the subject the student should be able to

1.0 Understand about concrete mix design - its methods and problems on mix design
2.0 Know about the various special concretes
3.0 Understand the methods of concreting under special conditions
4.0 Know about use of different transporting for concreting
5.0 Understand about Acoustics, sound insulation, air-conditioning, ventilation and mechanical services like lifts, elevators, escalators.

6.0 Understand the use of construction and earth moving equipments
6.1 Know about owning and operating cost and problems on owning and operating cost
7.0 Know about pre-fabrication, types advantages and dis-advantages.

Specific Instructional Objectives :-

1.0 Explain various properties of concrete
1.1 Mention data required for mix design
1.2 Explain nominal mix concrete
1.3 Enumerate various methods of proportioning concrete mix
1.4 Explain BS method, B.I.S. method and A.C.I. Method
1.5 Typical problems on above methods
2.0 Define special concrete
2.1 Ingredients and preparation of special concrete like ferro cement, fibre reinforced concrete and its types. Light weight concrete and its types. Foam concrete, High strength concrete and fly ash concrete

3.0 Understand about concreting under special condition
3.1 Concreting during cold weather
3.2 Concreting during Hot weather
3.4 Concreting in alkali soils
4.0 Know about handling and transporting of concrete
4.1 Mention different methods of handling and transporting concrete
4.2 Briefly explain equipments used for transporting concrete like hand buggies, power buggies, belt conveyers and concrete pumps

5.0 Understand about Acoustics, sound insulation, air-conditioning, ventilation and mechanical services like lifts, elevators, escalators.
5.1 Definition and need of Acoustics in buildings
5.2 List and explain the Acoustical defects.
5.3 Requirements and conditions of good acoustics.
5.4 List the factors which play important role in creating good acoustical conditions.
5.5 Practical cases of acoustical buildings like open air theatres, cinema theatres, public lecture hall, and class lecture room etc.
5.6 Definition of noise and its types.
5.7 Maximum acceptable noise levels
5.8 Means of noise control and sound insulation for
  i) Walls and partitions
  ii) Floors and ceilings
  iii) Doors and windows
5.9 Understand principles of providing ventilation
5.10 Explain methods and systems of ventilation
5.11 Purposes and classification of air-conditioning
5.12 Explain the systems and essentials of air-conditioning
5.13 Explain Lifts, elevators, Escalators – their types and uses.

6.0 Knowing about planning and selection of construction equipments
6.1 Understand study of earth moving equipments like drag line, tractor, Bull dozer
6.2 Understand the study and uses of compaction equipments like damper roller, smooth wheeled rollers and pneumatic tyred rollers and vibrating compactor
6.3 Mention owning and operating cost, simple problems on owning and operating cost

7.0 Introduction to pre-fabrication
7.1 Mention and explain different types of pre-fabrication
7.2 Give comparison of pre-fabrication and monolithic construction
7.3 List the advantages of pre-fabrication structure

V SEM DIPLOMA IN CIVIL ENGINEERING

MODEL QUESTION PAPER

SUB: Advanced Construction Technology

SUB.CODE: **TIME :3 Hrs**

Max. Marks:100

Instructions: 1. Section I is compulsory

2. Answer any 3 full questions from each section II,III,IV.

SECTION-I

1. a) Fill in the blanks 05

i) A moving stair is called as----------

ii) ----- are used to moderate the properties of concrete.

iii) Noise level is measured in --------

iv) The proportion of M20 grade concrete is ------

v) The process of consolidation of concrete mix after placing it in position is termed as ----------

b) Write a note on foam concrete 05

SECTION-II

2 . List the properties of concrete 10

3. Explain ACI method of proportioning of concrete 10

4. What is meant by Fibre Reinforced concrete?. What are its types?

Explain any two. 10

5. Explain the procedure for under water concreting. 10

SECTION-III

6. List and explain the Acoustical defects. 10
7. What are the general principles followed in the lnoise control of buildings 10
8. Explain the systems and essentials of air-conditioning 10
9. Define Ventilation. Explain the two methods of ventilation. 10

SECTION-IV

10. Explain with a neat sketch Earth moving equipment- Drag Line. 10
11. Explain with a neat sketch pneumatic tyred rollers . 10
12. What are the Advantages and disadvantages of pre-fabrication ? 10
13. Compare prefabrication with monolithic construction methods 10

Diploma Civil Engineering
VI Semester

Repairs and maintenance of civil work

Subject :
Code:

Contact Hrs/Per week: 4 Hrs **Total Contact Hrs : 64 Hrs**

SI.No	Topics	Hrs. Allocated
	Part A	
1	Introduction and principle of Maintenance	10
2	Maintenance and Rehabilitation of building	8
	Part B	
3	Defects & Rectification	12
4	Maintenance and Organization	12
	Part C	
5	Maintenance problems and their solutions	14
	New Inventions/Seminars/Visits	5
	Tests	3
	Total	64

Course Contents

1.0	Introduction and principles of Maintenance
1.1	Principles and objects of Maintenance of old and new buildings
1.2	Terms used in Maintenance and repairs
1.3	Causes of deterioration and decay of civil works
1.4	Maintenance of Mechanical works and Electrical conditioning - wiring - fitting and fixtures. Drainage system and water supply system inside the premises.
1.5	Maintenance of steel and wooden structures and elements
1.6	Maintenance of floors and R.C.C. Structure, bricks, tiles, bituminous materials
1.7	Maintenance of underground sump and over head tanks and terrace gardens
2.0	Maintenance and Rehabilitation
2.1	Rehabilitation of buildings (example)
2.2	Demolition of buildings - safety aspects - precautions
2.3	Precautions and safety measures to be taken before commencing demolition
2.4	Demolition process of trusses girders and beams, walls, flooring
2.5	Under pinning - Definition - methods of under pinning
3.0	Defects
3.1	Broad list of common defects
3.2	Methods of investigation, list of basic equipments for investigating defects, maintaining of building and site records
3.3	Diagnosis of defect, prescribing remedies, executing remedial prescription.
4.0	Maintenance organization
4.1	Inventory of building and other civil works required to be maintained
4.2	Inspection - annual, periodical - emergency inspection Proforma, Proforma for classification of maintenance operations
4.3	Estimates for maintenance works - and list of special materials and equipments need for special repairs and maintenance

4.4 Tendering and award of work

4.5 Maintaining departmental labour teams for petty repairs.

4.6 Maintaining records - Measurement book, check measurement book and standard measurement book precautionary note on specific maintenance.

5.1 Maintenance problems and their solutions. Adequate funds - minimum tools and maintenance staff

5.2 Foundation problems - water proofing, leaking basement - draining of pavement water, treating dampness in foundation, walls - omission of D.P.C. and by passing of D.P.C., window sill, down take pipes, and leakages in roof, leakages through the junctions of masonry and concrete. Use of integral liquid water proofing compounds and sealants. Cracks in walls - Horizontal - Vertical - diagonal - structural non-structural cracks of floors - removing of stains from floors - ink, rust, wood coloring - oil - paint and varnish - asphalt and vitamin, blood - urine, coffee, tea.

5.3 Timber defects - Termites, Scrapping doors ,Plaster works ,door jamb repairs, internal finishes, glazing, rendering & external finishing

5.4 Maintenance problem of plumbing, heating, hot water supply, clogged drains, sewers, leakage pipe joints, electrical installations, A.C pipes, PVC pipes, steel pipes and GI pipes.

5.5 Strengthening of canal embankments, silt clearance, weed removal, repairs to canal lining,
repairs of outlets, plugging of breaches in canals

Note I) The efforts should be made to find damaged & defective work spot and student should be directed to inspect and think about rectifying and finding solution to the problem.
ii) Visit to work site where repairs and maintenance activities are in progress.

Reference

I) Maintenance Engineering for Civil Engineers - By Nayak.B.S
Khanna publishers Delhi.
ii) Buildings failures - Diagnosis and Avoidance
by - Ransom W.H. Publishers and F.N. Spon
iii) Maintenance and repair of buildings
by - Hutchinson B.D. publisher by Newnes - Butterworth

General Educational Objectives

Upon completion of the study of the subject, the student should be able to

1 Know the principles, and objects of maintenance of old & new buildings
2 Understand the various repair works such as mechanical, electrical, water supply, and other civil engineering works
3 Know about the rehabilitation of deteriorated buildings
4 Know the safety aspects and precautions
5 Know about underpinning and its methods
6 Understand the common defects and structural, non structural, constructional cracks and remedial measures
7 Understand the maintenance organization - inventory - inspection - estimates tendering of maintenance work
8 Know the maintenance problems and their solutions pertaining to civil engineering section

Specific Objectives

1 Introduction and principles of maintenance (old & new buildings)

1.1 Know the terms used in maintenance

1.2 Mention Causes of deterioration and decay of civil engineering works

1.3 Understand about I) Mechanical works,
ii) Electrical wiring, fitting & fixtures
III) drainage system & water supply work
iv) Steel and wood structures used in buildings

1.4 Study the maintenance of R.C.C. Structures, brick tiles and bitumen materials

1.5 Know the study of underground sump, overhead tanks and terrace gardens

2 Explain about rehabilitation

2.1 State the safety aspects during demolition of buildings

2.2 State process of demolition of trusses, girders, beams walls flooring

2.4 Appreciate the precautions and safety measures to be taken before commencing demolition

2.5 Define under pinning and explain its methods

3 Enumerate common defects in buildings & their investigations

3.1 To know structural, non structural & constructional cracks

3.2 Diagnose the defects and prescribe the remedies

4 Know about maintenance organizations

4.1 Maintenance of inventory of civil engineering structures

4.2 Inspections and types of inspections

4.3 Performa for inspection and maintenance operation

4.4 Estimates for maintenance work

4.5 Describe tendering and departmental repairs

4.6 Explain the types of measurement books and its maintenance

5 State the maintenance problems and their solutions such as inadequate funds minimum tools and maintenance staff

5.1 Know the foundations problems - water proofing and integral water proofing compound & Sealants used

5.2 Understand how to treating the dampness in foundation, walls

5.3 Explain about the omission of DPC & bypassing of D.P.C., window sill, down take pipes & leakage joints

5.4 Identify the cracks in walls & types

5.5 State the various stains from floors such as ink, rust, wood coloring oil paint varnish asphalt, bitumen, blood, urine, coffee & tea

5.6 Explain about maintenance of timber defects such as termites

5.7 State scraping doors and its maintenance

5.8 Explain the maintenance of plaster works in internal & external finishing

5.9 Describe the maintenance of plumbing in hot water supply

5.11 State clogged drains leaking pipe lines, electrical installations

5.12 Explain strengthening of canal embankment

5.13 State silt clearance weed removal

5.14 Explain repairs canal lining, outlet & plugging of breaches, in canal

MODEL QUESTION PAPER

VI Semester

Subject Repairs and Maintenance of Civil Work

Time 3 hrs. Max marks 100.

Instruction:

Answer any Two full questions in each page

PART A

1a)	What are the main objects of maintenance in old buildings?	5
b)	Define rehabilitation of deteriorated building and state steps to be taken to important	8
c)	Define underpinning and explain any one method of unpinning in foundation	7
2 a)	What are the main causes of deterioration of the roof of the buildings	5
b)	Explain the methods of repairs I) Electric wiring ii) Drainage system in a building	8
c)	Enumerate safety aspects taken during the demolition of building	5
3 a)	State the process to be undergone during the demolition of beams, in a buildings	5
b)	State the principles of a maintenance of new buildings	7
c)	What are the factors to be that control the R.C.C. structure	8
4 a)	Define tender and what are salient features in tender form	8
b)	What are the precaution to be taken in recording measurement book?	7

PART B

5a)	Enumerate the common defects in building and state in brief the method their rectifications	8
b)	What are the types of inspections to be conducted during the maintenance operation & explain briefly any one of them	7
6 a)	What do you meant by term inventory in building and state its significance	7
b)	What are the types of the cracks and explain any one methods to protect the building from construction cracks	8

PART C

7 a)	Enumerate foundation problem and explain water proofing problem in foundation	8
b)	State the various forms stains on the floor and explain the remedy to remove any one of the stain	7
8 a)	Distinguish between silt clearance and weed removal	5
b)	What are the maintenance problem in plumbing of hot water supply	5
c)	What is scraping of doors & how it is prevented	5
9 a)	Describe the methods of strengthening the canal?	7
b)	What do you mean by breach of canal and how can it be overcome	8

Subject Title: - GEOTECH ENGG (elective)
Subject Code:-

Hours / week : 4hrs
Total Hours 64 hrs

TOPIC ANALAYSIS

SL . NO.	Topic	Hours Allocated	Marks Weightage
1	Properties and classification of soils	08	18
2	Stress distribution in soil mass	08	18
3	Shear strength of soils	08	18
4	Theories of earth pressure	05	13
5	Consolidation and settlement analysis	06	14
6	Bearing capacity of soils	06	14
7	Site investigation and soil sampling	08	18
8	Shallows and deep foundation	12	27
Tests		03	
Revision & exam		4	
Total		64	140

General educational objectives

Upon completion of the study of the subject the student should be able to:-

1. Know the general Engg properties of soils and classify the soils as per I S and other methods.
2. Understand the stress distribution on soil mass.
3. Understand the procedures for determining the shear strength of soils.
4. Understand Theories of earth pressure.
5. Understand the consolidation theory and settlement analysis.
6. Understand the methods of evaluating the bearing capacity.
7. Understand the methods of soil investigations and sampling techniques.
8. Understand the design principles of shallow and deep foundation.

Specific educational objectives

Upon completion of the study of the subject the student should be able to:-

1.0 Define the general Engg properties of soils.

- 1.1 Classify the soils as per I.S. and other methods.
- 1.2 Define the Index properties of soils.
- 1.3 State the Engg. Properties of soils.
- 1.4 Classify the soils as per I.S methods particle size classification textural, classification and PRA classification.
- 1.5 Identify the soils in the field.

2.0 Determine the stress distribution on soil mass.

- 2.1 Define principal planes, Principal stresses and shear stress.

3.0 Understand the procedure for determining the shear strength of soils.

- 3.1 Measure the shear strength by direct shear test UCC test-vane shear test.
- 3.2 State the C-relationship for granular soils and cohesive soils.

4.0 Understand Theories of earth pressure.

- 4.1 Define the different types, lateral earth pressure, and earth pressure at rest.

5.0 Understand the consolidation Theory and settlement analysis.

- 5.1 Distinguish between compressibility and consolidation.
- 5.2 Explain by spring analogy the consolidation process.
- 5.3 State the Terzagi's theory of consolidation.
- 5.4 Describe the methods of estimation total settlement and differential settlement.

6.0 Understand the methods of evaluation the bearing capacity.

- 6.1 Define bearing capacity.
- 6.2 Enumerate the Terzagi's bearing capacity equation – assumptions – limitations.
- 6.3 Define bearing capacity factors.
- 6.4 Calculate the bearing capacity of square and circular footing.
- 6.5 State different methods of improving bearing capacity.

7.0 Understand the methods of soils investigation and sampling techniques.

- 7.1 State different methods of site exploration.
- 7.2 Explain the types of samples used in soil investigation.
- 7.3 Differentiate disturbed and undisturbed samples.
- 7.4 Explain penetration and sounding tests.
- 7.5 Sketch a typical spoils profile with necessary details.

8.0 Understand the design principles of shallow and deep foundation.

- 8.1 List the different types of shallow & deep foundation.
- 8.2 Suggest a suitable types of footing for given situation.
- 8.3 Sketch the pressure distributing beneath the footing.

8.4 Determine the load carrying capacity of pile by dynamic formula, static formula and pile load formula.
8.5 Explain the group action of piles.
8.6 Explain the functions and component parts of a well foundation.
8.7 Describe the method of sinking of well.
8.8 Explain the design principles for footing strip footings- spread footing eccentrically loaded spread footing, combined footings.

COURSE OUTLINE

1. **Properties and classification of soils.**
   General properties of soil – Index properties of soil. Engineering properties – field identification of soils. Preliminary definitions – Weight volume relationships simple problems.

2. **Stress distributing of soil mass**.
   concentrated force. Concept of effective stress and pore pressure use of chart. Concept of effective stress and pre pressure principal planes and principal stress – shear stress.
3. **Shear strength of soils.**
   Measurement of shear strength. Vane shear stress C- relationship for granular soils and cohesive soils.
4. **Theories of earth pressure.**
5. **Consolidation and settlement analysis (one dimensional consolidation only)**
   Consolidation process spring analogy Terzagi's Theory. Settlement of foundation. Permissible settlement total settlement – differential settlement methods of reducing settlement.
6. **Bearing capacity of soils.**
   Definitions – Rankine's analysis – Terzagis equation. Bearing capacity, factor, Methods of improving bearing capacity.
7. **Site investigation and soil sampling.**
   Methods of site exploration – soil samples. Disturbed and undisturbed samples. Penetration and sounding test. Soil profile.
8. **Shallow and Deep foundation.**
   Types of shallow and deep foundation. Pressure distribution below footings. Load carrying capacity of piles, pile group, load carrying capacity of piles, pile group well foundation, well sinking.

Reference Books

1. A text book of Soil Mechanics & Foundation Engineering – VNS Murthy, Dhanpat Rai & Sons 1682,, Nai sark, Delhi.
2. Construction and Foundation Engineering – Dr. Janardhana Jha and S. K. Sinha.
3. Problems in soil mechanics – B. C. Punmia.
4. A Text book of soil mechanics- Dr. B. C. Punmia.
5. Problems in soil mechanics – Shamsher Prakash.
6. Fpundation Design in Engg. Practice – Nayak.
7. Soil Mechanics in Engineering practice – Tenzagi & Peck.

DEPARTMENT OF TECHNICAL EDUCATION
DIPLOMA IN CIVIL ENGINEERING
FIFTH SEMESTER
SUBJECT: SOLID WASTE MANAGEMENT (ELECTIVE)

Contact Hrs/Week:4 Hrs. **Contact Hrs/Sem:64 Hrs.**

Sl.No.	Major Topics	No. of Hrs
1	Introduction to SWM	2
2	Properties of Solid Waste	2
3	Management of SW	10
4	Generation of SW	5
5	On-site handling of SW	6
6	Collection services	10
7	Transfer & Transport of SW	10
8	Separation & Processing of SW	6
9	Ultimate Disposal SW	10
	Tests	3
	Total	64

CONTENTS

1 Introduction-Definition, characteristics, types and sources

2 Properties of Solid Waste - Physical composition, Chemical composition of municipal solid waste Changes in composition, Sampling procedures.

3 Management of Solid waste - Materials flow in society, Reduction in raw material usage, Reduction in solid waste quantities, Segregation of waste Reuse of solid waste materials, Materials recovery, Energy recovery, Day to day SWM

4 Generation of solid waste - Functional elements of SWM.
Typical generation rates for municipal & selected commercial and industrial sources. Estimation of solid waste quantities. Factors affecting generation rates

5 On-site handling of Solid waste.
On-site storage.
On-site processing.
Organic composting.

6 Collection of solid waste - Collection services, collection systems
Collection routes- layout of routes & schedules

7 Transfer and Transport of Solid waste - Transfer stations.
Transfer operation, Equipment & accessory requirement
Environmental requirement.
Location of transfer stations.
Transfer means and modes.

8 Separation and processing of solid waste at MSW site - Objectives
Evaluating on-site processing equipment
Mechanical volume reduction, thermal volume reduction.
Manual component, types of processing

9 Ultimate disposal of solid waste - disposal by land filling
Occurrence of gases & lechates in land fills, Design considerations.
Landfill operational plan.

REFERENCES:

1. Solid Wastes: Engineering principles and management issues - Tchobanoglous, Theisen and Elliassen, Mcgraw - Hill
2. Environmental Engineering - Peavy, Rowe and Tchobanoglous
3. Solid waste management - P.Aarne Vesilind, William A. Worrel and Debra R. Reinhart, Thomson Brooks/Cole
4. Solid waste management - Zerald Kailey

GENERAL EDUCATIONAL OBJECTIVES:

Upon the completion of the study of the subject, the student should be able to

1.0 Understand the fundamentals of solid wastes.
2.0 Know the properties and composition of solid waste.
3.0 Know the principles of solid waste management.
4.0 Know the generation of solid waste.
5.0 Know the handling of solid wastes.
6.0 Know the collection of solid wastes.
7.0 Know the transportation of solid wastes.
8.0 Know the separation and processing of solid waste.
9.0 Know the disposal of solid wastes.

SPECIFIC INSTRUCTIONAL OBJECTIVES:

Upon the completion of the study of the subject, the student should be able to:

1.1 Define solid waste.
1.2 Know the Types of solid wastes.
1.3 Know the sources of solid waste.
1.4 Understand the difference between the Municipal, Industrial, Bio-medical & Hazardous wastes.
2.1 Know the Properties of Solid Waste
2.2 Know the Physical composition of solid wastes.
2.3 Know the Chemical composition of solid waste - Individual components, particle size, density.
2.4 Describe the typical composition of municipal solid waste.
2.5 Explain the sampling procedures for solid wastes.
2.6 Know the Chemical composition Formulae for obtaining energy values.
2.7 Understand the Modified Dulong Formula for chemical content.
2.8 Changes in composition.
3.1 Describe the Materials flow in society.
3.2 Explain the Reduction in raw material usage.
3.3 Explain the Reduction in solid waste quantities.
3.4 Describe how the Segregation of waste done.
3.5 Know the Reuse of solid waste materials.

3.6 Describe the Materials recovery in solid wastes.
3.7 Know the Energy recovery.
3.8 Explain the Day to day SWM.

4.1 Understand the Functional elements of SWM.
4.2 Know the Typical generation rates for municipal & selected commercial and industrial sources
4.3 Understand the Estimation of solid waste quantities
4.4 Know the Factors affecting generation rates
5.1 Understand the On-site handling of Solid waste - Handling of domestic, commercial & industrial solid wastes
5.2 Know the On-site storage- factors to be considered
5.3 Types & sizes of containers, container locations
5.4 Know the On-site processing- manual sorting, compaction & incineration Organic composting.
6.1 Explain the functional elements of Collection of solid waste.
6.2 Know the Collection services, collection systems- outline of operational tasks
6.3 Collection routes- layout of routes & schedules
7.1 Know the functional elements of Transfer and Transport of Solid waste.
7.2 Know Transfer stations - Factors to be considered.
7.3 Know the Types of transfer operation, capacity requirement, equipment covering of lorries.
7.4 Explain equipment & accessory requirement in MSWM.
7.5 Know the environmental requirement
7.6 Explain the Location of transfer stations, transfer means & modes.
8.1 Explain the objectives of separation & processing
8.2 Know the factors to be considered in evaluating on-site processing equipment.
8.3 Understand Mechanical volume reduction, thermal volume reduction & manual component,
8.4 Explain separation and types of processing
9.1 Understand important aspects of disposal by land filling
9.2 Know the factors to be considered in evaluating landfill sites.
9.3 Understand the occurrence of gases & lechates in land fills, Design considerations for land fill.
9.4 Draw Landfill operational plan - typical operational plan & typical plan for filling landfill

WEIGHTAGE TABLE

Chapter no.	Contents	No. of Hours.	Weightage
1	Introduction	2	4
2	Properties of Solid Waste	2	5
3	Management	10	20
4	Generation	5	10
5	On-site handling	6	10
6	Collection services	10	15
7	Transfer & Transport	10	15
8	Separation & Processing	6	6
9	Ultimate Disposal	10	15
			100

QUESTION PAPER PATTERN

Q1. a) Objective Questions(Chapter 1 to 9) 1X5=5
b) Definition of terms/ short notes 5

Section-I

Q2, Q3 & Q4 Questions from chapter 1, 2 & 3 answer any two questions out of three questions one choice 15X2 =30

Section-II

Q5, Q6 & Q7 Questions from chapter 4, 5 & 6 answer any two questions out of three questions one choice 15X2 =30

Section-III

Q8, Q9,& Q10 Questions from chapter 7, 8 & 9 answer any two questions out of three questions one choice 15X2 =30

TOTAL 100

QUESTION PAPER FORMAT

SUBJECT: SOLID WASTE MANAGEMENT (ELECTIVE)

TIME: 3 Hours **Max marks: 100**

Instructions: 1. Question No.1 is compulsory.
2. Answer any **TWO** questions from the remaining Sections I, II & III.

Q No 1 a)	Fill in the blanks with appropriate word/words	1x 5 = 5
	b) Short note/ Short answer type Questions	5
	SECTION-I	
Q.No 2 a)		5
b)	Questions from chapter 1, 2 & 3	5
c)		5
Q.No 3 a)		5
b)	Questions from chapter 1, 2 & 3	5
c)		5
Q.No 4 a)		5
b)	Questions from chapter 1, 2 & 3	5
c)		5
	SECTION-II	
Q.No 5 a)		5
b)	Questions from chapter 4, 5 & 6	5
c)		5
Q.No 6 a)		5
b)	Questions from chapter 4, 5 & 6	5
c)		5
Q.No 7 a)		5
b)	Questions from chapter 4, 5 & 6	5
c)		5
	SECTION-III	
Q.No 8 a)		5
b)	Questions from chapter 7, 8 & 9	5
c)		5
Q.No 9 a)		5
b)	Questions from chapter 7, 8 & 9	5
c)		5

Q.No 10a)		5
b)	Questions from chapter 7, 8 & 9	5
c)		5

Note: Weightage should be given on the basis of number of hours of teaching. Each question may comprise of two or three sub-divisions.

DIPLOMA IN CIVIL ENGINEERING
Fifth Semester
Subject: Irrigation & Bridge Drawing

Contact Hrs/Week: 6Hrs. Contact Hrs/Sem: 96 Hrs.

Major Topics

Chapter	Content	No. of Hours	Weight age of Marks
	SECTION-I		
1.	Earthen dams	6	
2.	Tank Sluice	18	50
3.	Tank weirs	18	
	SECTION-II		
4.	Cause way	6	
5.	Slab Culvert	9	
6.	Box Culvert	6	50
7.	Masonry arched Highway bridge	9	
8.	R.C.C. T beam bridge	15	
	Seminars/Visits	9	
	Total	96 Hours	100

SECTION-I

1. Cross section of earthen bunds

1. Types of earthen bunds
2. Details of earthen bund such as side slope, rivetment, hearting, core walls etc. to be determined using thumb rules and standard practice.
3. Drawing the cross section and sectional plan showing details of drainage arrangements of: I) Earthen bund with homogeneous materials
   ii) Earthen bund with hearting
   iii) Earthen bund with core wall

2. Tank Sluice

1. For the given discharge determination of the size of the orifice
2. Details of head wall, gibbet wall, barrel or Tunnel, rear cistern, wing wall etc. to be given based on standard practice.
3. Drawing longitudinal section sectional plan and cross section for
   I) A pipe sluice with plug arrangement
   ii) A tank sluice head wall & Gibbet wall type with Slabbed barrel and with plug arrangement.
   iii) A tank sluice Tower head type with Slabbed barrel and with shutter arrangement

3. Tanks weirs

1. Determination of the length of waste weir for a given catchments area
2. Details of body wall and bund (No Design) when details to be given
3. Details of protection works such as aprons wing walls etc to be given
4. Drawing the longitudinal section sectional plan and cross section of
   i) Weir with Vertical drop or Core wall type weir
   ii) Waste weir with water cushion
   iii) Weir with Stepped apron (Stepped Weir)

SECTION-II

4. Cause ways

Knowledge of the types of cause way to be provided based on discharge and other factors
Drawings of the plan and sectional views of

I) Low-level causeway
ii) High level causeway

5. Slab Culvert

1. Calculation of flood discharge of a culvert using empirical formula
2. Afflux, Determination of water way and number of opening
3. Draw the sectional elevation plan and cross section of
   I) Single span slab culvert with return wing walls
   ii) Two span slab culvert with splayed wing walls.

6. Box Culvert

1. Given the discharge & determination of water way and number of opening
2. Details of wing walls, parapets etc to be given based on thumb rules.
3. Draw the section elevation, plan and cross section of Box Culvert.

7. Masonry Arched Highway Bridge

1. Given the discharge, determination of water way & number of openings
2. Calculations of rise of arch, radius of arch, thickness and haunch fill as per rules and standard Practice
3. Draw plan, longitudinal section cross section of
   I) Single span Arched Highway Bridge with return/Splayed wing walls
   ii) Two span Arched Highway Bridge with splayed wing walls.

8. R.C.C. T - Beam Bridge (Railways & Highways)

1. General Principles involved in the design of RCC T Beam Bridge (Design not necessary) – Concept of application of IRC loading in design of bridges.
2. Details of abutment piers, wing walls etc to be determined using thumb rules and standard Practice.
3. Drawing of sectional elevation plan and cross section of
   I) A two span RCC T - Beam bridge with return wing walls
   ii) A two span RCC T - Beam bridge with splayed wing walls

Reference Books

1. Irrigation manual – Ellis. Tamil Nadu Govt. Publication
2. Irrigation Drawing - Sathyanarayana murthy (Subhash stores Bangalore)
3. Design of bridge - by N. Krishna murthy (Subhash stores Bangalore)
4. Bridge Engineering - Johnson D. Vector Oxford IBH Publications
5. Design and construction of highways bridge - K. S. Rekshit (New Central Book Agency Calcutta - 9
6. Irrigation Engineering and hydraulic structures - S.K. Garg (Khanna Publishers, Delhi)
7. Bridge Engineering - J.S. Allegia (Charotar book stall anand)
8. Civil Engineering Drawing Manual - TTTI Publications.

Sixth Semester Diploma Examination
MODEL QUESTION PAPER
IRRIGATION AND BRIDGE DRAWING

Time: 4 Hours Max. Marks : 100

Note : i) Data not given may be assumed suitably
ii) Drawing should be neat and fully dimensioned.
iii) Answer **ALL** questions

Q1. Draw the cross sections of an Earthen bund with core wall to suitable scale to the following details

Bed level	100.00m
Hard soil level	98.00m
Top bund level	105.00m
MWL	104.00m
FTL	103.00m
Top width of bund	3.0m
U/S slope	1½:1(H:V)
D/S slope	2:1 (H:V)
Core Wall:	
Top width	1.0m
Bottom width at bed level	2.0m
Bottom width at Hard soil level	1.5m

Rivetment on u/s is of 0.45m thick with 0.15m Gravel backing
Provide Rock toe on the downstream side. 20

Q2. The following are the details of a " Stepped Weir" with core wall bank connection:

Top width of bund	1.5m
Bund top level	102.5m
M W L	101.75m
F T L	101.00m
Ground level u/s	100.00m
Ground level d/s	99.00m
U/S slope	1½:1(H:V)
D/S slope	2:1 (H:V)
Length of weir	10.00m
Top width of weir	0.60m
Bottom width of weir at	
RL 99.50	0.75m
Width of concrete foundation	1.20m
Thickness of conc. Foundation	0.50m
Width of solid apron at RL100.00	
Including cut-off wall	3.0m
Depth of solid apron	0.6m
Width of solid apron at RL99.50	
Including cut-off wall	2.50m
Width of solid apron at RL99.00	
Including cut-off wall	2.50m

0.15mx0.15m dam stones are provided at one meter centre to centre
Cut-off walls are 0.50m thick, 1.00m high over concrete bed
Body wall is to be projected 4.5m into the bund to serve as core wall and raised in steps up to RL 101.90m End of bund is sloped at 1½:1 towards body wall.
Suitable revetment is provided wherever necessary
Assume any other data, Draw to a suitable scale

Cross- Sectional elevation of weir across the body wall 30

Q3. Following are the details for a RCC Slab Culvert proposed across a stream

a) Hydraulic Particulars

Catchment Area	:	4 Sq. Km
Ryve's constant		: 8
Velocity of flow through vent	:	1.75 m/sec
Average bed width of stream	:	8 m
Assume afflux	:	12 m

b) Constructional Details

No. of Spans	:	2
Bank slope	:	1:1
Bed level of stream	:	150.00 m
H.F,L	:	152.00 m
G.L & Road Formation Level	:	153.00 m
Hard rock level		: 148.50 m
Road Width	:	7.00m
Thickness of RCC slab		: 0.30m
Thickness of wearing course	:	0.10m
Bearing slab on abutment & pier		: 0.30m
Top and bottom width of pier	:	0.75m
Top width of abutment		: 0.90m
Bottom width of abutment (Front face vertical)	:	1.40m
Parapet wall	:	50mm thick(precast)

RCC Jalli work 0.80m high, between RCC piers of 0.15mX0.15m at 2m c / c

Wing Wall: Return type , top width 0.50m, front face vertical and back batter 1:6

Provide protection works both u/s and d/s

Calculate (I) Max. flood discharge (II) Linear waterway and span 10

Assuming any other data, draw to a scale of 1:50 the following views

(iii) Half longitudinal elevation and half longitudinal section 20

(iv) Half plan at top and half plan at bottom 20

OR

An R C C T-beam and Slab bridge of two spans has to be constructed across a stream with the following cross section.

Distance in 'm'	0	5	10	15	20	25	30	35	40
Reduced Levels in 'm'	104.5	104	102.5	98.8	98.5	99	102.8	104	104.5

Following are the constructional details :

Span width	-	10 m
H.F.L.	-	103.20 m
Road formation level	-	107.50 m
Clear Road width	-	8.0 m
Footpath on both sides	-	1.0 m each
R.C.C. parapet	-	1 m height and 10 cm thick
R.C.C. Slab	-	30 cm thick
Depth of rib	-	1.0 m
Width of rib	-	40 cm
Hard rock level	-	98.00 m

Abutment : S.S. masonry abutment top width 1.2 m, front face vertical, back batter 1 H : 6 V.

Wing Walls : Splayed at 45^0 with front face vertical, top width - 50 cm, back batter 1 H : 6 V.

Pier : S.S. masonry battered pier - top width 1 m with side batter 1 in 24

Semicircular cut and Ease waters, C.C. bed thickness for

Abutment, Wing wall, Pier, Return walls - 60 cm

Length of return walls provided at the end of wing wall - 2 m

Side slopes of road embankment - 1.5 :1

Provide 15 cm thick bearing slab. Also provide suitable protective works on U/S and D/S side

Draw to a suitable scale the following views :

i) Half plan at top and half at bottom 25

ii) Half elevation and Half longitudinal section 25

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA IN CIVIL ENGINEERING

FIFTH SEMESTER

SUB :- COMPUTER APPLICATIONS LAB (Civil)

Contact Hrs/Week:06 Contact Hrs/Sem:96

COURSE CONTENTS

PART A -(R.C.C. STRUCTURAL DRAWING)

Prepare the reinforcement details drawing for the following structural elements from the data given.

		No of Hours
1.	Singly and doubly reinforced beams	6
2.	Continuous beam for two spans	3
3.	T –beams	6
4	Lintel with Chejja	3
5.	One way and two way slabs	6
6	Continuous slab for two spans	3
7.	Column and column Footings- square and rectangle.	6
8.	Doglegged stair case, with waist slab & folded plate type stairs	6
9	R.C. Retaining Wall	3
10.	Simple box culvert(single cell)	3

PART B (STEEL STRUCTURAL DRAWING)

Prepare the fabrication drawing for the following steel structural elements from the given sketch.

1.	Apex joint of steel truss.	6
2.	End joint of steel truss.	3
3.	Intermediate joint of steel truss.	3
4.	Column base connections (Slab base and gusseted base)	6
5.	Beam column connection.	3
6.	Main beam and secondary beam connection details.	6

Detailing of R.C. Structures IS code SP34
Detailing of Steel Structures IS code SP38
Ductile detailing of RC structures IS 13920

PART C

PREPARATION OF MINI PROJECT USING ANY ONE OF THE FOLLOWING SOFTWARE. 18 Hrs

1. Planning and scheduling of a project using any available software.
2. Preparation of surveying drawings using available software.
3. Analysis and Design of simple Structural elements using available software.
4. Planning and Estimation of residential building using available software.
5. Digitizing the existing Topo sheet or Revenue map using G.I.S. Software.
6. Preparation of base map for small colony and design water supply distribution system
7.Design of economical Diameter of rising Main from source to the treatment plant.

Note:
To avoid piracy use Open source softwares like CADEMIA, BLENDER, FEDORA, REDHAT, UBUNTU, COLLAB CAD,Q CAD, GEO GEBRA, etc. can be down loaded free of cost.

REFERENCE BOOKS

1. Hand book on Concrete Reinforcement and Detailing by MG. SHAHA.
2. Detailing of RCC structures by SAWHNY.
3. Details of Steel Structure by SAWHNY.
4. Design of RCC Structures by RAMA AMRUTHAM.
5. Design of Steel Structures by NEGI.
6. Design of Steel Structure by RAMACHANDRA.

SCHEME OF VALUATION

1.Student has to prepare manual drawing
One from part A 10marks
2.Draw any one exercise
(Part A & Part B) using CAD
- Application relevant commands 20 marks
- Execution 30 marks
- Output/result/print out 05 marks

3.Record 05marks
4.Viva voce 15marks
5.Mini project (Part-C) 15 marks
Total=100marks

TOTAL 100 Marks

DIPLOMA IN MECHANICAL ENGINEERING

Fifth Semester

Sub: COMMUNICATION AND ANALYSIS SKILL DEVELOPMENT PROGRAMME (CASP)

HOURS/WEEK: 06 TOTAL HOURS: 96

Competence to be developed in learners:

I. To present orally any topic of the student's interest to the rest of the class without the assistance of media or any other aid (only talk) for at least 10 minutes creating interest in the listeners and sustaining the interest with a meaningful conclusion.
II. To prepare a study report on any product/service in comparison with another one that is comparable from technical specification to customer satisfaction.
III. To present with the aid of slides (6 to 10) about the study conducted above to the rest of the class in about 10 minutes with the use of print for information and slides for graphs, pictures, images, video and animations etc.

Note to teachers:

- A teacher may guide only 6 to a maximum of ten students per year. This is to ensure active participation of each learner.
- All 96 hours need NOT be contact hours by the teacher. Students may be encouraged to do activities on their own with peer group to ensure higher level of participation.
- There are ten different tasks to be completed in the course of 96 hours. On completion of each task, record the result and the marks along with the initials of the learner for future reference, inspection and evaluation.
- A few activities are suggested under each task. Teachers can improvise on the list and add more activities as they progress from one batch to another.
- Students should not be compared with each other; instead they must be compared to the standards given against each task.
- The standard suggested is minimum requirement, learners may excel. The services of those who excel may be utilised to guide other learners to reach the suggested minimum.
- The tasks 8, 9 and 10 may be evaluated in the presence of the total group so that learners get the benefit of knowing the inferences made by others and even their presentation style.

Details of tasks must be completed:

(One group consists of maximum 6 nos.)

Task 1 – Communication skills (one to one personal communication). 6 hrs. 5 marks.

Method of achieving task: Practice in pairs through role play

Suggested activities:

1. Telephonic conversation of a customer and supplier.
2. An Automobile showroom person and a customer.
3. Negotiation between Machine tool manufacturers and a technical representative of a polytechnic.
4. Conversation between quality inspectors and the production supervisor of shop floor regarding producing quality components.

Standards to be met:

- Given a telephone number, a student must be able to call and gather information from the person, sustaining the conversation for about 3 min using proper etiquettes and report on the enquiry made about the product or service. [e.g., call a toll free number to ask details about a product or service]
- Given a situation, a student must be able to talk to a person face to face in simulation, gather information about a product, discuss about it and also negotiate with him in the specified time (here, time can be specified by the teacher as per the need).

Task 2 – Communication exercise (one to many in simulation) 6 hrs. 5 marks.

Method of achieving task: Student should pick a topic and make presentation

Suggested Activities:

1. A very short talk highlighting the features of a two wheeler.
2. A creative advertisement sequence for a consumer product being eco friendly.
3. A debate on increasing the productivity of a manufacturing industry.
4. A panel discussion among students on issues related to cellular manufacturing.

Standards to be met:

- Given a brochure, one must be able to study about the product and understand it in 15 min and talk about it to his group highlighting its features and explain it in about 3 min.
- A student must be able to identify a topic of interest for debate, initiate the debate and carry it on, dividing the group into two based on different perspectives(e.g., For and against the topic)

Task 3 – Listening Skills: 6 hrs. 5 marks.

Method of achieving task: Listen to an advertisement and record the message

Suggested Activities:

1. View an advertisement of a branded product and write down the message behind.
2. Listen to the audio in a promotional CD for about 15 minutes of any chosen product or service. Note down points and discuss among friends.
3. View a CD of an innovative and safety practices observed in manufacturing industry for15 minutes and write down the summary in a paragraph of 20 lines.
4. Listen to a lecture on environmental effects of Thermal power plants and nuclear power plants and write a summary in 200 words.

Standards to be met:

- Given an audio clip or a visual of an advertisement, one must be able to listen carefully and understand it enabling him to write the message behind it in the specified time (say in about 5 min.).
- A student must be able to listen to a lecture or watch a CD for 15 min, noting down the key points and write a summary in 200 words in the next 15 min. **Note**: Hints taken and the summary must be hand written by the student and documented for evaluation.

Task 4 – Reading skills: 6 hrs. 5 marks.

Method of achieving task: Read commercially available literature and make presentation

Suggested activities:

1. Read an article from a magazine about the concept of Just in time and supply chain management techniques in production industry in order to control the inventory and talk to the rest of the group in about 5 minutes.
2. Read an advertisement of a newly released four wheeler by company and elaborate its qualities after collecting information from a different source like the company web site and a few customers.
3. Read an article on designing using CAD from the internet and discuss the merits.
4. Read an article on ERP packages from the internet and discuss the merits relevant to industry
5. Read a note on usage of automated material handling system and storage retrieval system from any technical journal and narrate in the class.

Standards to be met:

- Given an article from a journal or an advertisement from a magazine, one must be able to comprehend it in 15 to 20 min. Later on read it out to an audience, with proper intonation and elaborate it in the next 10 min.
- Given an article from the internet, a student must be able to gather more information from the net about it, understand it and read it out for an audience and narrate it.

Task 5 - Writing Skills: 12 hrs. 10 marks.

Method of achieving task: Prepare a resume in writing& highlighting the skill sets

Suggested activities:

1. Write a resume and a covering letter for three different jobs
    1) Wanted skilled technician for a fabrication industry.
    2) Wanted technician who is proficient in 3D Modelling for a MNC.
    3) Wanted Service Supervisor for Automobile show room
2. Write a synopsis for given topics such as optimising the machining parameters for alloy steel in 100 words.
3. Write a summary on the latest styles & features in domestic washing machine and refrigerator as house hold products.
4. Write an essay on any topic related to Mechanical/Automobile/Mining area for 150 words.

Standards to be met:

- ❖ Given a job advertisement, a student must be able to write a suitable resume and a covering letter in 30 min [Advertisements can be tailor-made by the teacher deliberately to train their students- e.g., two different jobs like a marketing person and an assistant in a Research & Development section and train students to prepare two resume for these jobs highlighting different achievements of the student in co-curricular activities to suit each job]
- ❖ Given a topic, a student must be able to write a synopsis or summary or an essay in about 150 words in the stipulated time.

Note: All these have to be hand written by the learner and documented for evaluation.

Task 6- Knowledge of using Internet: 6 hrs. 5 marks.

Method of achieving task: Use the internet and perform the task identified

Suggested activities:

1. Create an e-mail id and mail to 6 others
    1) Sending simple messages
    2) Forwarding messages with their comments.
2. Sending message with attachments
    1) Adding files as attachments
    2) Adding scanned attachments.
3. Collecting data from net
    1) Advanced welding practices available for underwater applications
    2) Computer aided process planning
4. Forwarding resumes to different jobs.

Standards to be met:

- Given an access to internet, one must be able to create an email ID, send mails, forward simple mails and also mails with attachments including scanned attachments and URL (web addresses for direct link). Also, they must be able to collect data from different websites using internet search engines and forward resumes to different job offering companies.
  Note: Printouts of the mails, replies received and also the attachments with date and time have to be documented.

Task 7- Oral communication: 12 hrs. 5 marks.

Method of achieving task: Conduct group discussion on a specific topic and record the discussions

Suggested activities:

1. Debate on current topics like Total quality management
2. Group discussion on latest developments in Fabrication and machining areas.
3. Discussion on qualities required for good entrepreneur.
4. Debate on role of women in managing the industry.

Standards to be met:

- Given a topic of relevance, they must be able to form groups and discuss/debate on it. Also one must take cue and participate actively in a group discussion . Encourage students to note down the points of discussion and file the points in the portfolio for evaluation.

Task 8- Data analysis: 18 hrs. 10 marks.

Method of achieving task: Collecting market data and analysing for meaningful inferences

Suggested activities:

1. Collect data for any two products/machines of two different producers used in manufacturing industry which includes technical details, specifications, cost and customer satisfaction.
2. Use appropriate tools and collect data from authentic sources. Depending on the source decide the number of units for collecting the data.
3. Analyse the data with a view to compare the two products/ machines.
4. Interpret the analysis for meaningful conclusions.
5. Record the whole process for any other person to verify.

Standards to be met:

- ❖ Given two products/equipments/service, one must collect adequate information from an authentic source for each, like the company website or the printed brochure and record the specifications.
- ❖ The maintenance of quality of the product/service needs to be studied from personnel working at different levels in the company (3 -5 in number) for each product/service. A set of questions needs to be prepared for collecting data. The same questionnaire has to be used for collecting data from the personnel mentioned above.
- ❖ One must compare the two products for all the parameters based on the specifications. Also, a market survey has to be done preparing a printed questionnaire of around 5 questions and collecting responses from 20 customers. Then, analyse the data, compare them and interpret the analysis for meaningful conclusions.

  Note: This being a comprehensive task may require few weeks to finish. The data collected and the analysis carried out need to be documented.

Task 9 - Presentation Skills: 12 hrs. 10 marks.

Method of achieving task: report the data collected and analysed through the activities in task 8. Student should present the analysis and inferences of Task 8 for about 10 minutes supported by few slides (6 to 10) of pictures, graphs, images. The text material if any may be printed and given to the audience. Discourage students from using text material in slides.

Standards to be met:

- ❖ One must present the analysis done in task 8 using slides with pictures, graphs, images etc in 10 min. The first slide may contain text only as per need but other slides should preferably have pictures and images. Usage of graphs for comparison and analysis is preferred. Text materials have to be given as handouts to the audience.

Task-10- Pick & Speak: 12 hrs. 5 marks.

Method of achieving task: Pick and speak on any topic at spot

Suggested activities

Pick a topic from a lot and student should be allowed to speak for the duration of 2 to 3 minutes without the aid of any other media.

Standards to be met:

- ❖ One must be able to talk extempore for 2 min on any topic picked randomly from the lot, given a time of two minutes for organising his/her thoughts. The topics can be kept simple and general (current events of interest like sporting event or headline of the day). It must be totally an oral activity without the aid of any other media.

Suggested topics for presentation, discussion, and written & other tasks.

- ➢ Window air conditioner
- ➢ Composite materials
- ➢ Hydrogen as alternative fuel
- ➢ Lean manufacturing
- ➢ Power plant safety

- Alternative materials for manufacturing
- Laser beam welding.
- Welding for Medical applications
- Quality certification standards
- Latest Mining equipments
- Comfort air conditioning systems
- Time and Method study
- Industrial Waste disposal
- Preventive maintenance
- Industrial safety
- Micro machining
- Aluminium castings
- Advantages of design work stations
- Ultrasonic machining
- Laser beam machining
- Plasma arc welding
- CNC cutting tools
- Total productivity maintenance
- CNC Milling and Turning centres
- Fluid power couplings

FORMAT OF LOG SHEETS *

Sl.No.	Date	Task	Progress of Task	Initials of staff in charge and the student	Evaluation (as suggested in each task)

Signature of Guide Signature of HOD

- All documented work as described in each task need to be filed in a portfolio with task no.1 at the bottom and task 10 on top.
- The log sheet may be filed on top.
- Learners need to have only one portfolio which contains all original documents. Duplicate copies need not be maintained. This is to ensure the authenticity of data collected and the analysis conducted on the data.

SCHEME OF EVALUATION
(Total no. of students in one batch for end examination should not exceed 20)

1. Maintenance of log book 10
2. Evaluation of prepared report on all ten tasks 65
3. End examination:

   A portfolio evaluation is recommended for the end examination evaluating the record of all ten activities of each individual learner for consistency and in case of any inconsistency the learner may be assessed on the criteria given against each task.

   Marks awarded for evaluating the portfolio - 50

Total= 125 marks.

Note to End examination evaluators:

- Check the genuineness and authenticity of all recorded activities.
- The learner may be asked to do one activity of the choice of the examiner which involves listening to instructions, writing a small paragraph of 50 words, reading it and talking for a few minutes.
- The learner may be asked about his satisfaction of the marks awarded and in case of any mismatch the examiner may assess his performance and alter the portfolio assessment (here the benefit of doubt may be in favour of the learner i.e., an improvement may be recorded but in case the examiner feels that the marks awarded is more the same may be retained).
- Do not compare the performance of one student with that of another.
- Always compare the performance to the standard.
- Any one task at random need be checked for each learner.
- Total time taken for the evaluation of a portfolio need not exceed 15 minutes.

- ❖ All documented work as described in each task need to be filed in a portfolio with task no.1 at the bottom and ten on top. The log sheet may be filed on top.
- ❖ Learners need to have only one portfolio which contains all original documents. Duplicate copies need not be maintained. This is to ensure the authenticity of data collected and the analysis conducted on the data.

Recommended text book for the prescribed syllabus:

Ashan Academy (2011), Communication and Analysis skills, Orient Blackswan, Hyderabad.

References:

1. Chakravarthi K. T. & Chakravarthi L. T. (2011), Soft Skills for Managers, biztantra, New Delhi.
2. Alex K., (2009), Soft Skills: S. Chand & company Ltd, New Delhi.
3. Pink M. A. & S. E. Thomas. : Communication Skills, S. Chand & company Ltd, New Delhi.
4. Siddons S. (2008), Presentation Skills, Universities Press, Hyderabad.
5. Adler.: Communication : Goals and Approaches, Cengage Learning.
6. http://en.wikipedia.org/wiki/English_Language_Skills_Assessment
7. http://www.how-to-write-a-resume.org/resume_writing_examples.html
8. http://www.mindtools.com/page8.html
9. http://lorien.ncl.ac.uk/ming/Dept/Tips/present/present.html

In case during the implementation of CASP any teacher has a suggestion to improve the learners competence concerning any one of the ten tasks please feel free to mail to the following addresses: 1) jointdirector.cdc@gmail.com or 2) ecb@vsnl.net

Department of Technical Education, Karnataka
DIPLOMA IN CIVIL ENGINEERING

FIFTH & SIXTH SEMESTER (Final examination will be in sixth semester)
Subject: PROJECT WORK

Contact Hrs/Week: 3 Hrs. **Contact Hrs: 48 Hrs+48 Hrs**

As far as possible students should be given live project problems with a view to:

i) Develop an understanding regarding the size and scale of operations and nature of field work in which students are going to play their role after completing the course of study in Civil engineering.
ii) Develop an understanding of subject based knowledge given in the classroom in the context of its application at work places.
iii) Provide first hand experience to develop confidence amongst the students to enable them to use and apply polytechnic based knowledge and skills to solve practical problems of the world of work.
iv) Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

For the fulfillment of above competencies, polytechnics may establish close linkage with 8- 10 relevant organizations for providing such an experience. It is necessary that each organization is visited well in advance by respective teachers and activities to be performed by students are well defined. The chosen activities should be such which are of curricular interest to students and of professional value to industrial/field organizations.

Each Project batch must not exceed 6 students.

Effort should be made to identify actual field problems to be given as project work to the students. Project selected should not be too complex which is beyond the comprehension level of the students. The placement of the students for such a practical cum project work should match with the competency profile and interest of students.

Students may be assessed both by industry and polytechnic faculty.

The suggested performance criteria is given below:

a) Punctuality and regularity **(Log book - mandatory and produced during IA verification)**
b) Initiative in learning/working at site
c) Level/proficiency of practical skills acquired
d) Sense of responsibility
e) Self expression/Communication skills
f) Interpersonal skills.
g) Report writing skills

h) Viva voce

Some of suggested projects are given below: These are only guidelines, teacher may take any project related to Civil Engineering depending upon the availability of projects. Preference should be given to practical oriented projects.

According to the local needs
The following major projects are suggested:

1. Construction of a small concrete road consisting of following activities
- Survey and preparation of site plan
- Preparation of drawings i.e. L-Section and X-Section
- Estimating of earth work
- Material estimating and costing with specifications
- Testing of Aggregates
- Design of Concrete Mix
- Preparation of sub grade with stone ballast
- Laying of concrete
- Testing of slump, casting of cubes and testing
- Technical report writing

2. Water Supply /Drainage system for a village / Layout
- Surveying
- Design of water requirements and water distribution system
- Preparation of drawing of overhead tank
- Material estimating and costing
- Specifications
- Technical report writing

3. Construction of shopping complex/School Building/Hostel Building/PHC/Residential Complex/Industrial Building/Bridges/Foundations/Flyovers/Under Passes
Preparation of detailed drawing – Plan, Elevation, section, layout, structural drawing, working drawing
Preparation of Detailed and Abstract Estimate, Quantity of Materials

4. Rainwater harvesting and Recharging
- Assessment of catchment's area
- Intensity of rainfall
- Monitoring during rainy season
- Quality and Quantity analysis
- Collection of water
- Recharge pit design
- Supply of water

5. Water Supply and Sanitary connections for a Multi storied building
Preparation of detailed drawing – Plan, Elevation, section, layout, working drawing
Preparation of Detailed and Abstract Estimate, Quantity of Materials

6. Report on Concrete Mix Design with/without Admixtures.
7. Green Buildings
8. Solar Farming
9. Critical Study of existing water supply system
10. Critical Study of existing Sewerage system
11. Solid waste management
12. Bio-medical waste disposal.
13. Flood water management – case study
14. Changes in Rainfall pattern and its impact
15. Traffic Study
16. Noise Study
17. Air pollution Study.
18. Valuation and Rent fixation
19. Water shed management
20. Restoration of Lakes.
21. Repair estimate of existing Buildings

The project report should consist of following items.

1. Introduction
2. Literature survey
3. Study Area
4. Methodology/Design/Tests
5. Result and Discussion
6. Conclusion and scope for future study
7. References.

GUIDELINES FOR THE PREPARATION OF PROJECT REPORTS

1. Project reports should be typed neatly in New Times Roman letters on both sides of the paper with 1.5 line spacing on a A4 size paper (210 x 297 mm). The margins should be: Left - 1.5", Right - 1", Top and Bottom - 0.75".
2. The total number of reports (**Soft bound**) to be prepared are
   - One copy to the department
   - One copy to the concerned guide(s)
   - One copy to the candidate.
3. Before taking the final printout, the approval of the concerned guide(s) is mandatory and suggested corrections, if any, must be incorporated.
4. Every copy of the report must contain
   - Inner title page (White)
   - Outer title page with a plastic cover

- Certificate in the format enclosed both from the college and the organization where the project is carried out.
- An abstract (synopsis) not exceeding 100 words, indicating salient features of the work.

5. The organization of the report should be as follows

1. Inner title page 2. Abstract or Synopsis 3. Acknowledgments 4. Table of Contents 5. List of table & figures (optional)	Usually numbered in roman

- Chapters (to be numbered in Arabic) containing Introduction-, which usually specifies the scope of work and its importance and relation to previous work and the present developments, Main body of the report divided appropriately into chapters, sections and subsections.
- The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.
- The **chapter must be left or right justified** (**font size** 16). Followed by the **title of chapter centered** (**font size 18**), **section/subsection numbers along with their headings must be left justified** with **section number and its heading in font size** 16 and **subsection and its heading in font size** 14. The **body or the text** of the report should have font size 12.
- The figures and tables must be numbered chapter wise
- The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.

Reference OR Bibliography: The references should be **numbered serially** in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.

1. For textbooks – Dr.V.L.Shah & Veena Gore, Limit State Design of Steel Structures, Structures Publications, 1 Edition, 2009.
2. For papers - Devid, Insulation design to combat pollution problem, Proc of IEEE, PAS, Vol 71, Aug 1981, pp 1901-1907.

- Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g.
- **V = IZ** ..... **(3.2)**
- All equation numbers should be right justified.
- Separator sheets, used if any, between chapters, should be of thin paper

SESIONAL MARKS EVALUATION:

1. First review (During the end of V Th semester) 25 mark
2. Second review (During the end of VI Th semester) 25 mark

TOTAL:50 mark

I A Marks:

Scheme of Evaluation

1	Log record	05
2	Synopsis	10
3	Presentation	10
	Total	**25**

NOTE: 1. Sesional marks to be awarded at the end of *EACH SEMESTER ONLY*

2.The candidate declaration and certificate sample copy are enclosed here for incorporation in final project report

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CANDIDATE'S DECLARATION

I, ---------- a student of Diploma in ---------- Department bearing Reg No----------of ---------- hereby declare that I own full responsibility for the information, results and conclusions provided in this project work titled **"**---------- "submitted to **State Board of Technical Examinations, Government of Karnataka** for the award of Diploma in ----------.

To the best of my knowledge, this project work has not been submitted in part or full elsewhere in any other institution/organization for the award of any certificate/diploma/degree. I have completely taken care in acknowledging the contribution of others in this academic work. I further declare that in case of any violation of intellectual property rights and particulars declared, found at any stage, I, as the candidate will be solely responsible for the same.

Date:

Place:

Signature of candidate

Name: ----------

Reg No----------

DEPARTMENT OF TECHNICAL EDUCATION
NAME OF THE INSTITUTION
Address with pin code

Department of ……..

CERTIFICATE

Certified that this project report entitled ----------

----------**”**which is being submitted by Mr./Ms. ……..……., Reg. No…..……, a bonafide student of …….in partial fulfillment for the award of **Diploma in ----------Engineering** during the year ……... is record of students own work carried out under my/our guidance. It is certified that all corrections/suggestions indicated for internal Assessment have been incorporated in the Report and one copy of it being deposited in the polytechnic library.

The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said diploma.

It is further understood that by this certificate the undersigned do not endorse or approve any statement made, opinion expressed or conclusion drawn there in but approve the project only for the purpose for which it is submitted.

Guide(s)
Name and signature

Examiners

1

2

Head of Department

Dept. of ----------

ROADMAP FOR PROJECT GUIDES

1. The project work is proposed to be carried out during the V and VI semesters so that learners prepare during the V semester, do some field work based on the preparation during the mid semester vacation and report the analysis and inferences during the VI semester.
2. The learners would reach a level of maturity by the time they reach V semester and so a meaningful project lasting for a year can be executed by them.
3. To execute the project with involvement needs constant guidance and monitoring of the progress of the learners by the guide.
4. This does not mean teacher has to advice learners.
5. Be confident about the ability of the learner and "intellectually provoke" them with challenging questions. These questions should prompt the learners to search information and update themselves (to be carried out during the first two weeks).
6. Do not feed information to learners. Instead crate a 'cognitive dissonance' (a challenging question or situation that the learner is not able to find an immediate answer but feels the need to search for information to find a solution).
7. Defer judgement on learners and give them identified sources if required like a journal article, book or a web site.
8. Even if the learners report their inability to solve do NOT give or prescribe a solution.
9. Be patient and give time for the learner to construct his knowledge.
10. Give corrective feedback to the learner by challenging his solutions so that his logic is questioned and it develops further.
11. This leads to the first activity viz., literature survey and conceiving a project.
12. During this phase meet the project team in a group and create a healthy competition among the learners to search different sources and synthesise their findings in the group.
13. Aim for bringing out a workable innovative project conceived within the first eight weeks as given in the schedule attached.
14. During these two phases and the third phase the teacher should assess the strengths and weakness of the members of the group and allocate differential work to team members on the remaining tasks to be carried out during the next thirty weeks.
15. This is to ensure active participation of all the members of the team.
16. By the end of the twelfth week finalise the project and a schedule of further activities for each member indicating the time frame in which his activities are to be executed may be made ready. A soft copy of this schedule may be collected from each learner by the guide to follow up.

17. This schedule prepared by each learner need to be documented for checking further progress of the project.
18. The next few phases of the project may require active guidance of the guide especially regarding the sources of collecting data, if a sample data is to be collected the number of units has to be decided, collating the data/fabricating, tryout/analysis and finally coming out with meaningful conclusions or models or application.
19. Data like models, designs, technical specifications, source code, protocols and original records need be collected from one authentic source as there will not be any variation. The teacher may guide the learners to authentic source.
20. Data having limited variability like product/service quality, processes and standards, procedures need to be collected from a sample as there is a variation. The number of units from whom (source) the data is to be collected is called sample. The sample needs to be representative of the expected variation. The decision on the size of the sample and the number of units need guidance from the teacher. For example, data regarding the quality of a product/service need be collected from 3 to 5 personnel at different levels of a service provider or dealers of a product. The numbers given are suggestive but a guide based on his experience has to make valid suggestions.
21. Data having a wide range of variation like customer satisfaction where the customers are members of the public need a larger number of units to accommodate the diversity. A tool like questionnaire with predetermined questions need to be prepared, tried out on a small sample and finalise the questions. Data may be collected from at least 30 units. This number is suggested to apply statistical analysis for meaningful conclusions. Guides may decide on the sample size depending on the accessibility of data.
22. The intention of the above three points viz., 19, 20 and 21 is to ensure objectivity in data collection i.e., to reduce the subjectivity of the human mind.
23. All the above activities need to be completed before three to four weeks before the end of V semester (refer the spread sheet related to scheduling).
24. The learners may be instructed to collect data objectively with identified sample during the next 4 to six weeks which includes the mid semester holidays. This would enable the learners to visit the field and collect data without the constraint of reporting to institution and attending classes on a regular basis.
25. The collected data need to be organised and entered to spread sheets or similar formats for analysis. Qualitative data may be converted to quantitative using a rating scale or similar data organisation procedures.
26. The result of most analysis on spreadsheet could be obtained in tables or graphs as per the requirement.
27. Activities mentioned in points 24, 25 and 26 may be carried out by learners during 4 to 8 weeks after commencement of VI semester.

28. Interpretation of the analysed tables and graphs to arrive at meaningful inference. The guide at this stage may defer his ideas on interpretation allowing the learners to do this. In case the learners err in the process they may be given corrective feedback.
29. A report of the whole process of doing the project may be written, word processed and submitted in triplicate.
30. Guides may contact industries and try to solve their problems so that the learners get a field experience and they get ready for the industry.
31. Innovations and innovative practices may be encouraged among the learners to be pursued as a project. Developing prototypes, (in simulation or real) trying out feasibility of new ideas, changing existing systems by adding modules, combining, assembling new modules and developing new systems may be given higher priority over routine bookish projects.
32. The schedule of events proposed is for an investigative project as a model. Guides may alter the prescribed schedule to suit the kind of innovative projects sited in point No.31 above.
33. Industry personnel may be involved in conceiving, executing and evaluating projects. This gives credibility to the institute and acceptance of learners for absorption into the company.

GUIDELINES TO LEARNERS TO CARRY OUT A TWO SEMESTER PROJECT

1. Carry out the project work through the V and VI semesters. Preparation must be done during the V semester and based on this, field work should be done during the mid semester vacation and reporting of analysis and inferences should be done in the VI semester.
2. You have the ability and the level of maturity needed to conceive an innovative and meaningful project accomplishing which gives you recognition by the industry and empowers you with the power of knowledge.
3. Understand your strength and weakness and make an effort to find the strength and weakness of other peers in the team.
4. Complement each other's strength rather than compete with peers within the team. This will enable you to complete a comprehensive and innovative project relevant to the industrial needs rather than doing a routine copy of what others have done.
5. Seek guidance from the teacher and update him/her about the progress.
6. Be confident about your ability and that of other members of your group. Take extra efforts to collect information, share with your peers and synthesise your knowledge.
7. Question everything including the ideas of your teacher. Accept the ideas and instructions which are internally consistent (logical).
8. Involve actively in group activities and contribute towards the tasks.
9. Do not depend too much on the teacher as a source of information, search on your own and build your knowledge structure. Search for authentic sources like journal articles, books and authentic sites rather than blogs and tweets.
10. Though brief, record your thoughts and activities including searches immediately.

11. Prepare a schedule for your work on a spread sheet and encourage your peers to do the same.
12. Show your schedule and that of others to the teacher and get his feedback.
13. Keep reviewing the schedule every fortnight and take corrective steps if needed. For doing this keep the general guideline schedule given in the curriculum as a backdrop.
14. Tools used for data collection like instruments, testing machines, questions to be asked and software may be tried out and standardised by the twelfth week of the project. Seek the teacher's help who is experienced in doing this.
15. Collect data dispassionately or objectively (without applying your personal prejudice). Complete this task before the VI semester begins.
16. While entering data into the spread sheet ask your peer member to verify. This will ensure accuracy of data entry.
17. Use appropriate mathematics/statistics for calculations. Seek help from external sources (other than your teacher) if required.
18. The results of your analysis need to be graphically represented and documented. You may also add photographs and video clips to increase the validity.
19. This task needs to be completed within 8 weeks after commencement of VI semester.
20. Interpret the data (after analysis) and arrive at meaningful inferences on your own in discussion with your peers. Get it ratified by your teacher. Suggestions from the teacher may be discussed among your peers and incorporated if they are internally consistent.
21. The project report may be word processed (videos, photographs attached in soft copy) and submitted in triplicate two weeks before the end of VI semester.
22. Involve passionately in the team work, make constructive contributions and come out with an industry friendly project which will equip you in your professional development.

PROJECT EVALUATION (At the end of 6th semester):

1. Relevance of the subject in the present context		10 marks
2. Literature Survey		10 marks
3. Experimental observation		20 marks
4. Results & Discussion		20 marks
5. Presentation(Max of 10 Slides)		40 marks
	TOTAL	**100 marks**

GOVERNMENT OF KARNATAKA

DEPARTMENT OF TECHNICAL EDUCATION

DIPLOMA COURSE IN CIVIL ENGINEERING (General)

SIXTH SEMESTER

Scheme of study and Examination (W.E.F 2011-12)

Sl No.	Theory Subject	Q P Code	Contact Hours			Exam. Duration	Scheme of Examination			Total Max. Marks	Min Marks for passing (with IA)
							End. Exam		I. A. Marks		
			Theory	Pract	Total		Max. Marks	Min. Marks for passing			
1	Railway, Tunnel & Harbour Engineering	9CE61	4	-	4	3	100	35	25	125	45
2	Estimating and Costing - II	9CE62	4	-	4	3	100	35	25	125	45
3	Design of Steel & Masonry Structures	9CE63	4	-	4	3	100	35	25	125	45
4	Construction Management & Constitution of India	9CE64	4	-	4	3	100	35	25	125	45
	Drawing /Practical										
5	Construction Practice	9CE65P	-	6	6	3	100	50	25	125	60
6	Extensive Survey Project *	9CE66P	-	6	6	3	100	50	25	125	60
7	Project work**(Continuation from 5th Semester)**	9CE67P	-	3	3	3	100	50	25	125	60
	Total		**16**	**18**	**31**		**700**		**175**	**875**	**360**

* **12 Days Survey Camp outside the Campus.**

DIPLOMA IN CIVIL ENGINEERING
VISem

Subject : RAILWAY, TUNNEL AND HARBOUR ENGINEERING

Hours per week 04 **Total hours: 64hr.**

COURSE CONTENT

SI. No	Topic	Hours allocated	Marks Weightage
	Railways		
1.	Introduction	2	5
2.	Permanent way	2	5
3.	Rails	4	10
4.	Sleepers	3	8
5.	Ballast	3	8
6.	Cross section of a railway track	3	8
7.	Track geometrics	6	15
8.	Maintenance of track	2	5
9.	Station and yards	2	5
10.	Points and crossings	2	5
11.	Signaling and interlocking	2	5
	Tunnels		
12.	Introduction	1	3
13.	Tunnel Surveying	3	8
14.	Size and shape of tunnels	2	5
15.	Ventilation of tunnels	2	5
16.	Constructing of tunnels	3	8
17.	Tunnel lining	2	5
18.	Drainage of tunnels	2	5
	Harbours		
19.	Introduction	1	3
20.	Break waters	2	5
21.	Jetties and quays	2	5
22.	Signals	2	5
23.	Docks	2	5
24.	Dredging	2	5
	Tests	3	--
	Innovation and Seminar	4	--
	Total	**64**	**145**

General educational objectives:

Upon completion of the study of the subject, the student should be able to

1 Appreciate the importance of railways to the development of a country

2 Know the different types of railway tracks; railway fastenings & maintenance of tracks.

3 Understand the functions of stations, yards, points and crossings and the method of signaling and interlocking.

4 Understand the importance of tunnels in transportation engineering.

5 Understand the methods of tunnel surveying, fixing the tunnel shape and size, and providing the facilities like ventilation, drainage and lining.

6 Know the different types of harbours and their component parts

7 Know the types & functions of the components like breakwater, jetties, signals, docks and the method of dredging.

Specific Instructional Objectives

Upon the completion of the study of the subject, the student should be able to

1 Understand and appreciate the importance of railways

1.1 State the necessity of railways

1.2 Compare roads and railways

2 Know the different types of railway tracks, railway fastenings and maintenance of tracks.

2.1 State different gauges used in Indian railways

2.2 State the advantages of having uniformity of gauges

2.3 Explain the component parts of permanent way

2.4 Explain the necessity of coning of wheels

2.5 State the advantages and disadvantages of CC & PSC types of sleepers

2.6 Sketch the cross sections of railway track for BG

2.7 Know the types of ballast

2.8 Sketch and dimensioning of flat footed rail

2.9 Know the maintenance of railway track

2.10 Know the duties of permanent way inspector

2.11 Know the types of gradients and super elevation

2.12 Understand the importance of widening of a railway track on curves

3 Understand the functions of stations and yards, points and crossings and the methods of signaling and interlocking

3.1 Describe different types of stations and yards

3.2 List the types of points and crossings with sketches

3.3 Explain the various signals and interlocking arrangements with suitable sketches

4 Understand the importance of tunnels in transportation engineering

4.1 List the advantages and disadvantages of tunnels

5 Understand the methods of tunnel surveying, fixing the tunnel shape &

Size and providing facilities like ventilation, drainage and lining

5.1 State the methods of locating the center line of a tunnel
5.2 State the factors affecting the size and shape of the tunnel
5.3 Explain the purpose, size and location of shafts in ventilation
5.4 Explain the different aspects of drainage and lining the tunnel

6 Know the different types of harbours and their component parts
6.1 Sketch harbour layout indicating its component parts
6.2 List the factors to be considered for selection of site for different types of harbour

7 Know the types and functions of the components like breakwaters, jetties, signals, quays, docks and dredging
7.1 List the types and functions of breakwaters
7.2 List the types and functions of jetties and quays
7.3 Describe various signals used in harbours
7.4 Explain the functions of different types docks
7.5 Know the necessity of dredging
7.6 Know the hydraulic dredger

COURSE OUTLINE

PART A. Railways

I Introduction

1. Necessity of new railway lines
2. Comparison of roads and railways
3. Railway terminology
4. Systems of railways

II Permanent way

1. Definition and requirements of an ideal permanent way
2. Selection of gauge
3. Advantages of uniformity in gauges
4. Component parts of a permanent way

III Rails

1. Function and requirements of rails
2. List the types of rail sections –study of flat footed rails
3. Length of rails
4. Rail joints – types and requirement
5. Welding of rails – methods and advantages
6. Creep-definition, causes and prevention
7. Coning of wheels

IV Sleepers

1. Definition & functions of sleepers
2. List the types of sleepers - requirements and study of CC & PSC sleepers
3. Advantages and disadvantages of CC & PSC sleepers
4. Sleeper de

V Ballast

1. Functions of ballast
2. Requirements of ballast
3. List the types of ballasts-study of broken stones & cinders

VI Cross sections of railway track

1. Cross sections of railway track in cutting and embankment for both single and double tracks (BG only)
2. Fixtures and fastenings-definition and functions only (Fish plates, Bolts, Springs and Chairs)

VII Track geometrics

1. Factors governing the alignment of railway track
2. Gradient and types of gradients
3. Super elevation-definition and objects
4. Relation of super elevation, gauge, speed and radius of the curve-derivation and simple problems (Without Derivation)
5. Widening of gauges on curves

PART B Railways

VIII Track maintenance

1. Definition, necessity and classification
2. Duties of permanent way inspector

IX Station and Yards

1. Technical terms used in stations
2. List the classification of railway stations
3. Layouts of railway station-class B, crossing type wayside on double line track and terminal station
4. Definition, purpose and requirements of railway yards
5. List the classification of railway yards
6. Layout of marshalling yard
7. Level crossing

X Points and crossings

1. Definition and necessity
2. Layout of a double line turnout with technical terms associated with it

XI Signaling and interlocking

1. Definition and Objects of signaling
2. List the classification of signals
3. Study of Semaphore & colored signals
4. Definition, necessity & principle of interlocking

PART C. Tunnels

I Introduction

1. Definition of tunnels
2. Advantages and disadvantages of tunnels

II Tunnel Surveying

1. Setting out the alignment of the tunnel on the ground
2. Constructing the shafts over the centre line
3. Transferring the alignment to inside of the tunnel

III Size and shape of tunnels

1. List the different shapes of the tunnels
2. Cross-sections of tunnels- circular, segmental & horse shoe tunnels
3. Factors affecting the size of the tunnel

IV Construction of tunnels

1. List the different types of tunneling
2. Needle beam method of tunneling
3. Heading and bench method of tunneling

V Tunnel lining

1. Objects of lining
2. Types of lining

VI Ventilation of the tunnels

1. Natural method of ventilation
2. Mechanical method of ventilation

VII Drainage of tunnels

1. Definition and purpose
2. Temporary drainage system
3. Permanent drainage system

PART D Harbours

I Introduction

1. Definition & classification of harbours
2. Selection of site for a good harbour

II Breakwaters

1. Definition and its function
2. Types of breakwaters-vertical wall type & composite

III Jetties & quays

1. Functions
2. Types of quays & jetties

IV Signals

1. Requirement of signals
2. List the types of signals
3. Study of beacon signal

V Docks

1. Definition & types of docks

VI Dredging

1. Definition & necessity of dredging
2. List the types of dredgers
3. Study of hydraulic dredger.

References

1. Roads Railway tunnels and Harbors By H S Vishwanath, Sapna Publications.
2. Transporting engineering by N L Arora
3. Transporting engineering by A Kamala
4. A text book of railway engineering by Saxena & Arora
5. Tunnel Engineering by S P Bindra
6. A text book of Railway engineering by S C Rangawala
7. Tunnel Engineering by S C Saxena
8. Harbours, docks and tunnel engineering by Srinivasan

DIPLOMA IN CIVIL ENGINEERING
VI Sem

MODEL QUESTION PAPER
VI SEM CIVIL

RAILWAYS, TUNNELS AND HARBOURS

TIME: 3 hours **MAX. MARKS:100**

Instructions:
1. Question No-1 is compulsory
2. Answer two full questions from each section

1. a) Fill up the blanks	1X5	5
i.		
ii		
iii		
iv		
v		
b) Write short notes on i. Uniformity of Gauges ii. Yards	2.5x2	5

RAILWAYS
SECTION - I

2. a) Give comparison between Road ways and Railways with suitable Characteristics	5
b) List the factors affecting the choice of the Gauge	5
c) What are the functions of Rails	5
3. a) Sketch the flat footed rail with dimensions	5
b) What are the ideal requirements of a sleepers	5
c) What are the advantages of Concrete Sleepers over the others	5
4. a) Mention the different types of Ballast and explain any one	5
b) What are the requirements of Fish Plats and Bolts	5
c) Sketch and label the cross section of a single lane BG Track in Banking	5

SECTION – II

5.a) What are the duties of Permanent Way Inspector	5
b) Define Cant. Mention the desired value of Cant for BG.	5
c) Draw a neat sketch of a single lane Way Side Station	5
6.a) Sketch and label double lane Turnout	5
b) State the principle of Inter locking	5
c) Explain briefly Colour Light Signaling System	5
7.a) Draw a neat sketch of Level Crossing	5
b) What are the requirements of Railway Yards	5
c) What are the different types of Crossings	5

TUNNELS

SECTION – III

8. a) List the methods of Tunneling in hard rock	5
b) Explain how a centre line of a tunnel is transferred from the surface to in side of the tunnel	10
9. a) What are the factors affecting while selecting the size of a tunnel	5
b) List the classification of the Tunnels	5
c) Explain the method of Heading and Bench Method of Tunneling	5
10 a) What are the purpose of Lining of Tunnels	5
b) Explain Natural Method of Ventilation	5
c) Explain briefly temporary Drainage System	5

HARBOURS

SECTION – IV

11 Explain with sketches any two types of Break waters	10
12 Explain briefly Wet Docks	10
13 Write a note on Hydraulic Dredger	10

Department of Technical Education, Karnataka

DIPLOMA IN CIVIL ENGINEERING
SIXTH SEMESTER
Subject:: ESTIMATING AND COSTING-II

Hours/Week - 04 Total hours/ Semester-64

TOPIC ANALYSIS

Chapter No.	Content	No. of hours	Marks Weightage
	PART –A		
1	Renovation & Remodeling of building	7	20
2	Valuation and Rent fixation	6	20
3	Road works	11	20
	PART – B		
4	Culverts	11	30
5	Irrigation works	11	30
6	Sanitary works	11	30
7	Innovation and seminar	04	
	Tests	03	
		Total= 64	Total=150marks

DETAILS OF CONTENTS

PART-A

1.Renovation & Remodeling of building
- 1.1 Concrete floor to Mosaic floor.
- 1.2 Converting the existing to the required accommodation.
- 1.3 Converting the Tiled and Mud roofs to R.C.C roofs.
- 1.4 Re-plastering.
- 1.5 Re-painting of internal and external walls.
- 1.6 Repainting of wood works.
- 1.7 Water proofing of existing roof.

2. Valuation and Rent fixation

2.1 Definition, Meaning and purpose of valuation.
2.2 Factors governing valuation.
2.3 Scrap value, Salvage value, Market value, Book value and sinking fund.
2.4 Calculation of depreciation by different methods.
2.5 Methods of valuation.
2.6 Rental value based on plinth area method.

PART – B

3. Detail Estimates and Abstract of Cost of Road work
   3.1 Compute earth work quantities from given cross sectional details
   3.2 Preparation of Detailed Estimates and Abstract of Cost of
      a. WBM/WMM Roads
      b. Bituminous Roads
      c. Concrete Roads
4. Culverts
   Preparation of Detailed Estimates and Abstract of Cost of
      a. Slab Culvert
      b. Arch Culvert
5. Irrigation works
   Detailed Estimates and Abstract Cost of
      a. Lined Canal
      b. Tank weirs
      c. Tank Sluice
6. Sanitary works
   Detailed Estimates and Abstract Cost of
      a. Manhole
      b. Septic Tank
      c. Soak pit.
7. Innovation and seminar
   Estimation of sanitary and water supply connection for a residential/public/institutional building.

General Educational Objectives

Upon the completion of the study of the subject the student should be able to

1. Understand the method of estimating renovation and remodeling works.
2. Know the method of building valuation
2. Understand the method of preparing abstract estimate for Civil Engineering works.

Specific Instructional Objectives

Upon the completion of the study of the subject the student should be able to

1. Get an idea of renovation and remodeling of an existing items of a building.
2. Know the value of property and fixing of rent.

3. Prepare the estimate & cost for the following road works
    - 3.1 Earthwork for roads.
    - 3.2 Water bound macadam road(WBM) / Wet mix macadam road(WMM)
    - 3.3 Bituminous roads
    - 3.4 Concrete roads
4. Prepare the estimate & cost for the following culverts
    - 4.1 Single span Slab culvert (Splayed and Return type wing wall)
    - 4.2 Single span Arched Culvert
5. Prepare the estimate & cost for the following Irrigation works
    - 5.1 Earth work for canal
    - 5.2 Canal lining
    - 5.3 Tank weirs (Vertical drop only)
    - 5.4 Tank sluice (head wall, gibbet wall with rectangular barrel)
6. Prepare the estimate & cost for the following Sanitary works
    - 6.1 Manhole
    - 6.2 Septic tank
    - 6.3 Soak pit
7. Seminar and innovative practice

    7.1 Understand the method of estimating Sanitary and water supply connections for buildings.

REFERENCE BOOKS

1. Estimating and costing-II - By H.S.Vishwanath. Sapna Publications.
2. Estimating and costing By B. N. Datta.
3. Estimating and costing -By M. Chakraborti.
4. Estimating and costing -By S. C. Rangwala.
5. Estimating and costing -By G. S. Birdie.
6. Estimating and costing -By V. N. Vazirani and S.P.Chandola.

MODEL QUESTION PAPER
ESTIMATING AND COSTING-II

Time:3hours Max.marks:100

Instruction: Answer any two full questions from each section.

PART –A

1. Prepare detailed and abstract estimate for the following items of the building as shown in fig.1
    a) Repainting with distemper for internal walls and ceiling at Rs.75 per sqm.
    b)Removal of existing flooring at Rs.60 per sqm. and laying of marble flooring at Rs.180 per sqm.
    c)Removal of existing W.P.C at Rs.40 per sqm. and Laying C.C W.P.C at Rs.300 per sqm. **20**

2. a) Define valuation. What is the necessity of valuation?. **08**
    b)What is difference between depreciation and Obsolescence ? **04**

c) A building costing Rs. 15lakhs has been constructed on a free hold land measuring 100sqm. recently in big city prevailing rate of land is the neighbour hood of Rs. 4500 per sqm. Determine the net rent of the property if the expenditure on an out going including sinking fund is Rs. 42000 per annum. Work out also the gross rent of the property per month. **08**

3. Estimate the quantity of earthwork for the portion of a road between chainages 0 to 10 from the following data, lengths being measured with a standard 20m chain.

Chainages	0	1	2	3	4	5	6	7	8	9
G.L.	131.1	131.2	130.9	130.8	130.7	130.6	130.4	129.1	129.5	129.7

The formation level at 0 chainage is 130.0 and the road is in a rising gradient of 1 in 200.

The width of formation 9 m. and the side slopes 1 1/2 : 1 in banking and 1:1 in cutting

The lateral slope of the ground may be assumed as level **20**

PART-B

4.Prepare a detailed estimate of a slab culver of 2m span and 4m road way of the following items of work as shown in fig.2

a) Earthwork in excavation in hard gavelly soil.
b) Cement concrete bed 1:3:6 for foundation.
c) Size stone masonry in C.M 1:6 .
d) R.C.C work 1:2:4 for slab.
e) Cement concrete 1:2:4 for wearing coat. **30**

5. An irrigation canal has the following details.

Bed width -4m
Top width of right bank-1.5m
Top width of left bank-3m
Side slope in cutting-1:1
Side slopes in banking-1 ½ :1
Height of banks from the bed -2.55m
Longitudinal slope of the bed is 1 in 5000.

There is no tranverse slope of the bed and the ground.
Ground levels at 6 consecutive stations at 50m intervals are as follows:

Station	1	2	3	4	5	6
R.L. of ground	200.00	200.31	200.52	200.57	199.68	199.21

Bed level at station 1=198.50
Estimate the quantity of earthwork in cutting and in banking. **30**

6. Estimate the cost for the following items of work for a 50 users septic tank as shown in fig.3

a) Earthwork excavation at Rs.75 per sqm.
b) Cement concrete 1:2:4. at Rs.2800 per cum.

c) I class Brick work in C.M 1:4 at Rs.2150 per cum.
d) 20mm thick cement plaster in C.M.1:3 at Rs. 125 per sqm.
e) R.C.C. slab including steel complete work roof slab at Rs.3800 per cum. **30**

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Department of Technical Education
DIPLOMA IN CIVIL ENGINEERING

Subject**: DESIGN OF STEEL AND MASONARY STRUCTURES**.

VI SEMESTER

Subject code: Hours per week 04

Total hours:64

COURSE CONTENT

Chapter No.	Contents	No. of Hours	Marks Weightage
	Part A		
1	Introduction to steel structures	04	05
2	Design of Bolted joints	06	15
3	Design of welded joints	05	15
4	Design of Beams	05	15
	Part B		
5	Design of columns	05	12
6	Design of Column bases	05	15
7	Design of compression member	04	12
8	Design of Tension Members	04	12
	Part C		
9	Introduction to limit state Design of steel structures	06	15
10	Analysis and Design of Masonry dams	05	15
11	Analysis and Design of Retaining walls	05	15
	Seminars and Innovations	04	
	Tests	03	
	TOTAL	**64**	146

Detailed Contents
PART A

1. Introduction to steel structures:

1.1 Advantages and Disadvantages of steel structures.
1.2 Loads and load combinations as per IS 875
1.3 Rolled steel structural sections as per SP16
1.4 Code provisions for Design of steel structures as per IS 800.

2. Design of Bolted joints.

2.1 Introduction.
2.2 Advantages and Disadvantages Of Bolts
2.3 Types of Bolts
2.4 Technical terms used in bolts
2.5 Stresses in bolts
2.6 Types of Bolted joints.
2.7 Failure of Bolted joints.
2.8 Tension capacity of plates.
2.9 Design strength of Bolt, shear, tension and bearing.
2.10 Efficiency of joints.
2.11 Design of simple Bolted joints.

3. Design of welded joints.

3.1 Introduction
3.2 Types of Weld.
3.3 Advantages and disadvantages of welded joints.
3.4 Fillet weld and its properties.
3.5 Butt-weld and its properties.
3.6 Calculation of strength of welded joints.
3.7 Design of fillet weld for symmetrical and unsymmetrical sections.
3.8 Design of roof truss joints.

4. Design of Beams.

4.1 Introduction.
4.2 Types of beams: main beam, secondary beam, spandrel beam, stringer beam and purlins.
4.3 Load carrying capacity of beams.
4.4 Design of rolled steel simple beams.
4.5 Design of primary and secondary beams.
4.6 Design of symmetrical built up sections.
4.7 Splicing of beams.

PART B

5. Design of columns.

5.1 Columns, end condition, effective length, slenderness ratio. Use of BIS tables for permissible stressing compression.
5.2 Design strength of Columns.
5.3 Design of axially loaded Columns (Simple and compound columns)

6. Design of Column bases.

6.1 Introduction.
6.2 Types of column bases .a)Slab base plate b) Gusseted base plate.
6.3 Design of Slab base plate and Gusseted base plate for axial loads.

7. Design of compression member

7.1 Analysis of compression members.
7.2 Design of angle struts: Continues and Discontinues strut for given end conditions (for axial load only)

8. Design of Tension Members.

8.1 Types of tension members (single and double angle)
8.2 Analysis of tension members.
8.3 Design of tension members (for axial load only)

PART C

9. Introduction to limit state Design of steel structures.

9.1 Classification of Limit state.
9.2 Loads and partial safety factors.
9.3 Partial safety factors for materials and loads combinations.
9.3 Plastic method of design of beams.
a) Introduction, plastic hinge, methods of plastic analysis of beams.

b) Factors affecting plastic modulus.
c) Shape factor and Plastic moment.
d) Web-buckling and crippling.
e) Simple problem on determination of plastic modulus ,shape factor and plastic moment.
f) Design of simple laterally supported I beam.

10. Analysis and Design of Masonry dams.

10.1 Design of masonry dams with water face vertical
10.2 Distribution of pressure at foundation when the dam is full and empty

11. Analysis and Design of Retaining walls.

11.1 Theory of earth pressure – calculation of earth pressure by Rankin's method .
- with and without surcharge
11.2 Conditions of stability for no tension, middle third rule.
11.3 Distribution of pressure at foundation
11.4 Design of masonry Retaining wall with earth face vertical.

General Educational Objectives:

Upon completion of the study the student should be able to understand:-

1 . The sections in steel structure and the allowable stresses.
2. The connections in Steel structures
3. The Design of R.S. beams, Columns, Column bases, Strut and Tie members.
4 .The basic concepts of Limit state design of steel structures. and simple problems on beams .
5. The analysis and design of masonry retaining walls and masonry dams.

Specific Instructional Objectives:

1.1 To know about the Advantages and Disadvantages of steel structures.
1.2 To know various Loads and load combinations as per IS 875
1.3 To know different types of Rolled steel structural sections as per SP16
1.4 To understand the Code provisions for Design of steel structures as per IS 800
..
2.1 To know about the Advantages and Disadvantages Of Bolts.
2.2 To know different types of Bolts
2.3To know various technical terms used in bolts
2.4 To know various Stresses in bolts
2.5 To know various types of Bolted joints.
2.6 To know different methods of failure of Bolted joints.
2.7To know the tension capacity of plates.
2.8 To Design strength of Bolt, shear, tension and bearing.
2.9 To determine Efficiency of bolted joints.

2.10 To Design of simple Bolted joints.

3.1 To know different Types of Weld.
3.2 To know Advantages and disadvantages of welded joints.
3.3 To understand Fillet weld and its properties.
3.4 To understand Butt-weld and its properties.
3.5 To Calculate strength of welded joints.
3.6 To Design fillet weld for symmetrical and unsymmetrical sections.
3.7 To understand the Design of roof truss joints.
.
4.1 To understand different types of beams .main beam, secondary beam, spandrel beam, stringer beam and purlins.
4.2 To determine Load carrying capacity of beams.
4.3 To understand the Design and analysis of rolled steel simple beams.
4.4 To understand Design and analysis of primary and secondary beams.
4.5 To understand Design and analysis of symmetrical built up sections.
4.5 To understand design and analysis of Splicing of beams.

5.1 To know the concepts of Columns, end condition, effective length, slenderness ratio. (Use of BIS tables for permissible stress in compression).
5.2 To determine the Design strength of Columns.
5.3 To understand the Design of axially loaded Columns (Simple and compound columns)

.
6.1 To know Types of column bases.a)Slab base b) Gusseted base .
6.2 To understand the Design of Slab base and Gusseted base for axial loads.

7.1 To understand the Analysis of compression members(struts)
7.2 To understand the Design of angle struts: Continues and Discontinues strut for given end conditions (for axial load only)

8.1 To understand different Types of tension members (single and double angle)
8.2 To understand the Analysis of tension members.
8.3 To understand the Design of tension members (for axial load only)

9.1 To know the Classification of Limit state. Design of steel structures.
9.2 To understand Loads and partial safety factors.
9.3 To understand Partial safety factors for materials and loads and its combinations.
9.4 To understand different method of Plastic method of design of beams.
a) Introduction, plastic hinge, methods of plastic analysis of beams.
b) Factors affecting plastic modulus.
c) Shape factor and Plastic moment.
d) Web-buckling and crippling.
e)To understand Simple problem on determination of plastic modulus ,shape factor and plastic moment.
f)To understand the Design of simple laterally supported I beam.

10.1 To understand the Design of masonry dams with water face vertical
10.2 To understand the concept of Distribution of pressure at foundation when the dam is full and empty

11.1 To understand the Theory of earth pressure – calculation of earth pressure by Rankin's method . - with and without surcharge.
11.2 To understand the Conditions of stability for no tension, middle third rule.
11.3 To know the Distribution of pressure at foundation
11.4 To know the Design of masonry Retaining wall with earth face vertical. With and without surcharge.

REFERENCES:-

1. Design of masonry steel structures By H S Vishwanath, Sapna Publications.
2. Design of Steel Structures by Ramachandra.
3. Design of Steel Structures by Neegi.
4. Design of steel Structures by Swany.
5. Limit state design of steel structures by prof. Dr.V.L.Shah Structures publication.
6. Limit state design of steel structures by Subramanya . Tata mcgrah Hill.

VI SEM Diploma Examination

CIVIL ENGINEERING

DESIGN OF STEEL AND MASONARY STRUCTURES

Time:3Hours (Max marks:100)

Instructions: Answer any two full questions from each part.
Assume missing data suitably.
Steel tables will be allowed in the examination.

PART-A

1. (a)List the advantages and Disadvantages of bolted connections 7
   (b) Define Nominal dia of bolt, Gross dia of bolt, Net area of bolt, gross area of bolt.8

2 (a) Two steel plates 100mm x 10mm and 80mm x 12mm are connected by 6mm fillet weld. Find the maximum force transmitted in the joint and the lap length. Assume allowable stress in steel -150 N/mm2. Allowable stress in weld is105 N/mm2. 6

   (b) Define(a) Size of weld.(b)Throat thickness (c)area of weld 6
   (c) Mention the difference between Fillet weld and Butt-weld. 3

3 A simply supported beam of span 6m carries 40 KN/m super imposed load . Design the rolled steel beam and also check for shear and deflection 15Marks

PART B

4. An ISLB 400 @ 569 N/m with cover plates 300 mmx 20 mm is used as a column for supporting total load of 1500KN. Design a gusseted base plate for the column. Assume bearing strength of concrete 5 N/mm2 and bearing strength of steel base plate 190N/mm2 20marks

5. (a) A strut in a truss is 3.25 m long and is subjected to an axial compressive forceof 500 KN. The member consists of two unequal angles. Design the section. The permissible compressive stress fro the member shall be taken conforming to I.S specifications. Take fy= 250 N/mm2 10marks

6..a Explain the method of calculating the net area of 6 marks

I. Single angle at one side of gusset plate.
ii. Double angle placed back to back on one side of gusset plate

(b) Design a single angle tension member to carry tensile load of 150KN 14 marks

PART C

7 (a) What are the method of plastic analysis of steel structures. 3marks

(b) Differentiate between web buckling and web crippling 3 marks

(c) A Simply supported beam 5m span carries uniformly distributed load of 40kn/m,in addition, the beam carries a central point load of 50kn. The beam is laterally supported. Design the section and check the section for shear and deflection. 9marks.

8. A masonry dam trapezoidal in section, retains water on its vertical face other details are as follows.

Height of dam =12m.
Maximum depth of water stored –11m.
Top width of dam =2m
Density of masonry –23kN/m3
Density of water – 10 kN/m3
Coefficient of friction between the foundation masonry and soil = 0.57.

Find the minimum bottom width required and also check for stability

15 marks.

9 A retaining wall1.2m wide at top and 3mwide at base with vertical face retaining earth is 5m high. The surface of earth is in level with the top of retaining wall. The earth pressure varies from zero at top to 35KN/m2at the bottom . Determine the maximum and minimum stress intensity at the base. Given unit weight of masonryas25 KN/m3 and weight of earth is 15 KN/m3. Check the stability of wall if co-efficient of friction is 0.6

15 marks.

DIPLOMA IN CD Ship
SIXTH SEMESTER

SUB: CONSTRUCTION MANAGEMENT AND CONSTITUTION OF INDIA

Contact hours per week:4 Hours **Contact Hours/semester:64 Hours**

Chapter no	Contents	No Hrs
	PART-A	
01	Construction Planning & Organization	14
02	Contracts & Tenders	04
03	Measurement of Works & Stores management	03
	PART-B	
04	Inspection & Quality Control	05
05	Safety in Construction works	06
06	Entrepreneurship & Management	10
	PART-C	
07	Constitution of India	07
08	Parliamentary system and procedures	06
09	Empowerment of Women	06
	Tests	03 Hrs
Total		**64 Hrs**

COURSE OUT LINE
PART-A

01 Construction Planning & Organization 14 Hrs

- Construction Team : Owner,Engineer & Contractor- Their Relationship
- Construction stages, Schedules, Job layouts, Pre tender & Post tender planning.
- Applications of CPM & PERT in construction planning. Network Analysis , Simple problems.
- Definition & Need of Organisation, Types & Organisation in PWD ,Construction Corporations & Private Construction Companies

02 Contracts & Tenders 04 Hrs

- Definitions: Types of Contracts-Piece work, Item rate, Cost plus percentage, Negotiated contracts , Labour contracts& Departmental Execution of works.
- Merits &limitations of each contract system.
- Tender, e-Tendering ,Tender Notice & Tender documents, EMD & SMD. Scrutiny of Tenders. Contract agreement & conditions of contract.

03 Measurement of Works & Stores management 03 Hrs

- Measurement Book, Recording of measurements –Pre measurements & Check measurements
- Classification of Stores. Issues, Indents & Bin cards

PART-B

04 Inspection & Quality Control 05 Hrs

- Principals of inspection, Enforcement of Specifications, Stages of inspection & quality control for each works such as masonry, RCC, Sanitary & water supply works.

05 Safety in Construction works 06 Hrs

- Importance of safety
- Causes &effects of accidents in construction Industry.
- Safety measures to be adopted for:
  Excavation
  Scaffolding & Form work
  Fabrication
  Demolition
- Occupational hazards in Construction Industry

06 Entrepreneurship & Management 10 Hrs

- Entrepreneurship- Concept-Definition- Role-Expectations.
- Motivational needs of the entrepreneur
- Characteristics of an entrepreneur
- Risks & Rewards in Entrepreneurship, Evaluation of Risks &Rewards.
- Feasibility report
- Initial and working capital requirements-Mobilisation of finance
- Preparation of a complete Project report
- Importance of Total Quality Management, ISO9000 certification procedure.
- Management- Definition- Functions.
- Requirements to become an entrepreneur- Licensed surveyor, valuer & Contractor.

PART-C

7.0 Indian Constitution

- Indian Constitution-Formation of Constituent Assembly-Framing of the Constitution-Drafting committee- Contributions of Dr. B R Ambedkar in drafting a constitution for India.
- Preamble-objectives-Directive principles
- Features of Constitution
- Fundamental Rights
- Fundamental duties
- Amendments for Indian Constitution
- Human Rights

8.0 Parliamentary system and procedures

- Government-Meaning-organs-functions.
- Parliament-meaning-Two houses-Lok Sabha-Composition-election-Presiding officer-term-RajyaSabha- Composition-election-Presiding officer-term
- Powers of parliament
- Executive Role - President-Vice President-Prime Minister-Council of Ministers
- Indian Judiciary system-Supreme Court-High Court-subordinate courts

- Constitutional bodies-Election Commission-Public Service Commission-Finance Commission
- Structure of State government- State Legislature-Governor-Chief Minister-Council of Ministers
- Local self government-meaning-Three tier system-Village panchayath-taluk panchayath-Zilla panchayath
- Local bodies-Municipalities and Corporations

9.0 Empowerment of Women

- Concept, Definition and need for Women's Empowerment
- Strategies, approaches, process, levels, principles and indicators for women's empowerment.
- Gender statistics in India – Glaring inequalities
- Women and Development:
- Goals and Objectives of National Policy for Women's Empowerment
- Advancement of Women through Five-Year Plans
- Special Programs for Women's Development.
- Constitutional Provisions towards Women's Rights and Special Legislations for Women.

Reference books:

1. Construction Management & Entrepreneurship, H.S.Vishwanath, Sapna Publications.

2.Sengupta.B, & H.Guha. "Construction Management and Planning ", Tata McGraw Hill Publishing Company Ltd., New Delhi.

3.Seetharaman. S, " Construction Engineering & Management ", Umesh Publications, Nai Sarak, New Delhi.

4.Boyd.C. & Paulson Jr, "Computer Applications in Construction ", Tata McGraw Hill Publishing Company Ltd., New Delhi, 1995

5.Sanga Reddy. S, "Construction Management", Kumaran Publications, Coimbatore.

6.Rangwala.S.C.,"Construction of Structures and Management of Works", Charotar Publishing House,Anand-388001,3rd Edition,2000.

7.Construction management by NITTTR, Chennai

General Educational Objectives

1.0 Knows the need for preliminary planning and the organizational steps in construction industry.

2.0 Understand the procedure for fixing agencies for execution.

3.0 Understand procedure of testing and quality control.

4.0 Understand the salient features measurement of works & stores management

5.0 Knows the safety aspects in civil engg construction works.

6.0 Knows the Basics of entrepreneurship & management in construction industry.

7.0 Know the importance of Indian Constitution

8.0 Understand the working of Parliamentary System.

9.0 Understand and appreciate the special provisions for empowerment of women

Specific Educational Objectives.

1.0 Know the need for preliminary planning and organizational steps in construction Industry.

1.1 Distinguish between Engineer and Contractor.

1.2 Distinguish between construction stages and Construction operations.

1.3 Know the need for material schedule, labour schedule,equipment schedule.

1.4 State the objectives of programming.

1.5 Explain the use of Job lay out-preparation of job layout.

1.6 Prepare the network diagram based on CPM for construction works.

1.7 Knows different organizations &gives the organizational structure of PWD,&Other construction agencies.

2.0 Understand the procedure for fixing agencies for execution of works

2.1 Define the terms contract, tender,e-tender.

2.2 Explain the various contract systems available for construction works.

2.3 List merits &demerits of each contract systems.

2.4 Explain the need for calling of tenders.

2.5 List the steps involved in fixing the agency for construction through tender systems.

2.6 Drafts a tender notice for a work.

2.7 Prepare tender document.

2.8 Explain the need of EMD &SMD.

2.9 Draw up a comparative statement..

2.10 List out the conditions of contract agreement.

3.0 Understand procedure for testing & quality control.

3.1 Explains the need for inspection and quality control.

3.2 Describes the various aspects of enforcement of sfecifications.

3.3 Describes the stages of inspection and quality control for
a) Masonry.
b) RCC
c) Sanitary and water supply services.

3.4 Identify the technical services & Inspection team required for inspection and quality control of a construction project or a job.

4.0 Understand the salient features measurement of works & stores management

4.1 Understand the importance of measurement book & rules to be followed in recording measurement. Premeasurements & Check measurements.

4.2 Explain the need for astore in a project., procurement of stores,types.

4.3 Explain the use of indent ,invoice &bin card in store management.

5.0 Knows the safety aspects in civil engg construction works

5.1 Explain the importance of safety in construction worka.

5.2 Causes and effects of accidents in construction industries.

5.3 Describe safety measures to be adopted in work sites for
a) Excavation. b) Scaffolding c)Demolition
d) Fabrication & erection

5.5 Give a brief note on occupational hazards in construction Industry

6.0 Know the Basics of entrepreneurship & management in construction industry.

6.1 Definition, concept of entrepreneurship & entrepreneur.
6.2 Role and expectations of an entrepreneur.
6.3 Analyse the motivational needs of an entrepreneur.
6.4 List the characteristics of entrepreneur.
6.5 Evaluate the risks and rewards in entrepreneurial venture.
6.6 Understand the definition of easibility report. list various points to be considered in preparing feasibility report.
6.7 Explain the role of financial organizations in the development of. Entrepreneurship.like banks,SISI,NSIC, SIDCO etc.
6.8 Explain the role of small scale industries in economic development of India.
6.9 Explain the details of preparing a construction project report.

7.0 Indian Constitution

7.1 Introduction to Indian Constitution
7.2 Discuss the Formation of Constituent Assembly
7.3 Discuss the Contribution of Contributions of Dr. B R Ambedkar in Drafting a constitution for India.
7.4 Discuss Preamble and its main objectives
7.5 State the Directive principles
7.6 Discuss the Features of Constitution
7.7 Mention the number of parts, articles, schedules and discuss the article -1
7.8 Discuss Fundamental Rights
7.9 Discuss Fundamental duties
7.10 Explain the Amendment and its procedure
7.11 Discuss Human Rights and its significance

8.0 Parliamentary system

8.1 Discuss the Parliamentary system of Government.
8.2 Discuss about:
8.2.1 Loka Sabha: Composition, election, Presiding officer and term
8.2.2 RajyaSabha: Composition, election, Presiding officer and term
8.3 Powers of parliament
8.3.1How law is made, three readings
8.3.2Diffrence between Bill and act
8.3.3Administrative control- Explain importance of questioning- concept of Question hour- concept of zero hour
8.3.4 Briefly explain about Confidence motion and Censure motion
8.4 Explain the meaning of the budget
8.5 President-Vice President-Prime Minister-Council of Ministers their appointments and functions
8.6 Discuss the formation and functions of supreme court-High court-Subordinate court.
8.7 Discuss the importance of Constitutional bodies-Election Commission-Public Service Commission-Finance Commission
8.8 Discuss the about state legislature:
8.8.1 Legislative assembly: Composition, election, Presiding officer and term

8.8.2 Legislative council: Composition, election, Presiding officer and term

8.9 Governor-Chief Minister-Council of Ministers their appointments and functions

8.10 Local self government-meaning-Three tier system

8.11 Discuss the formation and functions of Village panchayath-taluk panchayath-Zilla panchayath and urban local bodies such as Municipalities and Corporations

9.0 Empowerment of Women

9.1 Explain the Concept and Definition of Women's Empowerment.

9.2 Discuss the different strategies, approaches, process, levels, principles and indicators for women's empowerment.

9.3 Discuss the Gender statistics in India – Glaring inequalities.

9.4 Explain Women and Development

9.4.1 List the Goals and Objectives of National Policy-2001 for Women's Empowerment.

9.4.2 Discuss the emphasis given on the Advancement of Women through Five-Year Plans.

9.4.3 List the Various Special Programs for Women's Development from government.

9.5 State Constitutional Provisions towards Women's Rights -Fundamental Rights Article 14, 15, 15(3), 16-Directive of State Policy Article 39,42-Fundamental Duties 51(A)(e) and Reservation of seats Article 243(D)(3), Article 243(T)(3) - explain the following Special Legislation for Women-Dowry Prohibition Act 1961, Domestic Violence Act 2005,Sexual Harassment at Workplace Bill 2006, Equal Remuneration Act 1976,Hindu

TABLE SHOWING WEIGHTAGE OF MARKS FOR DIFFERENT CHAPTERS

Sl no	Description	Time alloted	Marks allotted
1	Construction Planning & Organisation	14 Hrs	34marks
2	Contracts & Tenders	03 Hrs	10marks
3	Measurement of Works & Stores management	04 Hrs	10marks
4	Inspection & Quality Control	05 Hrs	12 marks
5	Safety in Construction works	06 Hrs	14 marks
6	Entrepreneurship & Management	10 Hrs	20 marks
7	Constitution of India	07 Hrs	15 marks
8	Parliamentary system & Procedure	06Hrs	15 marks
9	Women Empowerment	06Hrs	15 marks
10	Tests	03 Hrs	
TOTAL		**64 Hrs**	**145marks**

DIPLOMA IN CIVIL ENGINEERING

FIFTH SEMESTER

SUB: CONSTRUCTION MANAGEMENT AND CONSTITUTION OF INDIA

MODEL QUESTION PAPER

MAX MARKS ;100 DURATION : 3 HRS

Instructions

1. Question No1 is compulsory
2. Answer any two questions from each sections.I,II,& III

1 a) Fill in the blanks with suitable word 1x5=5

i. ---------- are necessary for issuing materials from stores.
ii. Agencies are fixed for construction works through----------.
iii. ----------is the agreement between owner and contractor.
iv. Security in the form of ---------is submitted while submitting tender.
v. --------- is the method used for planning and controlling a construction project.

b) Write a short note on e- tendering 5

SECTION I

2

a) Distinguish between Engineer & contractor 5

b) With a neat sketch explain Job lay out 10

3 a)Draw the network and determine the critical time and critical path for the following activities

Events	Duration in days	remarks
Starting A	-----	-----
A TO B	9	------
A TO C	8	-----
B TO D	5	D succeeds B
C TO E	11	E succeedsC
C TO F	10	F succeedsC
D TO G	15	G succeedsE
E TO G	13	Gsucceeds E
F TO H	13	H succeedsF
H TO I	14	I succeedsH &G
G TO I	12	I succeeds H &G

7

b)Differentiate between CPM & PERT 5

c) Write ashort note on PWD organization 3

4. a)List different types of contract systems & explain any one 7

b)What are the contents of a tender document 3

c) Explain i) Premeasurement ii) Check measurement 5

SECTION II

5 a) Explain the need for a store in a construction project 5

b) What are the safety measures to be adopted during Fabrication and erection work 5

c) List various occupational hazards in construction industry 5

6 a)What are the causes and effects of accidents in construction industry? 7

b) Explain the following terms w r t construction management 8

i) Planning

ii) Directing

iii)Organising

iv) Controlling

7 a)What are the characteristics of an entrepreneur? 5

b)List the various risks and rewards in entrepreneurship 10

SECTION III

8 a) Discuss the Formation of Constituent Assembly 5

b) Discuss the Features of Constitution 5

c) Discuss role of Indian judicial system. 5

9 a) Explain how the president of India is elected 5

b) Explain three tier panchayath system 5

c) Explain the role of Finance commission 5

10 a) what are the approaches to empowerment of women? 5

b) List the goals and objectives of national policy for women's empowerment. 5

c) Write a note on dowry prohibition act. 5

DIPLOMA IN CIVIL ENGINEERING
SIXTH SEMESTER
Subject:: CONSTRUCTION PRACTICE

Contact Hrs/Week:6 Hrs. Contact Hrs/Sem: 96 Hrs.

Ex.No:	CONTENTS	No. of Hours
1	Study of tools required for construction work	3
2	Setting out centre line for a building and Setting Levels	9
3	Construction of walls, pillars in English Bond	9
4	Fabrication of form work for beam, slab, lintel with chajja, column	15
5	Bar bending and fabrication of reinforcements for beam, slab, lintel with chejja & column	18
6	Concrete Mix design	12
7	Non destructive tests on Concrete	3
8	Quantity survey	6
9	Field Visit & mini project report	9
	Innovation and seminar	6
	Tests	6
	Total=	96 Hours

GRADED EXCERCISES

1 Study of tools used in construction practice.

2 Setting out of centre line for a small building & transformation of levels using Water Tube levels.

3 Materials calculation and construction of
- 1 & 1½ Brick thick walls in English bond in mud mortar including a corner
- 1 & 1½ Brick thick Pillar in mud mortar
- 200mm , 150mm and 100mm concrete blocks

4 Fabrication of timber or steel form work for
- a beam
- a slab
- a column

5 Bar bending & Fabrication of Reinforcements for
- a beam
- a slab
- a lintel with chejja
- a column

6 Prepare mix design for M20 concrete & conduct compressive test for trail mixes.

7 Conducting Non-destructive tests on concrete
- Beam
- Flooring
- Slabs &
- Columns

using Rebound hammer and Ultrasonic pulse velocity testing machine.

8. Quantity survey: Preparing Bill Of Quantities (B.O.Q) by taking measurements on existing building.
9. Visit any construction site and prepare a mini project report for construction activities. Construction sites:
   - Residential buildings
   - Commercial buildings
   - Roads, bridges, culverts construction
   - or any construction activities in progress.

Reference Books

1 A text book of Building construction - Bindra & Arora (Dhanpat Rai and Sons Delhi -
2 A text book of Building construction - Sushil Kumar (Standard publishers)
3 S.P.34
4 A text book of Structural Design & Drawing - Singh (India publishing house)
5 A text book of Practical Building construction - Mantri (Mantri Publications)
6 Concrete Technology – MS Shetty.
7 Concrete Mix design – Krishna Raju
8 SP 23

LIST OF TOOLS/EQUIPMENTS

1	Trowels	15
2	Mortar pans	20
3	Plumb bob	15
4	Shovel (hand shovel)	10
5	Spade	4
6	Mason’s spirit level	5
7	6mm dia Transparent water tube	20m
8	Pick axe(3kg)	2
9	Bar bending Table	4
10	Straight edge	5
12	Tri square	5
13	Steel/ Plywood form work for column, beams & slab with accessories	3set
14	Aluminum ladder 3m height	2
15	Tubular scaffolding	1 Unit
16	Mason's tool kit	2
18	Roller brushes	10

19	Needle vibrator	1
20	Concrete mixer	1
21	Concrete moulds 15cmx15cmx15cm size with accessories as per IS standard	6
22	Rebound hammer for non destructive test	1
23	Ultra sonic pulse velocity testing machine	1

SCHEME OF VALUATION

1	Record	5marks
2	Mini project report on field visit	10marks
3	Planning/Procedure	15 marks
4	Observation, tabulation & Calculation	20 marks
5	Conducting exercise	30 marks
6	Viva Voce	20marks
	Total	**100 marks**

DIPLOMA IN CIVIL ENGINEERING

VI SEMESTER

SUBJECT: EXTENSIVE SURVEY CAMP AND TECHNICAL VISITS

MAX MARKS:100 **Duration: 15 days**

(Extensive Survey Camp shall be carried outside the campus, beyond 30km from the Institute)

Major topics:

1 Introduction
2 Reconnaissance Survey
3 Preliminary Surveys
4 Engineering Survey
5 Location Survey
6 Preparation of drawings.
7 Tracing and inking of Drawings
8 Filing and submission of drawings

9 **Technical Visits**
Visit to ongoing/existing projects (Irrigation, Hydel, Bridge, fly over, tunnels, water & waste water treatment plants, etc.)

Objectives:

1 Conduct surveys and prepare drawings and technical reports for a New Tank Project & new road project
2 Use of different surveying equipments.

Graded Exercises:

New Tank Project

1 Reconnaissance of the area and fixing the alignment of bund
2 Fly levelling to establish B.M from any available G.T.S B.M. to the site.
3 Conduct profile leveling & cross sectioning along centre line of bund(L.S & C.S).
4 Conduct capacity contours survey.
5 Conduct block levels at the proposed waste weir & sluice site.
6 Conduct surveys to alignment of canal(L.S & C.S).
7 **New Highway Project**
Conduct surveys for new hilly road alignment (L.S & C.S)
8 Town planning project for small village

Drawings to be prepared:

- Plan showing the alignment of Bund.
- Plotting of L.S. and C.S of Bund.
- Block levels at waste weir, tank sluice site.
- Contour map of water spread.
- Plan showing the alignment of Canal.
- L.S and C.S of Canal at different chainages
- Plan showing alignment of road.
- L.S & C.S of Road at different chainages as per IRC standards
- Alignment plan of road
- Preparation of existing village map/layout
- Zoning allocation

9 a) Calculation of earth work for New tank & Road project.
b) Capacity of reservoir using capacity contour.

10 Technical visit- Minimum 3 days

Objectives

1 Organize visits and ascertain Technical information about Civil Engineering aspects and to develop leadership quality

2 Apply the knowledge gained in different places in solving the real life problems in Civil Engineering

SCHEME OF EXAMINATION
Survey Camp and Technical visit

1 **Survey Camp**

a) Survey Camp Report & Drawings	40 marks
b) Two written questions on survey camp report	20 marks
c) Viva Voce	20 marks

2 **Technical Visits/Local technical Visits.**

Report on technical Visits.	20 marks
Total	**100 marks**

Department of Technical Education, Karnataka
DIPLOMA IN CIVIL ENGINEERING

FIFTH & SIXTH SEMESTER (Final examination will be in sixth semester)
Subject: PROJECT WORK

Contact Hrs/Week: 3 Hrs. **Contact Hrs: 48 Hrs+48 Hrs**

As far as possible students should be given live project problems with a view to:

i) Develop an understanding regarding the size and scale of operations and nature of field work in which students are going to play their role after completing the course of study in Civil engineering.
ii) Develop an understanding of subject based knowledge given in the classroom in the context of its application at work places.
iii) Provide first hand experience to develop confidence amongst the students to enable them to use and apply polytechnic based knowledge and skills to solve practical problems of the world of work.
iv) Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

For the fulfillment of above competencies, polytechnics may establish close linkage with 8- 10 relevant organizations for providing such an experience. It is necessary that each organization is visited well in advance by respective teachers and activities to be performed by students are well defined. The chosen activities should be such which are of curricular interest to students and of professional value to industrial/field organizations.

Each Project batch must not exceed 6 students.

Effort should be made to identify actual field problems to be given as project work to the students. Project selected should not be too complex which is beyond the comprehension level of the students. The placement of the students for such a practical cum project work should match with the competency profile and interest of students.

Students may be assessed both by industry and polytechnic faculty.

The suggested performance criteria is given below:

a) Punctuality and regularity **(Log book - mandatory and produced during IA verification)**
b) Initiative in learning/working at site
c) Level/proficiency of practical skills acquired
d) Sense of responsibility
e) Self expression/Communication skills
f) Interpersonal skills.
g) Report writing skills

h) Viva voce

Some of suggested projects are given below: These are only guidelines, teacher may take any project related to Civil Engineering depending upon the availability of projects. Preference should be given to practical oriented projects.

According to the local needs
The following major projects are suggested:

1. Construction of a small concrete road consisting of following activities
- Survey and preparation of site plan
- Preparation of drawings i.e. L-Section and X-Section
- Estimating of earth work
- Material estimating and costing with specifications
- Testing of Aggregates
- Design of Concrete Mix
- Preparation of sub grade with stone ballast
- Laying of concrete
- Testing of slump, casting of cubes and testing
- Technical report writing

2. Water Supply /Drainage system for a village / Layout
- Surveying
- Design of water requirements and water distribution system
- Preparation of drawing of overhead tank
- Material estimating and costing
- Specifications
- Technical report writing

3. Construction of shopping complex/School Building/Hostel Building/PHC/Residential Complex/Industrial Building/Bridges/Foundations/Flyovers/Under Passes
Preparation of detailed drawing – Plan, Elevation, section, layout, structural drawing, working drawing
Preparation of Detailed and Abstract Estimate, Quantity of Materials

4. Rainwater harvesting and Recharging
- Assessment of catchment's area
- Intensity of rainfall
- Monitoring during rainy season
- Quality and Quantity analysis
- Collection of water
- Recharge pit design
- Supply of water

5. Water Supply and Sanitary connections for a Multi storied building
Preparation of detailed drawing – Plan, Elevation, section, layout, working drawing
Preparation of Detailed and Abstract Estimate, Quantity of Materials

6. Report on Concrete Mix Design with/without Admixtures.
7. Green Buildings
8. Solar Farming
9. Critical Study of existing water supply system
10. Critical Study of existing Sewerage system
11. Solid waste management
12. Bio-medical waste disposal.
13. Flood water management – case study
14. Changes in Rainfall pattern and its impact
15. Traffic Study
16. Noise Study
17. Air pollution Study.
18. Valuation and Rent fixation
19. Water shed management
20. Restoration of Lakes.
21. Repair estimate of existing Buildings

The project report should consist of following items.

1. Introduction
2. Literature survey
3. Study Area
4. Methodology/Design/Tests
5. Result and Discussion
6. Conclusion and scope for future study
7. References.

GUIDELINES FOR THE PREPARATION OF PROJECT REPORTS

1. Project reports should be typed neatly in New Times Roman letters on both sides of the paper with 1.5 line spacing on a A4 size paper (210 x 297 mm). The margins should be: Left - 1.5", Right - 1", Top and Bottom - 0.75".
2. The total number of reports (**Soft bound**) to be prepared are
   - One copy to the department
   - One copy to the concerned guide(s)
   - One copy to the candidate.
3. Before taking the final printout, the approval of the concerned guide(s) is mandatory and suggested corrections, if any, must be incorporated.
4. Every copy of the report must contain
   - Inner title page (White)
   - Outer title page with a plastic cover

- Certificate in the format enclosed both from the college and the organization where the project is carried out.
- An abstract (synopsis) not exceeding 100 words, indicating salient features of the work.

5. The organization of the report should be as follows

1. Inner title page 2. Abstract or Synopsis 3. Acknowledgments 4. Table of Contents 5. List of table & figures (optional)	Usually numbered in roman

- Chapters (to be numbered in Arabic) containing Introduction-, which usually specifies the scope of work and its importance and relation to previous work and the present developments, Main body of the report divided appropriately into chapters, sections and subsections.
- The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.
- The **chapter must be left or right justified** (**font size** 16). Followed by the **title of chapter centered** (**font size 18**), **section/subsection numbers along with their headings must be left justified** with **section number and its heading in font size** 16 and **subsection and its heading in font size** 14. The **body or the text** of the report should have font size 12.
- The figures and tables must be numbered chapter wise
- The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.

Reference OR Bibliography: The references should be **numbered serially** in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.

1. For textbooks – Dr.V.L.Shah & Veena Gore, Limit State Design of Steel Structures, Structures Publications, 1 Edition, 2009.
2. For papers - Devid, Insulation design to combat pollution problem, Proc of IEEE, PAS, Vol 71, Aug 1981, pp 1901-1907.

- Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g.
- **V = IZ** ..... **(3.2)**
- All equation numbers should be right justified.
- Separator sheets, used if any, between chapters, should be of thin paper

SESIONAL MARKS EVALUATION:

1. First review (During the end of V Th semester) 25 mark
2. Second review (During the end of VI Th semester) 25 mark

TOTAL:50 mark

I A Marks:

Scheme of Evaluation

1	Log record	05
2	Synopsis& Report	10
3	Presentation	10
	Total	**25**

NOTE: 1. Sesional marks to be awarded at the end of *EACH SEMESTER ONLY*

2.The candidate declaration and certificate sample copy are enclosed here for incorporation in final project report

PROJECT EVALUATION (At the end of 6th semester):

1. Relevance of the subject in the present context 10 mark
2. Literature Survey 10 mark
3. Experimental observation 20 mark
4. Results & Discussion 20 mark
5. Presentation(Max of 10 Slides) 40 mark

TOTAL 100 mark

CANDIDATE'S DECLARATION

I, ---------- a student of Diploma in ---------- Department bearing Reg No----------of ---------- hereby declare that I own full responsibility for the information, results and conclusions provided in this project work titled **"**---------- "submitted to **State Board of Technical Examinations, Government of Karnataka** for the award of Diploma in ----------.

To the best of my knowledge, this project work has not been submitted in part or full elsewhere in any other institution/organization for the award of any certificate/diploma/degree. I have completely taken care in acknowledging the contribution of others in this academic work. I further declare that in case of any violation of intellectual property rights and particulars declared, found at any stage, I, as the candidate will be solely responsible for the same.

Date:

Place:

Signature of candidate

Name: ----------

Reg No----------

DEPARTMENT OF TECHNICAL EDUCATION
NAME OF THE INSTITUTION
Address with pin code

Department of ……..

CERTIFICATE

Certified that this project report entitled ----------

----------**”**which is being submitted by Mr./Ms. ……..……..., Reg. No…..……, a bonafide student of …….in partial fulfillment for the award of **Diploma in ---------- Engineering** during the year ……... is record of students own work carried out under my/our guidance. It is certified that all corrections/suggestions indicated for internal Assessment have been incorporated in the Report and one copy of it being deposited in the polytechnic library.

The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said diploma.

It is further understood that by this certificate the undersigned do not endorse or approve any statement made, opinion expressed or conclusion drawn there in but approve the project only for the purpose for which it is submitted.

Guide(s)
Name and signature

Examiners
1
2

Head of Department
Dept. of ----------

ROADMAP FOR PROJECT GUIDES

1. The project work is proposed to be carried out during the V and VI semesters so that learners prepare during the V semester, do some field work based on the preparation during the mid semester vacation and report the analysis and inferences during the VI semester.
2. The learners would reach a level of maturity by the time they reach V semester and so a meaningful project lasting for a year can be executed by them.
3. To execute the project with involvement needs constant guidance and monitoring of the progress of the learners by the guide.
4. This does not mean teacher has to advice learners.
5. Be confident about the ability of the learner and "intellectually provoke" them with challenging questions. These questions should prompt the learners to search information and update themselves (to be carried out during the first two weeks).
6. Do not feed information to learners. Instead crate a 'cognitive dissonance' (a challenging question or situation that the learner is not able to find an immediate answer but feels the need to search for information to find a solution).
7. Defer judgement on learners and give them identified sources if required like a journal article, book or a web site.
8. Even if the learners report their inability to solve do NOT give or prescribe a solution.
9. Be patient and give time for the learner to construct his knowledge.
10. Give corrective feedback to the learner by challenging his solutions so that his logic is questioned and it develops further.
11. This leads to the first activity viz., literature survey and conceiving a project.
12. During this phase meet the project team in a group and create a healthy competition among the learners to search different sources and synthesise their findings in the group.
13. Aim for bringing out a workable innovative project conceived within the first eight weeks as given in the schedule attached.
14. During these two phases and the third phase the teacher should assess the strengths and weakness of the members of the group and allocate differential work to team members on the remaining tasks to be carried out during the next thirty weeks.
15. This is to ensure active participation of all the members of the team.
16. By the end of the twelfth week finalise the project and a schedule of further activities for each member indicating the time frame in which his activities are to be executed may be made ready. A soft copy of this schedule may be collected from each learner by the guide to follow up.
17. This schedule prepared by each learner need to be documented for checking further progress of the project.
18. The next few phases of the project may require active guidance of the guide especially regarding the sources of collecting data, if a sample data is to be collected the number of

units has to be decided, collating the data/fabricating, tryout/analysis and finally coming out with meaningful conclusions or models or application.

19. Data like models, designs, technical specifications, source code, protocols and original records need be collected from one authentic source as there will not be any variation. The teacher may guide the learners to authentic source.
20. Data having limited variability like product/service quality, processes and standards, procedures need to be collected from a sample as there is a variation. The number of units from whom (source) the data is to be collected is called sample. The sample needs to be representative of the expected variation. The decision on the size of the sample and the number of units need guidance from the teacher. For example, data regarding the quality of a product/service need be collected from 3 to 5 personnel at different levels of a service provider or dealers of a product. The numbers given are suggestive but a guide based on his experience has to make valid suggestions.
21. Data having a wide range of variation like customer satisfaction where the customers are members of the public need a larger number of units to accommodate the diversity. A tool like questionnaire with predetermined questions need to be prepared, tried out on a small sample and finalise the questions. Data may be collected from at least 30 units. This number is suggested to apply statistical analysis for meaningful conclusions. Guides may decide on the sample size depending on the accessibility of data.
22. The intention of the above three points viz., 19, 20 and 21 is to ensure objectivity in data collection i.e., to reduce the subjectivity of the human mind.
23. All the above activities need to be completed before three to four weeks before the end of V semester (refer the spread sheet related to scheduling).
24. The learners may be instructed to collect data objectively with identified sample during the next 4 to six weeks which includes the mid semester holidays. This would enable the learners to visit the field and collect data without the constraint of reporting to institution and attending classes on a regular basis.
25. The collected data need to be organised and entered to spread sheets or similar formats for analysis. Qualitative data may be converted to quantitative using a rating scale or similar data organisation procedures.
26. The result of most analysis on spreadsheet could be obtained in tables or graphs as per the requirement.
27. Activities mentioned in points 24, 25 and 26 may be carried out by learners during 4 to 8 weeks after commencement of VI semester.
28. Interpretation of the analysed tables and graphs to arrive at meaningful inference. The guide at this stage may defer his ideas on interpretation allowing the learners to do this. In case the learners err in the process they may be given corrective feedback.
29. A report of the whole process of doing the project may be written, word processed and submitted in triplicate.

30. Guides may contact industries and try to solve their problems so that the learners get a field experience and they get ready for the industry.
31. Innovations and innovative practices may be encouraged among the learners to be pursued as a project. Developing prototypes, (in simulation or real) trying out feasibility of new ideas, changing existing systems by adding modules, combining, assembling new modules and developing new systems may be given higher priority over routine bookish projects.
32. The schedule of events proposed is for an investigative project as a model. Guides may alter the prescribed schedule to suit the kind of innovative projects sited in point No.31 above.
33. Industry personnel may be involved in conceiving, executing and evaluating projects. This gives credibility to the institute and acceptance of learners for absorption into the company.

GUIDELINES TO LEARNERS TO CARRY OUT A TWO SEMESTER PROJECT

1. Carry out the project work through the V and VI semesters. Preparation must be done during the V semester and based on this, field work should be done during the mid semester vacation and reporting of analysis and inferences should be done in the VI semester.
2. You have the ability and the level of maturity needed to conceive an innovative and meaningful project accomplishing which gives you recognition by the industry and empowers you with the power of knowledge.
3. Understand your strength and weakness and make an effort to find the strength and weakness of other peers in the team.
4. Complement each other's strength rather than compete with peers within the team. This will enable you to complete a comprehensive and innovative project relevant to the industrial needs rather than doing a routine copy of what others have done.
5. Seek guidance from the teacher and update him/her about the progress.
6. Be confident about your ability and that of other members of your group. Take extra efforts to collect information, share with your peers and synthesise your knowledge.
7. Question everything including the ideas of your teacher. Accept the ideas and instructions which are internally consistent (logical).
8. Involve actively in group activities and contribute towards the tasks.
9. Do not depend too much on the teacher as a source of information, search on your own and build your knowledge structure. Search for authentic sources like journal articles, books and authentic sites rather than blogs and tweets.
10. Though brief, record your thoughts and activities including searches immediately.
11. Prepare a schedule for your work on a spread sheet and encourage your peers to do the same.
12. Show your schedule and that of others to the teacher and get his feedback.
13. Keep reviewing the schedule every fortnight and take corrective steps if needed. For doing this keep the general guideline schedule given in the curriculum as a backdrop.

14. Tools used for data collection like instruments, testing machines, questions to be asked and software may be tried out and standardised by the twelfth week of the project. Seek the teacher's help who is experienced in doing this.
15. Collect data dispassionately or objectively (without applying your personal prejudice). Complete this task before the VI semester begins.
16. While entering data into the spread sheet ask your peer member to verify. This will ensure accuracy of data entry.
17. Use appropriate mathematics/statistics for calculations. Seek help from external sources (other than your teacher) if required.
18. The results of your analysis need to be graphically represented and documented. You may also add photographs and video clips to increase the validity.
19. This task needs to be completed within 8 weeks after commencement of VI semester.
20. Interpret the data (after analysis) and arrive at meaningful inferences on your own in discussion with your peers. Get it ratified by your teacher. Suggestions from the teacher may be discussed among your peers and incorporated if they are internally consistent.
21. The project report may be word processed (videos, photographs attached in soft copy) and submitted in triplicate two weeks before the end of VI semester.
22. Involve passionately in the team work, make constructive contributions and come out with an industry friendly project which will equip you in your professional development.