Sample Papers for Basic Test Series

HOME PRACTICE TEST SERIES
Since 2012

MATHS (PART – I)

{ Chap : 3 + 4 }

Time: $1^{1/2}$ Hours **Max. Marks: 30**

Note: 1. All questions are compulsory. 2. Use of calculator is not allowed.
3.Figures to the right of questions indicate full marks.

1.(A) Choose the correct alternative: (Any Three) **[3]**

I. The sequence -2 , 1 , 4 , 6 , 9 , ……. is
a) not an A.P. b) is an A.P. with d=2
c) is an A.P. with d= - 2 d) is an A.P. with d = 3

II. For an A.P. if tn = 18 , n = 12 , d = 1 , then a = ?
a) 3 b) -7 c) -5 d) 7

III. If t_1 = 3 , tn = 57 and Sn = 900 . What is the value of 'n' ?
a) 10 b) 45 c) 40 d) 30

IV. SAC in GST stands for ----------
a) State Audit Code b) Service Accounting Code
c) Service Audit Cell d) State Account Code

V. All goods in GST are classified by giving numerical code, the code is --------
a) GSTIN code b) SGST code c) SAC d) HSN code

(B) Solve the following questions (Any Three) : **[3]**

I. The first term 'a' and common difference 'd' are given.
Find first three terms of A.P. : a = -2 , d = 5
II. Find whether 209 is in the sequence 3,7,11,15,-----?
III. Find whether given sequence is A.P. or not and find next two terms
5/3 , 2/3 , - 1/3 , - 4/3 , ----- ,------,

IV. Retailer paid GST of Rs.4700/- at the time of purchase and collected GST of Rs.6000/- at the time of sale. Find his payable GST.
V. If 60 shares of FV Rs.10 were purchased at a premium of Rs.5 .Company declared 20% dividend on the shares .Then find total dividend received.

2.(A) Complete the following activites (*Any One*): [2]

I .Find tn for A.P. : 7,12,17,22 , …. , …. and then find 15^{th} term of A.P.

Activity : A.P. : 7,12,17,22 , …. , ….

$t_n =$ ☐ , $a = 7$, $d =$ ☐

Now we will find 't_n'

$t_n = a + (n - 1) \times d$

$t_{15} = 7 + (n - 1) \times$ ☐

$t_{15} = 7 +$ ☐

$t_{15} = 7 + (5 \times 15 - 5)$

$t_{15} =$ ☐

II. Which term of the following A.P. is 144 . A.P. is 4 , 11 , 18 , 25 , --- ,----.

Activity : Given AP 4, 11, 18, 25,----,----- .

Here $a = 4$, $d = 11 -$ ☐ $= 7$

n^{th} term of this AP is 144.

$t_n = a + (n - 1) \times d$

$144 = 4 + (n - 1) \times$ ☐

$144 = 4 +$ ☐

$144 + 3 =$ ☐

$\frac{147}{7} = n =$ ☐ Hence , $t_{\square} = 144$

III. Sumeet purchased 70 shares of MV Rs.50.Brokerage paid at the rate of 0.7% and rate of GST on brokerage is 18%. Find the total GST he paid .

Activity : Value of 70 shares = 70 x ☐ = Rs. 3500/-

Total Brokerage = Rs.3500/- x 0.7% = ☐
Now Total GST will be,

GST = 18 % x ☐ ∴ Total GST = ☐

(B) Solve the following questions (*Any Three*) : [6]

I. Find the sum of all even numbers from 1 to 125

II. Find the 20^{th} term of A.P. : 7 , 12 , 17 , 22 , ------ ?

III. If the first term of an A.P. is 5 and the common difference 2 .Then find S_{16}

IV. Vaishali invested Rs. 2,41,416 in shares of FV Rs.10 .If MV is 150 . Rate of brokerage is 0.5 % and GST is 18% .Then find the amount of brokerage paid and GST paid.

V. The value of watch is Rs. 590. The rate of GST is 18%. Then what is the price of watch for customer ?

3 (A). Complete the following activity 9 Any One) : [3]

I. Follow given steps and complete the activity to find production of oxygen gas cylinder.

2000 oxygen cylinder in 2^{nd} year

2600 oxygen cylinder in 5^{th} year

same growth every year

Find first equation for t_2 by using $t_n = a + (n-1)\,d$

Find second equation for t_5 by using $t_n = a + (n-1)\,d$

Substitute above value of t_2 into equation II and find ‘d’

Substitute above value of ‘d’ in equation I and find ‘a’

State what is mean by ‘a’ here

Now calculate production of oxygen cylinders in 9^{th} year by using $t_n = a + (n-1)\,d$

Find total production in first 7 years

II. Rakesh bought 70 shares of FV Rs.100 , having MV Rs. 200 . Company gave 35% dividend on the shares . Find the rate of return on investment ?

Activity : FV of shares = Rs. ☐ , MV of shares = Rs. ☐

The dividend is 35% ; Dividend Rs.35 on investment of Rs. 200/-

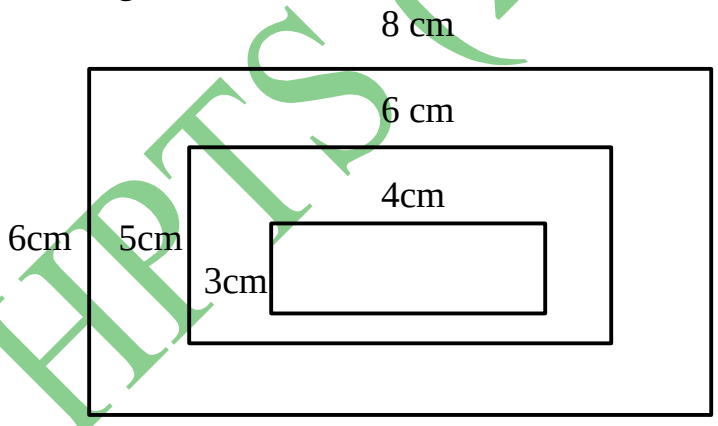
The rate of return on investment is = ☐/☐ x ☐

The rate of return on investment is = ☐

(B) Solve the following questions (Any Two) : [6]

I. In an A.P. the 15^{th} term is 44 .The sum of the 6^{th} and 8^{th} term is 40 . Find the A.P.

II. Observe the diagram and find the area of 25^{th} consecutive rectangle.



III. How many two digit numbers are divisible by 5 ?

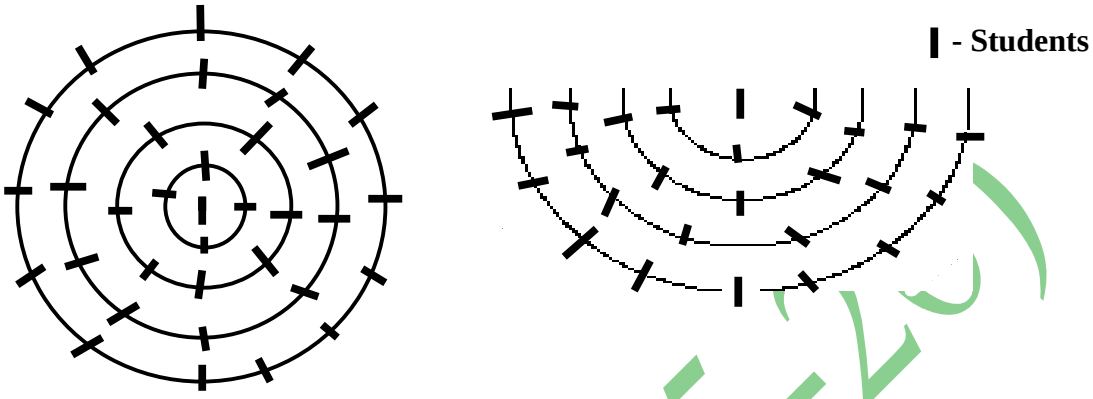
IV. Rameena invested 9930 in the shares of FV Rs.10 when the MV was Rs. 90 . She sold all the shares at MV of Rs.80 after taking 50% dividend .She paid 0.3 % brokerage at each stage of transactions. What was the total gain or loss in this transactions ?

V. Abdul invested in shares as follows .Find his total investment .

Company A : 300 shares , FV = Rs.10 , Premium = Rs. 10
Company B : 1540 shares ,FV = Rs.10 , Discount = Rs. 2
Company C : 160 shares , FV = Rs.100 , Premium = Rs.120 .

4.Solve the following questions (Any One): **[4]**

I. Observe given arrangements . In first arrangement there are total 25 circles and in second arrangement there are total 32 semicircles . Students if standing as shown in diagram , find which arrangement will accommodate more students and by how much number ?



II. The 20^{th} term and 29^{th} term of an A.P. are 30 and 57 respectively . Then find 42^{th} term.

III. Anil invested 12,500 when MV of the share was Rs.100 . He sold 40 shares when the MV was 120 and sold the remaining shares when the MV was Rs.70. He paid 0.1% brokerage for each trading. Find whether he made profit or loss and how much ?

5. Solve the following questions: **[3]**

I. The sum of natural numbers from 1 to n is 78 . Find the value of n ?

II. Rohit invested 18,090 in the shares of FV Rs.10 when the MV Rs.90 .He sold all the shares at MV Rs.110/- after taking 30% dividend. He paid 0.5 % brokerage at each stage of transactions. What was the total gain or loss in this trading ?

HOME PRACTICE TEST SERIES
Since 2012

SCIENCE AND TECHNOLOGY PART – I
{ Chap 9 : Carbon Compounds + Chap10 : Space Missions }

Time : $1^{1/2}$ Hours **Total Marks : 30**

Note :1.All questions are compulsory.2.Draw scientifically, technically correct labeled diagrams wherever necessary.3.Start writing each main question on new page. 4.Figures to the right indicate full marks .5.For each MCQ (i.e. Q.No.1-A) evaluation would be done for first attempt only.6.For each MCQ correct answer must be alphabet showing correct option.e.g. (I) (a) (II) (b) (III) (c)

1 (A).Choose the *correct* alternative : **[5]**

I. Ethanol reacts with sodium metal to release --------- gas.

(A) N_2 (B) O_2 (C) Na_2S (D) H_2

II. The indicator used in a oxidation of ethanol is ----------

(A) iodine (B) phenolpthaline (C) potassium permanganate (D) None of these

III. Geostationary satellite completes one revolution in ----------.

(A) 1 year (B) 90 min (C) 2 to 24 hrs (D) 24 hrs

IV. Mangalyan was launched in ----------

(A) 2015 (B) 2013 (C) 2012 (D) 2011

V. ---------- is a earth observation satelite

(A) INSAT (B) GSAT (C) IRS (D) IRNSS

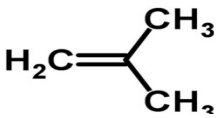
(B) Answer the following questions : **[5]**

I. Complete the correlation - High Earth Orbit : 35780 km :: Low Earth Orbit : ----------

II. Pick odd man out : Sputanik , INSAT , IRS , GSLV

III. Pick odd man out : CH_4 , C_2H_4 , C_3H_8 , C_5H_{12} , C_4H_{10}

IV. Identify the molecule :



V. State whether the following statement is *True* or *False :*
'Hexane is cyclic hydrocarbon'.

2 (A). Give *any one* Scientific Reason : **[2]**

I. Colour of iodine disappears in the reaction with oil but there is no colour change with vanaspati ghee

II. Launch vehicles of more than one stage are used to launch satellites.

(B) Attempt *any two* of the following questions : **[4]**

I. Find the type of the given reaction and explain it.

$$CH_2 = CH_2 \xrightarrow[Pt/Ni]{H_2} CH_3 - CH_3$$

II. Write IUPAC names of the following :

i) $CH_3 - CH_2 - CH_2 - \underset{\displaystyle Cl}{\underset{|}{CH}} - CH_3$

ii) $CH \equiv CH$

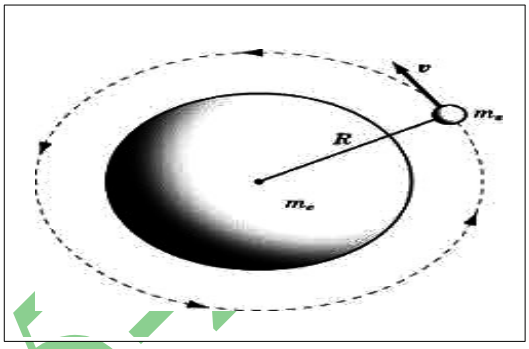
ii) $CH_3 - CH_2 - CH_2 - \overset{\displaystyle O}{\overset{\|}{C}} - CH_3$

III. Find the tangential velocity of the satellite if the orbit of a satellite is 36720 km above the earth's surface.{G = 6.67 x 10^{-11} Nm^2/Kg^2, M = 6 x 10^{24} Kg, R = 6400 km}

IV. Complete the table

Reactions	Combustion reaction	Substitution reaction
Definition		Place of one type of atom/group in a reactant is taken by another atom/group
Example		

V. Given diagram is showing orbit of an artificial satellite .



Answer the questions :

1. Which property of satellite decide height and nature of satellite's orbit ?
2. Critical velocity of the satellite is in which direction ?

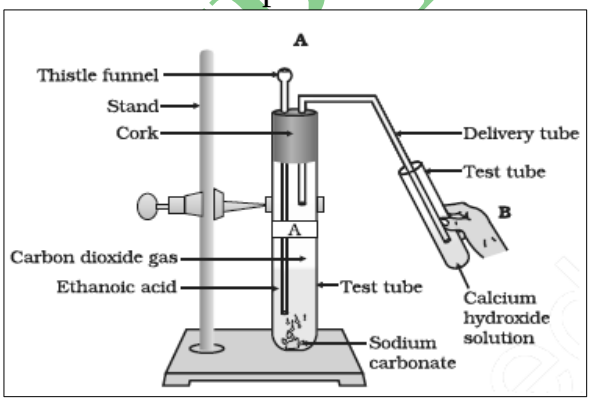
3. Attempt *any three* of the following questions : [9]

I. Identify the concept explained in this para and answer the questions :

CH_3 - OH , CH_3 – CH_2 - OH, CH_3 - CH_2 – CH_2 - OH, CH_3 – CH_2 – CH_2 – CH_2
These series of compounds are having same functional group but different length of carbon chain. Their chemical properties are very much similar. Gradation in physical properties observed in such group of compounds.

Que : a) Which prominent property of carbon compounds is discussed here ?
b) Explain this property . c) Give one more example.

II. Observe the experiment shown here and answer the questions



Que : a) Which reactants are used here ?
b) What change will take place in the colour of lime water ? Why ?
c) Write well balanced reactions taking place in this experiment .

III. Draw line structures for the following carbon compounds
a) Propene b) Cyclohexene c) Isobutane

IV. If the orbit of a satellite is 36720 km above the earth's surface and velocity of the satellite is 3.05 km/sec. How much time the satellite will take to complete one revolution around the earth ? ($G = 6.67 \times 10^{-11}$ Nm^2/kg^2 , R = 6400 km)

V. What is space debris ? Why it is necessary to manage space debris ?
VI. Complete the chart and explain in short.

Polymer	Monomer	Structure	Use
Polyethylene	$CH_2 = CH_2$	----------	Carry bags ,wear
PVC	---------	----------	----------
Polyacrylo nitrile	---------	----------	Winter clothing

4. Answer any one of the following questions : [5]

I. Observe the given reaction conditions and answer the questions :

Que : a) Which reactants are used here ?

b) What will be the product of this reaction ?

c) Which catalyst used here ?

d) Write well balanced reaction for the same .

e) What are the uses of the product formed ?

II. Explain structure and functioning of satellite launch vehicle with the help of neat labeled diagram.

HOME PRACTICE TEST SERIES
Since 2012

SCIENCE AND TECHNOLOGY PART – II
{ Chap 9 : Social Health + Chap 10 : Disaster Management }

Time : 1 1/2 Hours **Total Marks : 30**

Note :1.All questions are compulsory.2.Draw scientifically, technically correct labeled diagrams wherever necessary.3.Start writing each main question on new page.
4.Figures to the right indicate full marks .5.For each MCQ (i. e. Q. No.1-A) evaluation would be done for first attempt only.6.For each MCQ correct answer must be alphabet showing correct option. e. g. (I) (a) (II) (b) (III) (c)

1 (A).Choose the *correct* alternative : **[5]**

I. Alcohol affects ----------

(A) lungs (B) digestive track (C) heart (D) nervous system

II. Adolescents are under the influence of ---------

(A) parents (B) teachers (C) peer group (D) neighbourhood

III. Rehabilitation is a part of ---------- phase.

(A) transitional (B) terminal (C) ultimate (D) later

IV. Disasters always leads to damage ----------
(A) life & property (B) communication & health
(C) society & local government (D) economy & ecology

V. Attack of virus is a ---------- type of disaster.

(A) Geological (B) Unknown (C) Biological (D) International

(B) Answer the following questions : **[5]**

I. Find the odd man out :
Gardening, Bird Watching, Lingering in nature, Indulging in selfie, Rearing animals

II. Find whether the given statement is right or wrong .
'Ability to change one's own behaviour according to changing social conditions is an important characteristics of social health.'

III. Identify the sign :

IV. Name the type of disaster – Erosion

V. Match the following :

Column I	Column II
1. tsunami	(a) Atmospheric
2. snow-storms	(b) Geological
	(c) Biological
	(d) Unknown

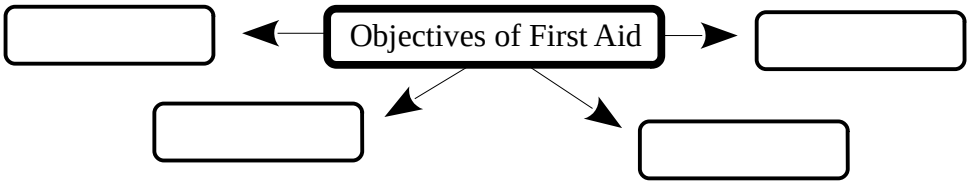
2 (A). Give *any one* Scientific Reason : **[2]**
I. Importance of disaster management has become the foremost need of almost all the nations
II. Girls are facing the problem of stress .

(B) Attempt *any two* of the following questions : **[4]**

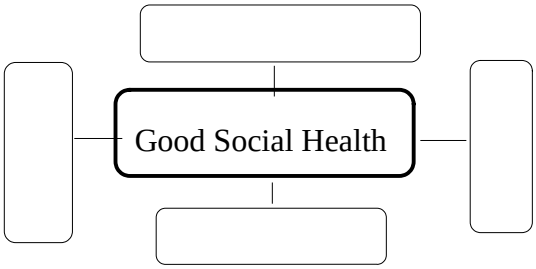
I. Observe the picture and answer the questions.

Que : a) What type calamity is shown in this picture?
b) Suggest measures to manage such calamities.

II. Complete the flow chart :



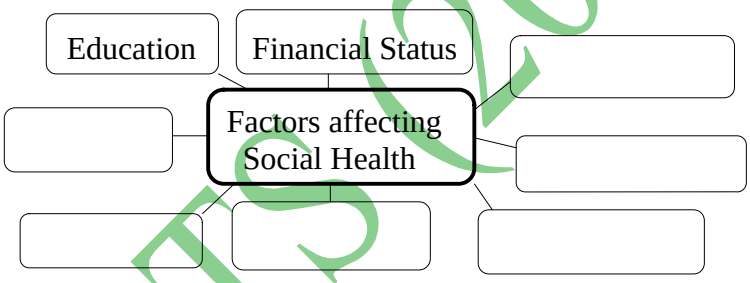
III. Complete the concept map :



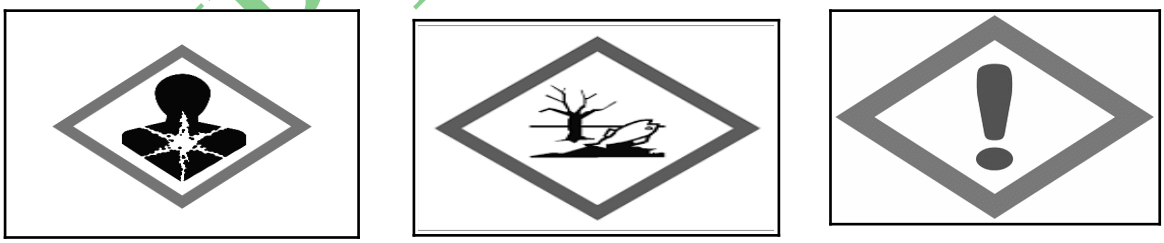
IV. Mock drill is arranged on disaster of fire in schools.
What are the objectives of mock drills ?

3. Attempt *any three* of the following questions : **[9]**

I. Complete the chart and explain in short :



II. Write the meanings of following signs .



(a) **(b)** **(c)**

III. Observe the picture and answer the questions.

Que : a) What are these senior citizens doing ?
b) Why it is necessary to perform such activities ?
c) Suggest some more similar useful activities ?

IV. What will you do if your friend is spending more time on mobile games.

V. Observe picture and answer the questions ::

Que : a) Which mental illness is shown in above picture ?
b) Which social message will you give against this type of behavior ?

4.Answer the following question : **[5]**

I. Explain the structure of Disaster Management Authority in detail with the help of concept map.

Answer Key

SCIENCE AND TECHNOLOGY PART – I
{ Chap 9 : Carbon Compounds + Chap10 : Space Missions }

Time : $1^{1/2}$ Hours **Total Marks : 30**

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1 (A).Choose the *correct* alternative : **[5]**

I. Ethanol reacts with sodium metal to release --------- gas.

(A) N_2 (B) O_2 (C) Na_2S **(D) H_2**

II. The indicator used in a oxidation of ethanol is ----------

(A) iodine (B) phenolpthaline **(C) potassium permanganate** (D) None of these

III. Geostationary satellite completes one revolution in ----------.

(A) 1 year (B) 90 min (C) 2 to 24 hrs **(D) 24 hrs**

IV. Mangalyan was launched in ----------

(A) 2015 **(B) 2013** (C) 2012 (D) 2011

V. ---------- is a earth observation satelite

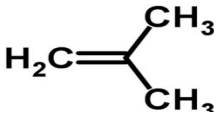
(A) INSAT (B) GSAT **(C) IRS** (D) IRNSS

(B) Answer the following questions : **[5]**

I.Complete the correlation : High Earth Orbit : 35780::Low Earth Orbit: **180 -2000 km**

II. Pick odd man out : Sputanik,INSAT,IRS,**GSLV**

III. Pick odd man out : CH_4 , $\mathbf{C_2H_4}$, C_3H_8 , C_5H_{12} , C_4H_{10}

IV. Identify the molecule :  **isobutylene**

V. State whether the following statement is *True* or *False :*
'Hexane is cyclic hydrocarbon'. **False**

2 (A). Give *any one* Scientific Reason : [2]

I. Colour of iodine disappears in the reaction with oil but there is no colour change with vanaspati ghee .**Reason: Oil is having unsaturated chains while vanaspati ghee is having saturated chains . Unsaturated compounds having tendency to undergo addition reaction to form saturated compounds. The addition of iodine with unsaturated compounds take place instantaneously at room temperature and colour of iodine disappears. Hence colour of iodine disappears in the reaction with oil but as vanaspati ghee is saturated , it does not undergo addition with iodine and no colour change.**

II. Launch vehicles of more than one stage are used to launch satellites.
Reason :The structure of the launch vehicle is decided by the weight of the satellite and the type of satellite orbit.The fuel of the vehicle also depends on these factors.The fuel forms a major portion of the total weight of the launch vehicle.Thus vehicle has to carry a large weight of the fuel. To overcome this problem, launch vehicle of more than one stage are used. Due to this weight can be reduced step by step.

(B) Attempt *any two* of the following questions : [4]

I. Find the type of the given reaction and explain it.

$CH_2 = CH_2 \xrightarrow[Pt/Ni]{H_2} CH_3 - CH_3$

It is 'Addition Reaction'

Expl:As given on textbook page no.125.

II. Write IUPAC names of the following :

i) $CH_3 - CH_2 - CH_2 - CH(Cl) - CH_3$ **2-chloropentane**

ii) $CH \equiv CH$ **ethyne**

ii) $CH_3 - CH_2 - CH_2 - C(=O) - CH_3$ **pentane-2-one**

III. Find the tangential velocity of the satellite if the orbit of a satellite is 36720 km above the earth's surface. G = 6.67 x 10^{-11} Nm^2/Kg^2, M = 6 x 10^{24} Kg, R = 6400 km.

Soln: Use v = √ GM/R+h. Put values & calculate (Ans:3046.485m/s = 3.05 km/s)

IV. Complete the table

Reactions	Combustion reaction	Substitution reaction
Definition		Place of one type of atom/group in a reactant is taken by another atom/group
Example		

V. Given diagram is showing orbit of an artificial satellite .Answer the questions .

1. Which property of satellite decide height and nature of satellite's orbit ? **Ans : Functions of satellite**
2. Critical velocity of the satellite is in which direction ?

Ans : Critical velocity of the satellite is in tangential direction to the orbit.

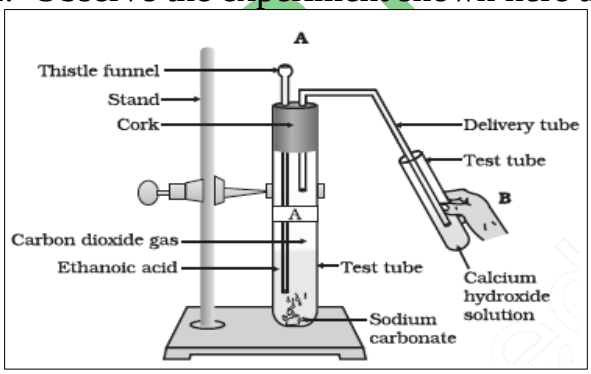
3. Attempt *any three* of the following questions : [9]

I. Identify the concept explained in this para and answer the questions :

CH_3 - OH , CH_3 – CH_2 - OH, CH_3 - CH_2 – CH_2 - OH, CH_3 – CH_2 – CH_2 – CH_2
These series of compounds are having same functional group but different length of carbon chain. Their chemical properties are very much similar. Gradation in physical properties observed in such group of compounds.

a) Which prominent property of carbon compounds is discussed here ?
Ans : Homologous Series
b) Explain this property . c) Give one more example.
Ans : As given on textbook page no. 118

II. Observe the experiment shown here and answer the questions .

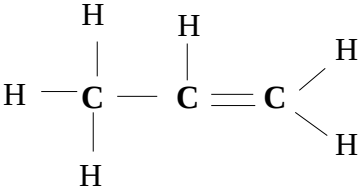


a) Which reactants are used here ? - **Sodium carbonate & Ethanoic acid**
b) What change will take place in the colour of lime water ? Why ? - **Lime water becomes milky due to CO_2 gas.**
c) Write well balanced reactions taking place in this experiment .

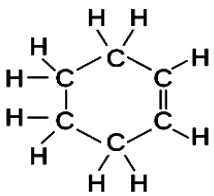
$$2CH_3COOH + Na_2CO_3 \rightarrow CH_3COONa + H_2O + CO_2$$

IV. Draw line structures for the following carbon compounds

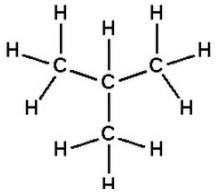
a) Propene :



b) Cyclohexene :



c) Isobutane :



IV. If the orbit of a satellite is 36720 km above the earth's surface and velocity of the satellite is 3.05 km/sec. How much time the satellite will take to complete one revolution around the earth ? (G = 6.67 x 10^{-11} Nm^2/kg^2 , R = 6400 km)

Sol: Use v = distance/time = circumference/time = 2 π r / T = 2 π (R + h) / T . Put values and calculate T (Ans : 24 hrs 22 min)

V. What is space debris ? Why it is necessary to manage space debris ?

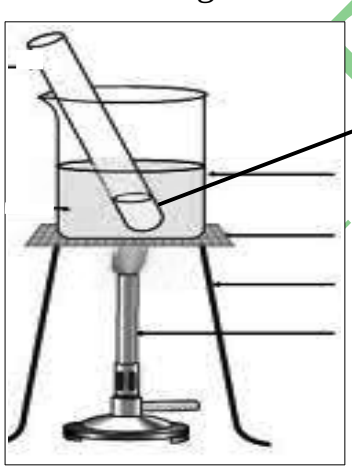
Ans : As given on textbook page no.143

VI. Complete the chart and explain in short.

Polymer	Monomer	Structure	Use
Polyethylene	$CH_2 = CH_2$	$+CH_2 - CH_2+_n$	Carry bags ,wear
PVC	---------	$+CH_2 - CHCl+_n$	----------
Polyacrylo nitrile	---------	$+CN-CH=CH_2+_n$	Winter clothing

4. Answer any one of the following questions : [5]

I. Observe the given reaction conditions and answer the questions :



Mixture of Ethanoic Acid , Ethanol and Conc. Sulphuric Acid

Beaker

Wire Gauze

Stand

Burner

a) Which reactants are used here ? **- Ethanoic Acid , Ethanol and Conc. Sulphuric Acid**

b) What will be the product of this reaction ? **- ethyl ethanoate , an ester.**

c) Which catalyst used here ? **- Conc. Sulphuric acid acts here as a catalyst.**

d) Write well balanced reaction for the same **.**

$$CH_3\text{-}COOH + CH_3\text{-}CH_2\text{-}OH \xrightarrow[\text{Acid}]{} CH_3COOCH_2 + H_2O$$

e) What are the uses of the product formed ?

Ans : Esters are used in making fragrances,flavouring agents,soap.

II. Explain structure and functioning of satellite launch vehicle with the help of neat labeled diagram. **Ans : As given on textbook page no. 140**

Answer Key

MATHS (PART – II)
{ Chap : 5 + 6 }

Time: $1^{1/2}$ Hours **Max. Marks: 30**

Note: 1. All questions are compulsory. 2. Use of calculator is not allowed.
3.Figures to the right of questions indicate full marks.

1.(A) Choose the correct alternative: **[3]**

I. The value of $\sin^2 45 + \cos^2 60$ is --------

a) 1 **b) 3/4** c) $1/\sqrt{2}$ d) $3/\sqrt{2}$

II. $\sec\theta \times \cos\theta$ = --------

a) 0 **b) 1** c) 2 d) $1/\sqrt{2}$

III. The point of concurrence divides the median in the ratio ----------

a) 3 : 2 b) 1 : 2 **c) 2 : 1** d) 1 : 3

IV. If $\cos(60° - x) = \sin 60°$. Value of 'x' is --------

a) 30° b) 90° c) 60° d) 45°

V. If the angle made by the line with the positive direction of X – axis is 60°
Then slope is ---------- a) 1 **b) not defined** c) $\sqrt{3}$ d) 2

(B) Solve the following questions : **[3]**

I. If $\sin\theta = \frac{9}{15}$. Find the value of $\cos\theta$ using trigonometric identity.

Soln : Use $\sin^2\theta + \cos^2\theta = 1$. Put values and first calculate $\cos^2\theta$.
Then take square root of both sides and calculate $\cos\theta$
(Ans : $\cos\theta = 12/15$)

II. If $\tan\theta = \frac{3}{4}$, then find $\operatorname{cosec}\theta$ and $\sin\theta$.

Soln: $\cot\theta = 1/\tan\theta$; $\cot\theta = 4/3$; $1 + \cot^2\theta = \operatorname{cosec}^2\theta$; 1+16/9 = 25/9
(Ans : $\operatorname{cosec}\theta = 5/3$)

1/ cosec θ = sin θ ; 1/(5/3) (Ans : sin θ = 3/5)

III. Prove that $\cos^2 \theta (1 + \tan^2 \theta) = 1$

Soln : LHS : $\cos^2 \theta (1 + \tan^2 \theta)$ | **$(1)^2 = 1$**

$\cos^2 \theta (\sec^2 \theta)$ | **LHS = RHS**

$(\cos \theta \times \sec \theta)^2$ | **Hence Proved**

IV. Find the slope of the line passing through points A (3 , 4), B (5, 8)

Sol: Use $\frac{y_2 - y_1}{x_2 - x_1}$ put values and calculate . (Ans : 2)

V. Find k , if line passing through A (-11,- 2) and B (7, k)

Sol: m = $\frac{y_2 - y_1}{x_2 - x_1}$; 1/3 = k - (-2)/ 7 - (-11) ; 1/3 = k + 2/ 7+11 ; 1/3 = k+2/18 ; Solve . (Ans: k =4)

2.(A) Complete the following activities (*Any One*): [2]

I. Find the distance between following pairs of points.
A(3,4) ; B(5,2) by filling correct options.

Activity : Suppose co-ordinates of point A are (x_1 , y_2) and of point B are (x_2 , y_2)

x1 = 3 , y1 = 4

x2 = [**5**] , y2 = 2

By distance formula

$AB = \sqrt{ (x_2 - x_1)^2 + (\boxed{y_2 - y_1})^2 }$

$= \sqrt{ (\boxed{5 - 3})^2 + (2 - 4)^2 }$

$= \sqrt{ (\boxed{2})^2 + (\boxed{-2})^2 }$

$= \sqrt{ \boxed{4 + 4} }$

$= \boxed{\sqrt{8}}$

II . Find x if distance between M (x , 8) and N(2 , 16) is 17 by completing following activity.

Activity : M (x , 8) and N (2 , 16)

MN = 17

By distance formula

$MN = \sqrt{ (x - 2)^2 + (\boxed{8 - 16})^2 }$

$17 = \sqrt{ (x - 2)^2 + (-8)^2 }$

squaring both the sides , we get

$289 = \boxed{(x - 2)^2} + 64$

$(x - 2)^2 = \boxed{225}$

Take square roots of both sides

$x - 2 = \pm \boxed{15}$

Either $x - 2 = \boxed{15}$ or $x - 2 = -15$

$x = \boxed{17}$ or $x = -13$

III. If sec θ = 25 / 7 , then tan θ = ?

Activity : $1 + \tan^2\theta = \sec^2\theta$

$1 + \tan^2\theta = (25/7)^2$

$$\tan^2\theta = \frac{\boxed{625}}{\boxed{49}} - 1$$

$$\tan^2\theta = \frac{\boxed{625} - \boxed{49}}{49} = \frac{\boxed{576}}{\boxed{49}}$$

$\tan\theta = \boxed{24/7}$

(B) Solve the following questions : **[6]**

I. Prove that , $\cot^4\theta + \cot^2\theta = \text{cosec}^4\theta - \text{cosec}^2\theta$

Sol: $\cot^4\theta + \cot^2\theta$
$\cot^2\theta\ (\cot^2\theta + 1)$
$\cot^2\theta$ x $\text{cosec}^2\theta$
As $1 + \cot^2\theta = \text{cosec}^2\theta$
$(\text{cosec}^2\theta - 1)$ x $\text{cosec}^2\theta$
$\text{cosec}^4\theta - \text{cosec}^2\theta$
LHS = RHS
$\cot^4\theta + \cot^2\theta = \text{cosec}^4\theta - \text{cosec}^2\theta$

II. If $8 \sin\theta + 15 \cos\theta = 0$ Find the value of $\sec\theta$.

Sol: $8 \sin\theta + 15 \cos\theta = 0$

$8 \sin\theta = 15 \cos\theta$

$\sin\theta / \cos\theta = 15 / 8$

$\tan\theta = 15/8$

$1 + \tan^2\theta = \sec^2\theta$

$1 + (15 / 8)^2 = \sec^2\theta$

$1 + (225/64) = \sec^2\theta$

$\frac{64 + 225}{64} = \sec^2\theta$

$\frac{289}{64} = \sec^2\theta$ (Ans : $\sec\theta = 17 / 8$)

III. Find the coordinates of the points of trisection of the line segment AB with A(3,8) and B (-3,-7). **Soln: A(3,8) and B (-3,-7). Let P (x_1,y_1) and Q (x_2,y_2). AP = PQ = QB**

$\frac{AP}{PB} = \frac{AP}{PQ + QB}$ ---- (P-Q-B)

$\frac{AP}{PB} = \frac{AP}{AP + AP}$;

$\frac{AP}{PB} = \frac{AP}{2AP} = \frac{1}{2}$; P divides segment in the ratio 1 : 2.

Now find x_1 and y_1 by using section formula (Ans : $x_1 = 1$, $y_1 = 3$; P (1,3))

$\frac{AQ}{QB} = \frac{AP + PQ}{QB}$ ---- (A -P-Q)

$\frac{AQ}{QB} = \frac{QB + QB}{QB}$;

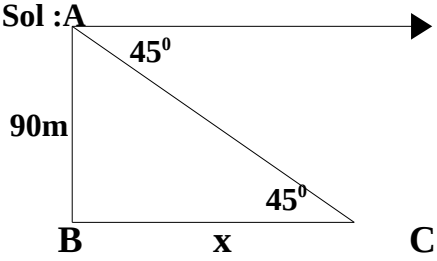
$\frac{AQ}{QB} = \frac{2QB}{QB} = \frac{2}{1}$; Q divides segment in the ratio 2 : 1

Now find x_2 and y_2 by using section formula (Ans : $x_2 = -1$, $y_2 = -2$; Q (-1,-2))

(Ans : Coordinates of trisection are (1,3) and (-1,-2))

IV. From the top tower a jawan is watching military camp with an angle of depression 45°.If the height of the tower is 90cm . Find how far the camp is from tower?

Sol :



Jawan is at A , Camp is at C .We are finding distance BC.
tan 45 = AB/BC ; 1 = 90/x ; x = 90 /1 ; x = 90 m

3 (A). Complete the following activity : [3]

I . $\cos\theta = \frac{1}{\sqrt{2}}$. then find the value of $\frac{1-\text{cosec}\,\theta}{1+\sec\theta}$ by filling appropriate options.

Activity : $\cos\theta = \frac{1}{\sqrt{2}}$

$\sec\theta =$ **$\sqrt{2}$**

$\sin^2\theta + \cos^2\theta = 1$

$\sin^2\theta +$ **$(1/\sqrt{2})^2$** $= 1$

$\sin^2\theta = 1 -$ **$1/2$** $= \frac{1}{2}$

$\sin\theta =$ **$1/\sqrt{2}$**

$\text{cosec}\,\theta =$ **$\sqrt{2}$**

$$\frac{1-\text{cosec}\,\theta}{1+\sec\theta} = \frac{1-(\sqrt{2})}{1+\sqrt{2}}$$

II. In ΔPQR, O (-2,-5) is the centroid. If P (-12,-17) and Q (5,7) .Then find the 'x' coordinate of R by completing following activity .

Activity : P (-12 , -17) , Q (5 , 7) , O (-2 , -5)
Suppose p has coordinates (x1,y1) ,Q has coordinates (x2,y2) and R has coordinates (x3,y3) and O has coordinates (x,y)

By centroid formula ,

$$x = \frac{x1 + x2 + x3}{3}$$

$$-2 = \frac{-12 + 5 + x3}{3} \quad \text{----}$$

$$-6 = -7 + x3$$

x3 - 1

(B) Solve the following questions : [6]

I. Prove : $\frac{\cot^3\theta - 1}{\cot\theta} = \frac{\sin^2\theta + \tan\theta}{\sin^2\theta \times \tan\theta}$

Sol: $\frac{(\cot\theta - 1)(\cot^2\theta + \cot\theta + 1)}{\cot\theta - 1}$ **= $\cot^2\theta + 1 + \cot\theta = \text{cosec}^2\theta + \cot\theta = \text{cosec}^2\theta + 1/\tan\theta$; $1/\sin^2\theta + 1/\tan\theta$; $\sin^2\theta + \tan\theta / \sin^2\theta \times \tan\theta$. LHS = RHS**
(Ans : Hence Proved)

II. Verify that points A (-3,3) B (3,3) and C (3,8) are vertices of a right angled triangle
Sol : Use distance formula and find AB,BC and AC
(Ans : AB = 6,BC = 5 , AC = $\sqrt{61}$)
Then find whether $AB^2 + BC^2 = AC^2$ or not
(Ans : $AB^2 + BC^2 = 61$, $AC^2 = 61$)
Hence by converse of Pythagoras Theorem , Δ ABC is right angled triangle.

III. From the top of a building, an observer looking at a car makes angle of depression of 70°.If the height of the lighthouse is 70 m. Then find how far the car is from the building. (tan 70° = 2.75) **Ans: tan θ = 70/x ; tan 70 = 70/x x = 70/1.22 = 57.38 m**

4.Solve the following questions (*Any One*): [4]

I. Prove the following :

$$\sec\theta(1 + \sin\theta)(\cot\theta) = \frac{\sec\theta}{\tan\theta} + 1$$

Solution : LHS = sec θ (1 + sin θ) (cot θ)

= (sec θ + sec θ . sin θ) (cot θ)

$= \left(\sec\theta + \frac{1}{\cos\theta} . \sin\theta\right)(\cot\theta)$

$$= \left(\sec\theta + \frac{\sin\theta}{\cos\theta}\right)\left(\frac{1}{\tan\theta}\right)$$

$$= (\sec\theta + \tan\theta)\left(\frac{1}{\tan\theta}\right)$$

$$= \frac{\sec\theta + \tan\theta}{\tan\theta} = \frac{\sec\theta}{\tan\theta} + 1$$

LHS = RHS

Ans : Hence Proved : $\sec\theta\,(1 + \sin\theta)\,(\cot\theta) = \frac{\sec\theta}{\tan\theta} + 1$

II. Find the lengths of the medians of a triangle whose vertices are A (2,2) ; B(4,2) ; C (2, 4) **Solution : A (2,2) ; B (4, 2) ; C (2, 4) ,**
Now , consider midpoints say, D(x_1 , y_1), E(x_2 , y_2), F (x_3,y_3) of sides BC, AC and AB
Now find x1 and also y1 by using midpoint formulas
(Ans : x1 = 3 and y1 = 3 ; D (3,3)).
Now in the same find x2,y2 and x3,y3
(Ans : x2 =2 ,y2 = 3 ,x3 =3 , y3 = 2 ; E(2,3) , F(3,2))
Now find length of median AD by using distance formula (Ans : √2)
Now find length of median BE by using distance formula (Ans : √5)
Now find length of median CF by using distance formula (Ans : √5)

III. Fighter plane at a height of 580 m from earth , made an angle of depression of 45° and bombarded a special missile which destroyed target at say C . In another attempt it destroyed target at D from same height and same point but by decreasing an angle of depression by 15°. Find how far is the second target from first target. (√3 = 1.73)
Sol : tan 45° = AB/BC ; BC = 580/tan45 = 580/1 = 580 m ;
tan 30° = AB / BD ; 1/√3 = 580/BD ; BD = 580 x √3 ; BD = 580 x 1.73 = 1003.4 m
Distance of second target from first target = 1003.4 – 580 = 423.4 m

5. Solve the following questions (any one) : [3]

I. Find whether $\sec^4 A\,(1 - \sin^4 A) - 2\tan^2 A = 1$ or not ?
Soln : $\sec^4 A\,(1 - \sin^4 A) - 2\tan^2 A = \sec^4 A - \sec^4 A \cdot \sin^4 A - 2\tan^2 A$
$1/\cos^4 A - 1/\cos^4 A \cdot \sin^4 A - 2\sin^2 A/\cos^2 A$
$1/\cos^4 A - \sin^4 A/\cos^4 A - 2\sin^2 A/\cos^2 A$
$1 - \sin^4 A/\cos^4 A - 2\sin^2 A/\cos^2 A$
$1 - (\sin^2 A)^2/\cos^4 A - 2\sin^2 A/\cos^2 A$
$(1 - \sin^2 A)(1 + \sin^2 A)/\cos^4 A - 2\sin^2 A/\cos^2 A$
$\cos^2 A\,(1 + \sin^2 A)/\cos^4 A - 2\sin^2 A/\cos^2 A$
$1 - \sin^2 A/\cos^2 A$; $\cos^2 A/\cos^2 A = 1$
LHS = RHS

II. Find whether points P (1,-1) ,Q (4,2) , R (1,-2) , S (-2,-5) are the vertices of a parallelogram or not

(Ans : PQ = 3 √2 , QR = 5 , RS = 3 √2, PS = 5)
As PQ = RS and QR = PS , □ PQRS is a parallelogram. Hence points P(1,-1) ,Q(4,2) ,R(1,-2) , S(-2,-5) are the vertices of a parallelogram.

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SCIENCE AND TECHNOLOGY PART – I
{ Chap : 1 - Gravitation }

Time : $1^{1/2}$ Hours **Total Marks : 30**

Note :1.All questions are compulsory.2.Draw scientifically, technically correct labeled diagrams wherever necessary.3.Start writing each main question on new page.
4.Figures to the right indicate full marks .5.For each MCQ (i.e. Q.No.1-A) evaluation would be done for first attempt only.6.For each MCQ correct answer must be alphabet showing correct option.e.g. (I) (a) (II) (b) (III) (c)

---

1 (A).Choose the *correct* alternative : **[5]**

I. Weight is --------- quantity .

(A) vector (B) scalar (C) not vector nor scalar (D) universal constant

II. For the motion of an object thrown upwords, acceleration is ----------

(A) positive (B) negative (C) zero (D) infinite

III. If we jump 2 m on earth ; how much we can jump on Moon with same force ?

(A) 2 m (B) 12 m (C) 18 m (D) 1/3rd m

IV. What will be the weight of a body on moon's surface if it weighs 72N on earth ?

(A) 6N (B) 72N (C) 10N (D) 12N

V. The gravitational force between two particles separated by distance 'r' will vary as
-------- (A) r (B) 1/r (C) $1/r^2$ (D) r^2

(B) Answer the following questions : **[5]**

I. Find odd man out :
Mass,Weight,Kinetic Energy,Gravitational Constant,Potential Energy.

II. K.E on surface of earth : ½ mv^2 : : K.E at infinite distance from earth : ---------

III. State whether the following statement is *True* or *False :*
"Direction of weight is towards the centre of earth"

IV. Match the following :

Column I	Column II
1. Escape Velocity	(a) GM/R^2
2. g	(b) GMr
	(c) $\sqrt{2gR}$
	(d) $\sqrt{gr}$

V. Identify the following :
When an object moves under the influence of the force of gravity alone, it is in : --------

2 (A). Give *any one* Scientific Reason : **[2]**
I. The value of 'g' decreases as we go deep inside the earth.
II. The weight of a body is different on different planets.

(B) Attempt *any two* the following questions : **[4]**

I. A solid metal ball of 5 kg is released from a height of 80 m and falls freely to the ground .Take g = 10 m/s^2 . What will be velocity of the ball on reaching the ground ?

II. What is gravitational potential energy ? What will be the potential energy for the object at an infinite distance ? Why ?

III. Give two examples of 'Free Fall'.

3. Attempt *any three* of the following questions : **[9]**

I. A ball is thrown up and reaches a height of 7. 2 m before coming down. What was its initial velocity ? How much total time will it take to come down ? (Take g = 10 m/s^2

II. Explain the concept escape velocity with example .

III. Complete the table .

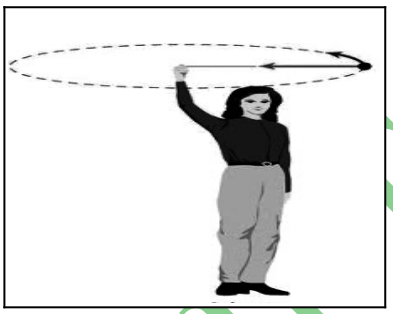
G	----------	It is the gravitational force acting between two unit masses kept at a unit distance away from each other	----------
Mass	kg	----------	Same everywhere
Weight	------	----------	----------

IV. Read the following para and answer the questions :

The earth exerts gravitational force on objects near it . According to Newton's second law of motion , a force acting on a body results in its acceleration. Thus , the gravitational force due to the earth on a body results in its acceleration. This is called acceleration due to the gravity and is denoted by 'g' .Acceleration is vector. As the gravitational force on any object due to the earth is directed towards the centre of the earth, the direction of the acceleration due to gravity is also directed towards the centre of the earth i.e vertically downwards.

Que : a) Define ' Earth's gravitational acceleration'.
b) What is the direction of 'g' ?
c) State the formula to calculate the value of 'g' ?

V. Observe the picture and answer the questions :

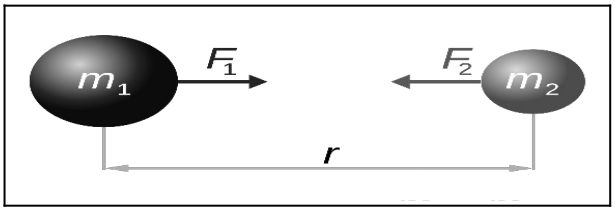


Que : a) In this activity which force is acting on the stone ?
b) Define that force ?
c) What will happen if the girl release the string ?

4. Answer any one of the following questions : **[5]**

I. State and explain with diagram three laws of Kepler.

II. Observe the diagram and answer the questions :



Que : a) Which force present between these two objects ? Define it ?

b) If the mass of second object doubled, the gravitational force of attraction between given two bodies will be ?

c) What change in the gravitational force of attraction between given two bodies you will see, if we double the distance between these bodies ?

d) The ‘gravitational force of attraction’ is a weaker force but it controls the Universe. State the reason.

e) If two Sumo Wrestlers are sitting at a distance of 3 m from each other. Their masses are 120 kg and 150 kg respectively. What will be the gravitational force between them ?

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MATHS (PART – I)

{ Chap : 1 - Linear Equations in Two Variables }

Time: $1^{1/2}$ Hours **Max. Marks: 25**

Note: 1. All questions are compulsory. 2. Use of calculator is not allowed.
3.Figures to the right of questions indicate full marks.

1.(A) Choose the correct alternative: **[3]**

I. For drawing graph of 4x + 3y = 13 , if x = -2. What is the value of y ?

a) 3 b) -3 c) 4/3 d) 7

II. What is the value of $\begin{vmatrix} 3 & 2 \\ 5 & 7 \end{vmatrix}$

a) 3 b) -2 c) -5 d) 11

III. For simultaneous equations in x and y , if D =20 , Dx = -14 , Dy = -10 , then what is the value of y?

a) 7/10 b) 4/3 c) - 4/3 d) - 1/2

(B) Solve the following questions : **[3]**

I. For certain simultaneous equations in x and y ; if Dx = 15 , D = 3 , then find 'x'.

II. Find the value of (x + y) if 2x + 3y = 12 and 3x + 2y = 8

III. Find value of determinant .

$$A = \begin{vmatrix} 3\sqrt{2} & 7 \\ 2 & 2\sqrt{2} \end{vmatrix}$$

2.(A) Complete the following activities (*Any One*): [2]

I Find the value of following determinant :

Activity :

$$A = \begin{vmatrix} 5/2 & 2/4 \\ 3/4 & 1/4 \end{vmatrix} = (\square \times 1/4) - (\square \times 3/4)$$

$$= 5/8 - \square = \frac{10 - 6}{\square}$$

Hence value of determinant is $\square$

II. Complete the table to draw the graph of $2x - y = 3$:

Activity :

x	-----	-----	-----
y	- 2	1	2
(x,y)	(----, - 2)	(---- , 1)	(5/2 , 2)

(B) Solve the following questions (*Any Three*) : [6]

I. Solve by Cramer's method : $3m - 1n = -3$; $3m + 1n = 15$

II. Find value of x by Cramer's rule for the equations : $3x + 2y = -7$; $2x + 4y = -8$

III. Find the value of following determinant :

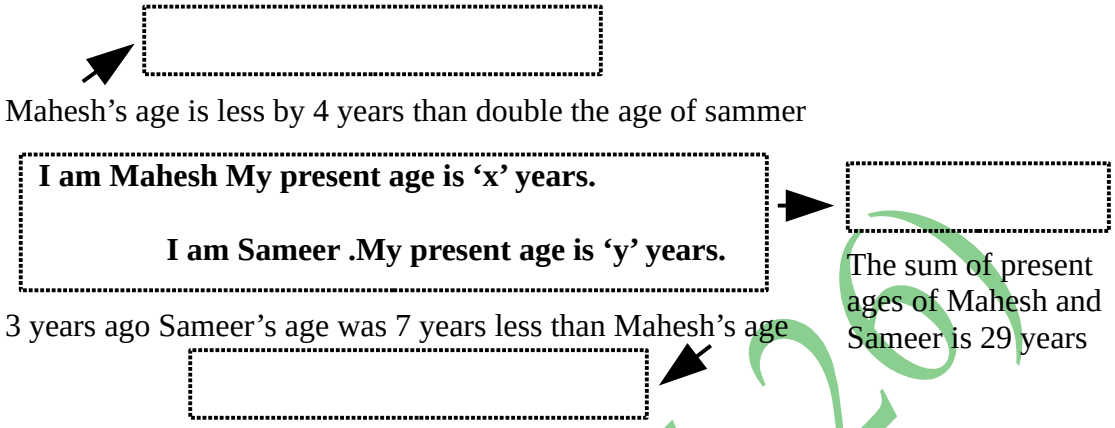
$$A = \begin{vmatrix} -5 & 4 \\ 1 & -4 \end{vmatrix}$$

IV. The perimeter of a rectangle is 34 cm .The length of the rectangle is more than triple its breadth by 1. Then Find length and breadth by determinant method.

3 (A). Complete the following activity (Any Two) : [3]

I. There are some instructions given below .Frame the equations from the information and complete blank boxes shown by arrows -

Activity:



II. Solve : x + y = 4 ; 5x – 3y = 12

Activity: x + y = 4 …….. 1 and 5x – 3y = 12 …… 2

Let's solve the equations by eliminating y.

By multiplying equation 1 by 3, we get

3x + ☐ = ☐ ……. 3

Let's add eq . 3 & 2

3x + ☐ = 12 ……. 3

5x – 3y = 12 …… 2

☐ = 24 Hence x = ☐

Substituting, x = ☐ in eq . 1, we get

☐ + y = 4 Hence y = ☐

(B) Solve the following questions (Any Two): [6]

I. Solve equations by drawing graphs of x + y = 7 and 3x – y = 1 .

II. A shopkeeper sold item A and item B as follows . Find Selling prices of both items A and B.

Monthly Sale	Item A	Item B	Total Sale
August	10 pieces	5 pieces	Rs.4000/-
September	24 pieces	1 piece	Rs. 7400/-

III. Solve : 49x + 51y = 249 ; 51x+49y = 251

IV $\frac{2}{5}x + y = \frac{11}{5}$; $x + \frac{2}{3}y = \frac{11}{3}$

4. Solve the following questions (Any One): **[4]**

I. A boat travels 12 km upstream and 20 km downstream in 4 hours. Same boat travels 28 km upstream and 40 km downstream in 9 hours .What is the speed of boat in still water and speed of water current ?

II. A three digit number is equal to 22 times the sum of its digits .If the digits are reversed the new number is 99 more than the old number .The middle digit is equal to the sum of extreme digits. Find the original number .

5. Solve the following questions: **[3]**

I. Solve following simultaneous equations by graphical method.

x + y = 0 ; 3x – y = 8

II. Solve $\frac{3}{x} + \frac{4}{y} = 6$; $\frac{2}{x} + \frac{3}{y} = 5$.

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HISTORY AND POLITICAL SCIENCE
{ Chap - 1 : Historiography (West) + Working of the constitution }

Time:1 1/2 Hours **Total Marks:30**

Note :1.All the activities/questions are compulsory.2.Figures to the right indicates full marks.3.Activities/Que No.1 to 5 are based on History and Activities/Que No. 6 to 9 are based on Political Science.4.It is mandatory to write a complete statement as answer in Question No. 1(A) and Question No.6 .
5.In Question No. 2(A) and 8(B) the appropriate answer is expected to be written by pen only in the concept map.6.In Question No.1(B) students are expected to only *identify* the *wrong* pair.

1(A).Choose the correct option from the given options and complete the statements: **[3]**

I. Articles by Leopold von Ranké is published in ----------
(A) Das Capital (B) Reason in History
(C) The Histories (D) The Theory and Practice of History

II. ---------- felt that explaining the transition in history is more important.
(A) Karl Marx (B) Michel Foucault (C) René Descartes (D) Voltaire

III. -------- said that the timeline of historical events was indicative of progress.
(A) George Hegel (B) Michel Foucault (C) René Descartes (D) Voltaire

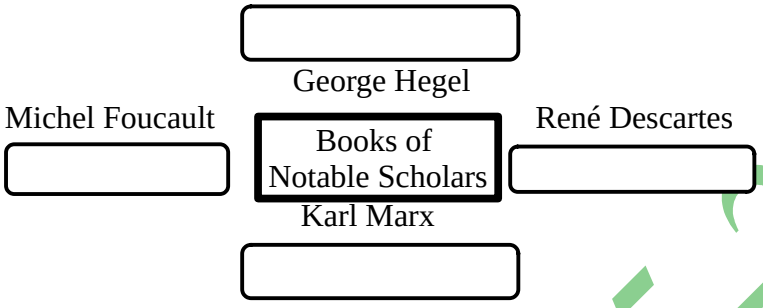
(B) Identify the wrong pair and write : **[2]**

I. 1) Karl Marx – Human history is the history of class struggle.
2) Voltaire – Analysis through Dialectics is important
3) Leopold von Ranké – Criticised imaginative narration of history 4) Simon de Beauvoir – Established fundamentals of feminism

II. 1) Voltaire – Founder of modern historiography
2) Rene' Descarte – insisted on verifying reliability of historical documents
3) George Hegel – Synthesis
4) Michel Faucault – Subjected climate,technology to historical analysis

2(A). Do as directed : (*Any One*) **[2]**

I. Complete the concept map :



II. Prepare the concept map showing ' Various disciplines useful in historical research'

(B) Write Short Notes : (*Any Two*) **[4]**

I. Historiography II. Class Struggle III. The Archaeology of Knowledge

3. Explain the following statements with reasons : (*Any One*) **[2]**

I. It is said that "Annales School gave new direction to history writing".

II. According to Hegel " grasping the meaning of any event happens in terms of two direct opposites".

4. Read the following passage and answer the questions given below: **[4]**

René Descartes was the foremost among scholars who insisted on verifying the reliability of historical documents by critically examining them. Among the rules given by him in his book, the following is supposed to have a great impact on the scientific method of research : Never to accept anything foe true till all grounds of doubt are excluded.

Voltaire's original name was Francois-Marie Arouet. He was French. He opined that along with objective truth and chronology of historical events considering social traditions,trade,economy,agriculture,etc. was also equally important in historiography. It gave rise to the thought that understanding all aspects of human life is important for history writing.

Que : I. Which basic rule put forth by René Descartes in historiography ? 1

II. What is Voltaire's original name ? 1

III. How did Voltaire expand scope of historiography ? 2

5.Answer the following questions in detail : (*Any One*) [3]

I. How does historical research differ from physical sciences' research ?

II. Explain the distinct work of Simone de Beauvoir in historiography.

6.Choose the correct option from the given options and complete the sentences: [2]

I. The 73rd and 74th amendment is about ----------

(A) 33% women reservation (B) Federal structure (C) SC-ST Act (D) RTI

II. Constitution came into force on ----------

(A) 26th January 1950 (B) 15th August 1950

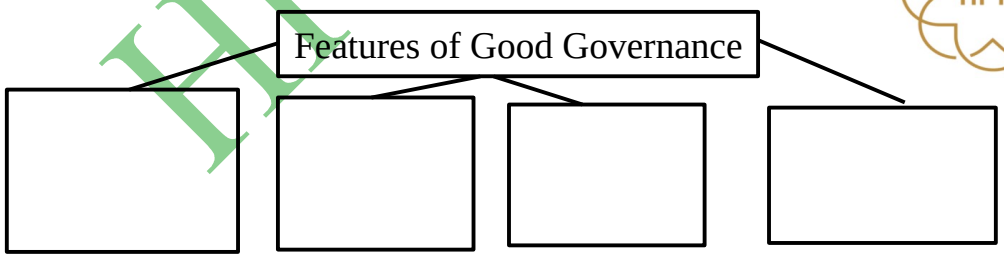
(C) 16th August 1947 (D) 15th August 1947

7. State whether the following statements are true or false with reason : [2]

I. Indian democracy become successful to a great extent

8.(A) Complete following activity [2]

● Complete the concept map



(B) Explain the concept [2]

I. Social justice and equality

9. Answer in brief : [2]

I. What is Political Maturity

Answer Key

SCIENCE AND TECHNOLOGY PART – II
{ Chap ; 1 - Heredity and Evolution }

Time : $1^{1/2}$ Hours **Total Marks : 30**

Note :1.All questions are compulsory.2.Draw scientifically, technically correct labeled diagrams wherever necessary.3.Start writing each main question on new page. 4.Figures to the right indicate full marks .5.For each MCQ (i.e. Q.No.1-A) evaluation would be done for first attempt only.6.For each MCQ correct answer must be alphabet showing correct option.e.g. (I) (a) (II) (b) (III) (c)

1 (A).Choose the *correct* alternative : **[5]**

I. The age of materials determined by ---------- method.
(A) carbon consumption **(B) carbon dating**
(C) paleontological evidences (D) genetic analysis

II. Darwin said that all the organisms reproduce ----------.

(A) with mutations (B) uprightly **(C) prolifically** (D) rapidly

III. First wise-man is ----------

(A) Ramapithecus (B) Cro-Magnon **(C) Neanderthal** (D) Modern Man

IV. Transfer of information from molecule of DNA to mRNA called ---------- process

(A) translation **(B) transcription** (C) translocation (D) mutation

V. ---------- is a proof of evolution.

(A) appendix (B) liver (C) spleen (D) heart

(B) Answer the following questions : **[5]**

I. Find the odd man out : Venation,Leaf petiole,Leaf shape,**Colour of petals**

II. Find correlation : Use of organs : **Legs of swan** :: Disuse of organs : **Ostrich wings**.
(Ostrich wings / Legs of swan / Human Nostrils)

III. Write in one sentence the difference between human hand and patagium of bat in evolutionary evidences.
Ans : Appendix is a vestigial organ while human hand & patagium are anatomical evidences.

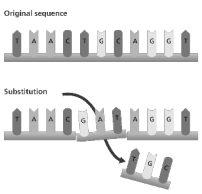
IV. Complete the correlation : Cenozoic Era : Aves :: Mesozoic Era : **Reptiles**

V. Match the following :

Column I	Column II
1. Hugo de Vries **(b)**	(a) Translocation
2. Anticodon **(d)**	(b) Mutation theory
	(c) Natural Selection
	(d) Translation

2 (A). Give *any one* Scientific Reason : **[2]**
I. It seems that vertebrates have been slowly originated from invertebrates.
Reason : Carbon dating method shown that invertebrates were present on earth in the Palaeozoic era of geological time period i.e. much before the vertebrates. Vertebrates dominated in Cenozoic era. Fossils of invertebrates are present in lower strata while vertebrates in upper strata of earth. At the same time vetebrates are showing structural complexity than invertebrates. Hence it seems that ……...
II. *Peripatus* is a connecting link between Annelida and Arthropoda.
Reason : Peripatus shows segmented body, thin cuticle and parapodia like organs. These characters are typical of Annelids. At the same time it shows tracheal respiration and open circulatory system like Arthropods. Due to these combined characters it is said that Peripatus is a …….

(B) Attempt *any two* of the following questions : **[4]**
I. Explain the concept : Anatomical evidences of evolution.
Ans : As given on textbook page no. 4
II. Identify the process from given diagram and explain it.



Ans : It is the process of 'Mutation'.
Expln : Living organisms can produce new individuals like themselves due to genes only and some of those genes are transmitted to the next generation without any changes. However, sometimes sudden changes occur in those genes. Sometimes any nucleotide of the gene changes its position that causes a minor change which is nothing but the 'mutation'. It may cause genetic disorders like sickel cell anemia

III. Write a note on Vestigial organs
Ans : As given on textbook page no.5.

3. Attempt *any three* of the following questions : [9]

I. Explain importance of following organisms with respect to evolution
1. Lung Fish 2. Duckbill Platipus (**Ans : As given on Textbook Page No. 6 &7)**

II. Read the para given below and answer the questions .

All the organisms compete with each other in a life threatening manner. Nature allows those organisms to live who are fit to live in that environment. In California mustard plant having short growing season survived a drought. Some people are more resistant to malaria and can survive in a spread of malaria in Africa. Apart from a main role of nature in such a evolution process , there are other slow and abrupt changes also seen in nature. Sustained and naturally selected organisms perform reproduction with their own specific characters.

a) Which theory of evolution is indicated in these statements?
b) Who proposed this theory ?
c) Explain this theory. Which objections raised against this theory ?
Ans : 'Darwin's Theory of Natural Selection' is discussed here. Charles Darwin proposed this theory (½ mark each); Expln & objections : As given on textbook page no. 7. (2 marks)

III. Complete the para by using given options .

Each m RNA is made up of thousands of **triplet codons .** As per the message on mRNA , amino acids are supplied by the **tRNA .** For this purpose, tRNA has **anticodons** having complementary sequence to the codon on mRNA. This is called as **translation .**

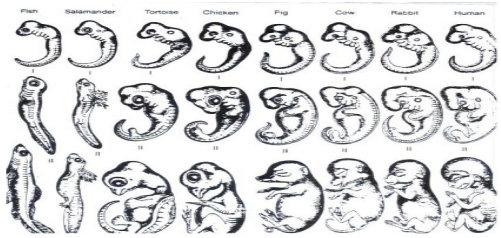
The amino acids brought in by tRNA are bonded together by **peptide bonds** with help of **rRNA .** During this process, ribosome keeps on moving from one end of mRNA to other end by the distance of one one triplet codon. This called as **translocation.**
(½ mark each)
(mRNA , rRNA , tRNA , codons , peptide bonds , triplet codons , anticodons , transcription , translocation , translation , amino bonds)

IV. Read the para given below and answer the questions given below.

Morphological changes occurring in living organisms due to activities or laziness of that organism Morphological changes occurring in living organisms are responsible for evolution. Maximum use of organs make it strong or more useful. No use of the organ can make it weak or degenerate it over a generations. These modifications in the body can be transferred from one generation to another generation. But this theory is not accepted completely.

a) Which theory of evolution is indicated in this para ?
b) Who proposed this theory ?
c) Explain this theory. Why it is not accepted widely ?
Ans: I) These are statements of Lamarck's Theory of Evolution' II) Jean-Baptist Lamarck proposed this theory (1/2 mark each) III) Explain as given on textbook page no.8 (2 marks)

V. Observe the diagram and answer the questions :



a) Which evolutionary evidence shown in this picture ?
b) How it describes evolution . Explain

Ans : Embryological evidence is shown in this picture. Expln : Comparative study of embryonic developmental stages of various vertebrates given in the picture shows that all embryos show extreme similarities during initial stages and those similarities decrease gradually. Similarities in initial stages indicate the common origin of all these animals. This is one of evidence of evolution.

4.Answer any one of the following questions : [5]
I. Explain the statement ' Modern man is evolved from monkey like animal.'
Ans : As given on textbook page no.9 from ' Evolution of some of the 2 core year old ……..this evolution had been faster than earlier.'
(Diagram is deleted from evaluation by Board. For self study. No teaching)
II. Complete the table .Give explanation for your answers.

	Term	**Definition**	**Example**	**Complementary Process/Example**
1	Transcription	**The process of mRNA from DNA**	mRNA	Translation
2	**Species**	Group of organisms that produces fertile individuals through natural reproduction	Tiger	**Rabbit**
3	Acquired Characters	Change in organs/body due to use-disuse during organism's life time	**Wings of emu have become weak due to no use**	Ancestry of acquired Characters
4	Morphological Evidences	Similarities seen in animals and plants	**Shape of Venation**	Leaf shape

Answer Key
MATHS (PART – I)
{ Chap : 1 - Linear Equations in Two Variables }

Time: $1^{1/2}$ Hours **Max. Marks: 25 ~~30~~**

Note: 1. All questions are compulsory. 2. Use of calculator is not allowed.
3.Figures to the right of questions indicate full marks.

1.(A) Choose the correct alternative: **[3]**

I. For drawing graph of 4x + 3y = 13 , if x = -2. What is the value of y ?

a) 3 b) -3 c) 4/3 **d) 7**

II. What is the value of $\begin{vmatrix} 3 & 2 \\ 5 & 7 \end{vmatrix}$

a) 3 b) -2 c) - 5 **d) 11**

III. For simultaneous equations in x and y , if D =20 , Dx = -14 , Dy = -10 , then what is the value of y?

a) 7/10 b) 4/3 c) - 4/3 **d) - 1/2**

(B) Solve the following questions : **[3]**

I. For certain simultaneous equations in x and y ; if Dx = 15 , D = 3 , then find the value of x ?
Soln : Use x = Dx/D and y = Dy/D . Put Values and calculate . (Ans : x = 5 , y = -2)

II. Find the value of (x + y) if 2x + 3y = 12 and 3x + 2y = 8
Soln : Multiply 2x + 3y = 12 by 3 & 3x + 2y = 8 by 2 . Then subtract II **from** III **. You will get y Then put value of y in** I **and find x . Then find x + y (Ans : 4)**

III. Find value of determinant .

$A = \begin{vmatrix} 3\sqrt{2} & 7 \\ 2 & 2\sqrt{2} \end{vmatrix}$ **Soln : ($3\sqrt{2}$ x $2\sqrt{2}$) - (2 x 7) = 12 – 14 = -2**

2.(A) Complete the following activities (*Any One*): [2]

I Find the value of following determinant :

Activity :

$$A = \begin{vmatrix} 5/2 & 2/4 \\ 3/4 & 1/4 \end{vmatrix} = (\boxed{\mathbf{5/2}} \times 1/4) - (\boxed{\mathbf{2/4}} \times 3/4)$$

$$= 5/8 - \boxed{\mathbf{6/16}} = \frac{10 - 6}{\boxed{\mathbf{16}}}$$

Hence value of determinant is **1/4**

II. Complete the table to draw the graph of $2x - y = 3$

Activity :

x	**1/2**	**2**	**5/2**
y	- 2	1	2
(x,y)	(**1/2** , - 2)	(**2** , 1)	(5/2 , 2)

(B) Solve the following questions (*Any Three*) : [6]

I. Solve the simultaneous equations , $4x - 2y = 8$; $2x + y = 8$. **(Deleted by Board)**

Soln: Multiply 2x + y = 8 by 2 and add I & III & find x . Then put value of x in I and find y (Ans : x = 3 , y = 2)

II. Find value of x by Cramer's rule for the equations : $3x + 2y = -7$; $2x + 4y = -8$

Soln : For eq I : a1 = 3, b1 = 2, c1 = -9 For eq. II a2 = 2 , b2 = 3 , c2 = -8 .

Use D = $\begin{vmatrix} a1 & b1 \\ a2 & b2 \end{vmatrix}$ Put values and calculate D . then Use Dx = $\begin{vmatrix} c1 & b1 \\ c2 & b2 \end{vmatrix}$ and Dy = $\begin{vmatrix} a1 & c1 \\ a2 & c2 \end{vmatrix}$

x = Dx / D & y = Dy/D. Find Dx,Dy & x , y

(Ans: D = 8, Dx = - 12, Dy = - 10, x = - -3/2 , y = - 5/2)

III. $\frac{2}{5}x + y = \frac{11}{5}$; $x + \frac{2}{3}y = \frac{11}{3}$ **(Deleted by Board)**

Soln: Multiply I by 5 and II by 3. Then again multiply Eq III by 3 and Eq IV by 2. Then subtract IV from III & Find y .Put value of y in III and find x .

(Ans : x = 3 and y = 1)

IV. The perimeter of a rectangle is 34 cm .The length of the rectangle is more than triple its breadth by 1. Then Find length and breadth by determinant method.
Soln: Take length of rectangle x & breadth y. Put eq. wrt first & second conditions 2 (x+y) = 34 …. x+y = 17 ; x = 3y + 1 ….. x – 3y = 1 . Then solve these by determinant method.
(Ans : x = 13 cm & y = 4 cm)

3 (A). Complete the following activity : [3]

Solve : x + y = 4 ; 5x – 3y = 12 **(Deleted by Board)**
Activity: x + y = 4 …….. 1 and 5x – 3y = 12 …… 2
Let's solve the equations by eliminating y.
By multiplying equation 1 by 3, we get

3x + **3y** = **12** ……. 3

Let's add eq . 3 & 2

3x + **3y** = 12 ……. 3
5x – 3y = 12 …… 2

8x = 24 Hence x = **3**

Substituting x = **3** in eq . 1, we get

3 + y = 4 Hence y = **1**

(B) Solve the following questions (Any Two): [6]

I. Solve equations by drawing graphs of x + y = 7 and 3x – y = 1 .
Solution : Find at least 4 ordered pairs for both of these given equations . Then draw plot points on graph paper and draw lines. Note Co-ordinates of Point of intersection of the two lines. These co-ordinates indicate solution of given equations (Ans : Co-ordinates will be x = 2 and y = 5)

II. A shopkeeper sold item A and item B as follows.Find Selling prices of both items A and B . **Soln : Put equations wrt above info. 10x + 5y = 4000 & 24x + y = 7400.**

Multiply II **by 5, it will be 120x + 5y = 37000 . Then subtract** I **from** III **and find x . Put value of x in eq** I **and find y . (Ans : x = 300 Rs. y = 200 Rs.)**

Monthly Sale	Item A	Item B	Total Sale
August	10 pieces	5 pieces	Rs.4000/-
September	24 pieces	1 piece	Rs. 7400/-

III. Solve $\frac{3}{x} + \frac{4}{y} = 6$; $\frac{2}{x} + \frac{3}{y} = 5$.**(Deleted by Board)**

Soln :Take 1/x = m & 1/y = n & put eqns again. 3m + 4n = 6, 2m + 3n = 5 . Solve these two and find m & n. Then find x & y by using 1/x = m & 1/y = n. (Ans : x = -1/2 & y = 1/3)

4.Solve the following questions (Any One): [4]

I. A boat travels 12 km upstream and 20 km downstream in 4 hours . Same boat travels 28 km upstream and 40 km downstream in 9 hours .What is the speed of boat in still water and speed of water current ?

Soln :Let the speed of the boat in still water be x km/hr and the speed of water current be y km/hr. Speed of boat in downstream = (x+y) km/hr & that in upstream = (x- y) km/hr. Now distance = speed x time i.e. time = distance/speed. Time taken by the boat to travel 12 km upstream = 12/x-y hrs & it takes 20/x+y hrs to travel 20 km downstream. Now put eq. For first & second conditions : $\frac{12}{x-y} + \frac{20}{x+y} = 4$ **&** $\frac{28}{x-y} + \frac{40}{x+y} = 9$ **, take 1/x-y = m & 1/x +y = n**

Put eq. 12m + 20n = 4 & 28m + 40n = 9 .Solve & find m & n .Then find x – y & x + y . x + y = 20 & x – y = 4 Solve these two eqs & find x & y (Ans : x = 12 km/hr & y = 8 km/hr)

II. A three digit number is equal to 22 times the sum of its digits .If the digits are reversed the new number is 99 more than the old number .The middle digit is equal to the sum of extreme digits.Find the original number .

Soln : Three digit number should be : 100x + 10 (x + y) + y =110x + 11y

The sum of digits : x + (x + y) + y = 2x + 2y

From first condition , Given Number = 22 (sum of digits)

110x + 11y = 22 (2x + 2y) ; 110x + 11y = 44x + 44y

110x – 44y = 44y – 11y ; 66x – 33y = 0 ---------- I

Now, the number obtained by reversing digits will be

100y + 10 (x+y) + x = 110y + 11x

From 2nd condition, Given number + 99 = new number

110y + 11x + 99 = 110y + 11x

99x – 99y = - 99

x – y = - 1

x = y - 1 ---------- II

Now substitute value of x in eq.I and find value of y. (y = 2) . Then find value of x by putting y=2 in eq.II **(x=1) . <u>Now number is 132</u>.**

5. Solve the following questions:
[3]

I. Solve following simultaneous equations by graphical method.

x + y = 0 ; 3x – y = 8

<u>Soln</u> : Put ordered pairs for these two eqs & draw graph with help of these pairs. And find co-ordinates of the point of intersection of the two lines.
(Ans : (-2,2))