MY DREAMz ACADEMY

Dilsuknagar,HYD.Contact:7995918905/06.

Test Name : NEET GRAND TEST -02

Batch : BIPC LONG TERM

No Questions : 180 Time : 180 MIN

IMPORTANT INSTRUCTIONS:

Please read the instructions carefully

- The candidate must immediately fill their details on the **OMR SHEET** before attempting the test booklet.
- Duration of the test is **3hrs(180Min)**,test booklet contains **180 questions**.
- This test paper comprises of **two sections**.Each subject consist of two sections i.e., Section A which consist of **35 questions** and Section B which consist of 15 questions,Out of these **15 questions** candidate can choose to attempt all questions.
- Each question carries **4 Marks** for each correct response,For each incorrect response **1 mark** will be deducted from the total score.The maximum marks are **720**.
- Use **BLUE/BLACK** Ball point pen only for writing responses on **OMR SHEET**.Use of pencil,sketch pen,gell pens are strictly prohibited.
- No candidate is allowed to carry any textual material,printed or written,bits of papers,pager,mobile phone any electronic gadgets etc.. Except the Identity card and hall ticket into the examination hall.
- **Rough work** is to be done only on the space provided in the test booklet.
- Don't fold or make any stray marks on the **ANSWER SHEET**.
- Use of white fluid for correction is not permissiable on the ANSWER SHEET.
- On the completion of the test the candidate must hand over the answer sheet to the invigilator after completing the time.However the candidate is allowed to take away this test booklet with them.

ALL THE BEST

NAME:.....

BATCH:..... TEST DATE:.....

ROLL NO:.....INVIGILATOR SIGN:.....

SET: A

Test Id: 685921

Part - A Botany

Section - I: Single Correct

This section contains a total of 45 questions.
All questions in this section are mandatory.
For every correct response you shall be awarded 4 marks.
For every incorrect response -1 marks shall be deducted.

1. How many of the following is/are correct statement(s) regarding a cell membrane in prokaryotes?
(i) Selectively permeable in nature
(ii) Structurally similar to eukaryotic cell membrane
(iii) Interacts with outer world
(iv) Innermost layer of cell envelope
(v) Living layer

(a) Only (ii), (iii) and (iv)
(b) (i), (ii), (iii), (iv) and (v)
(c) Only (i), (iii), (iv) and (v)
(d) Only (i)

2. Read the following statements (assertion-A and reason-R) and select the correct option:

A: 'Success' of mammals is largely due to their ability to maintain a constant body temperature and thrive whether they live in Antartica or in the Sahara desert.
R: The mechanisms used by most mammals to regulate their body temperature are similar to the ones that we humans use.

(a) Both A and R are true and R is correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) Both A and R are false statements

3. Which of the following statements are incorrect?
(i) The base of each pyramid represents the producers or the first trophic level while the apex represents tertiary or top level consumer.
(ii) An organism may occupy more than one trophic level simultaneously.
(iii) A species occupies only one trophic level in the same ecosystem at the same time.
(iv) Trophic level represents a functional level, not a species as such.
(v) Energy at a lower trophic level is always more than at a higher level.
(vi) Ecological pyramids do not take into account the same species belonging to two or more trophic levels.
(vii) Ecological pyramids do not accommodate a food web.
(viii) Saprophytes are not given any place in ecological pyramids.

(a) Only (iii)
(b) (ii) and (iii)
(c) (iii) and (iv)
(d) All are correct

4. Which of the following is true for the location of few genes of *Drosophila melanogaster* studied by T. H. Morgan?

(a) The distance between the genes y^+ and w^+ is greater than the distance between w^+ and m^+
(b) The distance between the genes y^+ and w^+ is same as the distance between w^+ and m^+
(c) The distance between the genes w^+ and m^+ is greater than the distance between y^+ and w^+
(d) The distance between the genes y^+ and w^+ and between w^+ and m^+ may vary greatly between individual flies

5. Radial symmetry is found in flowers of:

(a) *Cassia*
(b) Chilli
(c) Gulmohur
(d) *Canna*

6. Read the following statements (assertion-A and reason-R) and select the correct option.

A: *Mycoplasma* is pathogenic both to animals and plants.
R: These organisms lack cell wall and can survive without oxygen.

(a) Both A and R are true and R is corect explanation of the A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) Both A and R are false statements

7. Read the following statements:
I. In the Engelmann's experiment, the aerobic bacteria accumulated mainly in the region of green light of the split spectrum
II. Action spectrum of photosynthesis corresponds closely to absorption spectra of chlorophyll-*a* showing that chlorophyll-*a* is the chief photosynthetic pigment
III. Some organisms do not release O_2 during photosynthesis
IV. There occurs a clear division of labour w.r.t. light reaction and dark reaction within the chloroplast
V. Purple and green sulphur bacteria can liberate O_2 during photosynthesis
Which of the statements are correct?

(a) I, II and III
(b) I and V only
(c) II, III and IV

(d) III, IV and V

8. Find out the correct statement(s).
(a) Growth in plants is internal/intrinsic and open
(b) Growth, at a cellular level, is principally a consequence of increase in the amount of protoplasm
(c) Plant growth is localised

(a) Only (a) & (b)
(b) (b) only
(c) Only (b) & (c)
(d) (a), (b) & (c)

9. Which one is wrongly matched?

(a) Gemma cups – *Marchantia*
(b) Biflagellate zoospores – *Brown algae*
(c) Uniflagellate gametes – *Polysiphonia*
(d) Unicellular organism – *Chlorella*

10. ER divides the intracellular space into two distinct compartments called

(a) Luminal (inside ER) and extra luminal (cytoplasm)
(b) Luminal (cytoplasm) and extra luminal (inside ER)
(c) Extra-luminal (inside cell wall) and luminal (cytoplasm)
(d) Luminal (inside plasma membrane) and extra luminal (cytoplasm)

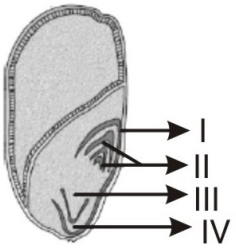
11. If vascular bundles are radial in a plant part:

(a) Secondary growth is mandatory
(b) Dedifferentiation is mandatory
(c) Xylem will be exarch
(d) Parenchyma is absent in that organ

12. How do the chromosome appear during prophase of animal cell during mitosis?

(a) Consisting of four chromatids which remain attached to centromere
(b) Consisting of two chromatids which remain attached to centromere
(c) Consisting of four chromatids without centromere
(d) As chromatin material without any defined structure

13. Identify the part of the seed from the given figure which is destined to form root when the seed germinates:



(a) I (b) II (c) III (d) IV

14. How many chromosomes are present in a diploid somatic cell of an organism during metaphase, if meiocyte in this organism has 23 bivalents during metaphase I?

(a) 23 (b) 46 (c) 92 (d) 69

15. Pseudocopulation is an example which is applicable to:

(a) Wasp and fig
(b) *Ophrys* and bees
(c) *Ophrys* and wasp
(d) None of the above

16. Two kingdom classification system did not distinguish between:

(a) Eukaryotes and prokaryotes
(b) Unicellular and multicellular organisms
(c) Photosynthetic and non-photosynthetic organisms
(d) All of the above

17. Protonema is:

(a) Haploid and is found in mosses
(b) Diploid and is found in liverworts
(c) Diploid and is found in pteridophytes
(d) Haploid and is found in pteridophytes

18. Sewage water contains large amounts of

(a) Organic matter only
(b) Microbes only
(c) Heavy metals and microbes
(d) Organic matter and microbes

19. Ethylene is not directly applied in the field as a gas due to its high diffusion rate. Which compound is used to overcome this limitation?

(a) Ethephon
(b) Agent orange
(c) Benzaldehyde
(d) 2, 4, 5-T

20. The oldest seed is that of .....

(a) *Annona squamosa*
(b) Apple
(c) *Lupinus arcticus*
(d) *Mangifera indica*

21. How many ATP molecules will be produced in a brain cell from a glucose molecule involving *electron transport chain only*?

(a) 32 (b) 16 (c) 40 (d) 26

22. Read the following statements with respect to electron transport chain and oxidative phosphorylation:

(i) Ubiquinone receives reducing equivalent via $FADH_2$ (complex-II).
(ii) Cytochrome-*c* is a small protein attached to the outer surface of the inner mitochondrial membrane.
(iii) Both UQ and cytochrome-*c* are mobile electron carriers in the inner mitochondrial membrane.
(iv) Complex V is ATP reductase.
(v) The presence of O_2 is vital as it drives the whole process of removing hydrogen from the system.

Which of the above statement is/are correct?

(a) (i), (ii), (iii) and (v)
(b) (iv) only
(c) (iii), (iv), (v)
(d) (i), (iii), (iv)

23. Which technique was used by Mendel during his experiments on pea plant?

(a) Artificial pollination
(b) Cross pollination
(c) Self–pollination
(d) All of the above

24. During which phase(s) of the cell cycle the amount of DNA remains at 2c only in a cell?

(a) G_0 and G_1
(b) G_2 and M
(c) G_2 only
(d) G_1 and S

25. Compared to C_3 plants, C_4 plants:

(a) Can continue to fix CO_2 even at relatively low CO_2 concentrations
(b) Have higher rates of photorespiration
(c) Grow better in cool and moist condition
(d) Do not use RuBisCO for CO_2 fixation

26. Out of 38 ATP molecules produced per glucose moelcule oxidized during aerobic respiration:

(a) Four are produced during glycolysis and 34 during respiratory chain
(b) Two are produced outside mitochondria and 36 inside mitochondria
(c) Two during Krebs' cycle and 36 from electron trasport chain
(d) All formed from oxidative phosphorylation

27. During the creation of proton gradient and breakdown of proton gradient in chloroplast, protons move respectively:

(a) From the stroma to cytoplasm and from the cytoplasm to stroma
(b) From the cytoplasm to stroma and from stroma to cytoplasm
(c) From the thylakoid lumen to stroma and from the stroma to thylakoid lumen
(d) From the stroma to thylakoid lumen and from the thylakoid lumen to stroma

28. Read the following statements (assertion-A and reason-R) and select the correct option:

A: Warm and moist environment favour decomposition whereas low temperature and anaerobiosis inhibit decomposition resulting in build up of organic materials.
R: Temperature, soil and moisture are the most important climatic factors that regulate decomposition through their effects on the activities of soil microbes.

(a) Both A and R are true and R is correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) Both A and R are false statements

29. The class Dicotyledonae and Monocotyledonae belong to the

(a) Same division called Magnoliophyta (or Angiospermae)
(b) Different divisions
(c) Different families
(d) Same phylum called Magnoliophyta (or Angiospermae)

30. Given below is a stretch of non-template strand of a dsDNA:

5' CCATACGCGCCTGTG 3'

What will be the base sequence of the primary transcript?

(a) 5' CCATACGCGCCTGTG 3'
(b) 3' CCAUACGCGCCUGUG 5'
(c) 3' CCATACGCGCCTGTG 5'
(d) 5' CCAUACGCGCCUGUG 3'

31. Which inoculum is added to milk to form curd?

(a) A starter of LAB
(b) A starter of *Penicillium*
(c) *Lactobacillus bulgaricus* and *Streptococcus*
(d) Probiotics

32. Read the following statements (assertion-A and reason-R) and select the correct option:

A: The dog flower plant shows incomplete dominance for inheritance of flower colour.
R: In pink flowers, both alleles are expressed equally.

(a) Both A and R are true and R is correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) Both A and R are false

33. Which of the following systems of classification were based on natural affinities?

(a) Natural
(b) Artificial
(c) Sexual
(d) Phylogenetic

34. Read the following statements (assertion-A and reason-R) and select the correct option.

A: Gymnosperms possess haploid endosperm.
R: Gymnosperms possess embryo sac.

(a) Both A and R are true and R is correct explanation of the A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) Both assertion and reason are false statements

35. Waxy layer on epidermis:

(a) Is called trichome and is found in stems and roots
(b) Is called epiblema and is present in stems but absent in roots
(c) Is called cuticle which is absent in roots
(d) Helps in exchange of gases in stems and roots

36. Self–incompatibility is not:

(a) Genetic mechanism
(b) Positional separation of anther and stigma
(c) Prevention for geitonogamy
(d) More than one option is correct

37. A marriage between a colour blind man and a normal woman produces:

(a) All carrier daughters and normal sons
(b) 50% carrier daughters, 50% normal daughters
(c) 50% colourblind sons, 50% normal sons
(d) All carrier offspring

38. Ethyl alcohol fermentation occurs in:

(a) *Lactobacillus*
(b) Muscles of humans
(c) Yeast
(d) All of these

39. Which of the following statements is not correct?

(a) Biodiversity is the occurrence of variety of life forms differing in morphology, anatomy, habitats and habits
(b) Systematics is the branch of biology that deals with cataloguing plants, animals and other organisms into categories that can be named, remembered, compared and studied
(c) Classification is the branch of biology that deals with principles and procedures of identification and nomenclature of organisms
(d) None of these

40. If *E. coli* containing ^{15}N - ^{15}N DNA was allowed to grow for 80 minutes in medium containing ^{14}N then, what would be the percentage of light density and hybrid density DNA molecule?

(a) 87.5% light density; 12.5% hybrid density
(b) 75% light density; 25% hybrid density
(c) 25% light density; 75% hybrid density
(d) 12.5% light density; 87.5% hybrid density

41. The causative agent of "avian influenza" is:

(a) Bacteria
(b) Virus
(c) Fungus
(d) Nematode

42. Radioactive elements used by Hershey and Chase in their experiment were:

(a) ^{32}S and ^{35}P
(b) ^{14}N and ^{15}N
(c) ^{32}S and ^{15}N
(d) ^{35}S and ^{32}P

43. **Statement I:** *Aspargillus niger* (a fungus) is used for the production of citric acid.
Statement II: Streptokinase produced by bacterium *Staphylococcus* is used as clot buster.

(a) Both statements are correct
(b) Statement I is correct and II is incorrect
(c) Statement I is incorrect and II is correct
(d) Both statements are incorrect

44. Which of the following represents the edible swollen portion of *Allium cepa*?

(a) Aerial stem
(b) Roots
(c) Intermodes
(d) Leaf bases

45. Parenchyma cells are generally thin-walled. An example of thick-walled parenchyma in dicot root is:

(a) Pith
(b) Pericycle
(c) Endodermis
(d) Hypodermis

Part - B Chemistry

Section - I: Single Correct

This section contains a total of 45 questions.
All questions in this section are mandatory.
For every correct response you shall be awarded 4 marks.
For every incorrect response -1 marks shall be deducted.

46. If a substance 'A' dissolves in solution of a mixture of 'B' and 'C' with their respective number of moles as n_A, n_B and n_C, mole fraction of C in the solution is:

(a) $\frac{n_C}{n_A \times n_B \times n_C}$
(b) $\frac{n_C}{n_A + n_B + n_C}$
(c) $\frac{n_C}{n_A - n_B - n_C}$
(d) $\frac{n_B}{n_A + n_B}$

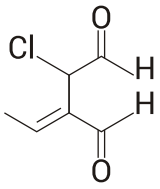
47. H_2O is polar, whereas BeF_2 is not. It is because

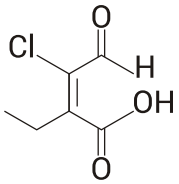
(a) The electronegativity of F is greater than that of O
(b) H_2O involves hydrogen bonding whereas BeF_2 is a discrete molecule
(c) H_2O is linear and BeF_2 is angular
(d) H_2O is angular and BeF_2 is linear

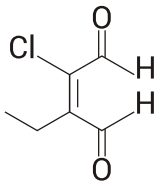
48. Radial nodes present in 3s and 3p-orbitals are respectively

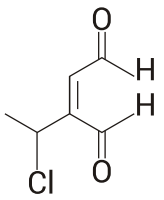
(a) 0, 2 (b) 2, 1
(c) 1, 1 (d) 2, 2

49. The correct structure of 2-chloro-3-ethylbut-2-enedial is:-

(a) 

(b) 

(c) 

(d) 

50. What is the correct set of quantum numbers for the 21st electron in Chromium?

(a) n = 4, l = 0, s = +1/2 or -1/2
(b) n = 3, l = 2, s = +1/2 or -1/2
(c) n = 4, l = 2, s = +1/2 or -1/2
(d) n = 4, l = 1, s = +1/2 or -1/2

51. Which of the following is correct?

(a) Group 17 of p-block elements have highly negative electron gain enthalpies
(b) Groups 17 of p-block elements has highly positive electron gain enthalpies
(c) Group -17 elements are known as the halogen family
(d) Both (a) and (c)

52. Match List I with List II

List I (Elements)		**List II** (Properties in their respective groups)	
A.	Cl, S	I.	Elements with highest electronegativity
B.	Ge, As	II.	Elements with largest atomic size
C.	Fr, Ra	III.	Elements which show properties of both metals and non metal
D.	F, O	IV.	Elements with highest negative electron gain enthalpy

Choose the correct answer from the options given below :

(a) A-II, B-III, C-IV, D-I
(b) A-III, B-II, C-I, D-IV
(c) A-IV, B-III, C-II, D-I
(d) A-II, B-I, C-IV, D-III

53. Which of the following diatomic molecular species has only π bonds according to Molecular Orbital Theory?

(a) O_2 (b) N_2
(c) C_2 (d) Be_2

54. Match List I with List II

	List I		List II
A.	XeF_4	I.	See-saw
B.	SF_4	II.	Square planar
C.	NH_4^+	III.	Bent T-shaped
D.	BrF_3	IV.	Tetrahedral

(a) A-IV, B-III, C-II, D-I
(b) A-II, B-I, C-III, D-IV
(c) A-II, B-I, C-IV, D-III
(d) A-IV, B-I, C-II, D-III

55. Which among the following is an extensive property of the system ?

(a) Temperature
(b) Volume
(c) Refractive index
(d) Viscocity

56. Dihedral angle of least stable conformer of ethane is:

(a) 60^0 (b) 0^0
(c) 120^0 (d) 180^0

57. A system is provided 50 joule of heat and work done on the system is 10 J. The change in internal energy during the process is

(a) 40 J (b) 60 J
(c) 80 J (d) 50 J

58. Nitrogen can form only one chloride with chlorine which is NCl_3 whereas P can form PCl_3 and PCl_5. This is

(a) due to absence of d-orbitals in nitrogen
(b) due to difference in size of N and P
(c) due to higher reactivity of P towards Cl than N
(d) due to presence of multiple bonding in nitrogen.

59. The Eu^{2+} ion is a strong reducing agent in spite of its ground state electronic configuration (outermost): [Atomic number of Eu = 63]

(a) $4f^7 6s^2$
(b) $4f^6$
(c) $4f^7$
(d) $4f^6 6s^2$

60. Nucleotides contain

(a) A phosphoric acid group
(b) A nitrogenous base
(c) A pentose sugar
(d) All of these

61. The correct option for the value of vapour pressure of a solution at 45^0C with benzene to octane in the molar ratio 3 : 2 is: [At 45^0C vapour pressure of benzene is 280 mm Hg and that of octane is 420 mm Hg. Assume Ideal gas]

(a) 336 mm of Hg
(b) 350 mm of Hg
(c) 160 mm of Hg
(d) 168 mm of Hg

62. Given below are the standard electrode potentials of few half-cells. The correct order of these metals in increasing reducing power will be

$K^+/K = -2.93$ V, $Ag^+/Ag = 0.80$ V,
$Mg^{2+}/Mg = -2.37$ V, $Cr^{3+}/Cr = -0.74$ V.

(a) K < Mg < Cr < Ag
(b) Ag < Cr < Mg < K
(c) Mg < K < Cr < Ag
(d) Cr < Ag < Mg < K

63. Calculate the molecular formula of compound which contains 20% Ca and 80% Br. Molecular weight of compound is 200.

(a) Ca_2Br_3
(b) $CaBr_2$
(c) $CaBr$
(d) Ca_2Br

64. Benzene on nitration gives nitrobenzene in presence of HNO_3 and H_2SO_4 mixture, where:

(a) HNO_3 acts as a base and H_2SO_4 acts as an acid
(b) Both H_2SO_4 and HNO_3 act as an acids
(c) HNO_3 acts as an acid and H_2SO_4 acts as a base
(d) Both H_2SO_4 and HNO_3 act as a bases

65. Oxidation number of Fe in violet coloured complex $Na_4[Fe(CN)_5(NOS)]$ is :

(a) 0 (b) 2 (c) 3 (d) 4

66. The radii of F, F^-, O and O^{2-} are in the order

(a) $O^{2-} > O > F^- > F$
(b) $F^- > O^{2-} > F > O$
(c) $O^{2-} > F^- > O > F$
(d) $O^2 > F^- > F > O$

67. In the reaction $2N_2O_5 \rightarrow 4NO_2 + O_2$, $\frac{d[NO_2]}{dt}$ at any time t was found to be 2.4×10^{-4} mole L^{-1} min^{-1} with rate constant 4.4×10^{-4} min^{-1}. Hence $-\frac{d[N_2N_5]}{dt}$ at the same time t and the corresponding rate constant of the reactions respectively would be

(a) 1.2×10^{-4} mole L^{-1} min^{-1} and 4.4×10^{-4} min^{-1}

(b) 1.2×10^{-4} mole L^{-1} min^{-1} and 8.8×10^{-4} min^{-1}

(c) 4.8×10^{-4} mole L^{-1} min^{-1} and 2.2×10^{-4} min^{-1}

(d) 2.4×10^{-4} mole L^{-1} min^{-1} and 4.4×10^{-4} min^{-1}

68. Match the metal ions given in Column I with the spin magnetic moments of the ions given in Column II and assign the correct code :

Column I	Column II
a. Co^{3+}	i. $\sqrt{8}$ BM
b. Cr^{3+}	ii. $\sqrt{35}$ BM
c. Fe^{3+}	iii. $\sqrt{3}$ BM
d. Ni^{2+}	iv. $\sqrt{24}$ BM
	v. $\sqrt{15}$ BM

(a) (a) - iv, (b) - i, (c) - ii, (d) - iii

(b) (a) - i, (b) - ii, (c) - iii, (d) - iv

(c) (a) - iv, (b) - v, (c) - ii, (d) - i

(d) (a) - iii, (b) - v, (c) - i, (d) - ii

69. For a reaction $\frac{1}{2}A \rightarrow 2B$, rate of disappearance of 'A' related to the rate of appearance of 'B' by the expression.

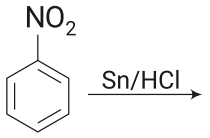
(a) $-\frac{d[A]}{dt} = \frac{1}{4}\frac{d[B]}{dt}$

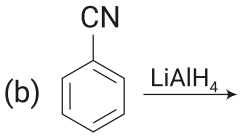
(b) $-\frac{d[A]}{dt} = \frac{d[B]}{dt}$

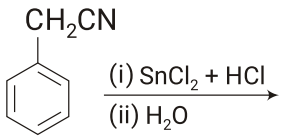
(c) $-\frac{d[A]}{dt} = 4\frac{d[B]}{dt}$

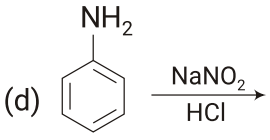
(d) $-\frac{d[A]}{dt} = \frac{1}{2}\frac{d[B]}{dt}$

70. Kjeldahl method of Nitrogen estimation fails for which of the following reaction products ?

(a) 

(b) 

(c) 

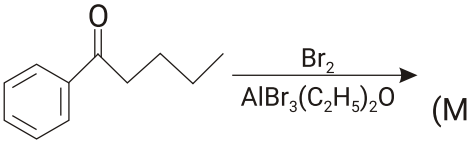
(d) 

(a) (a) and (d)

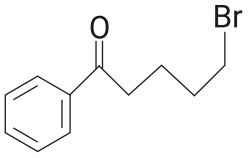
(b) (c) and (d)

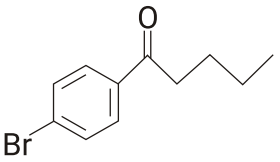
(c) (a), (c), and (d)

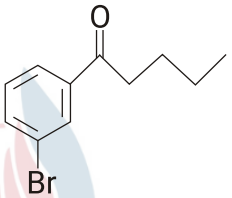
(d) (b) and (c)

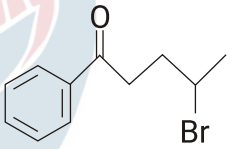
71. 

Consider the given reaction, the product A is:

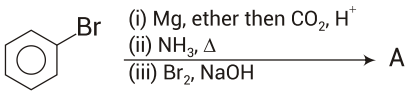
(a) 

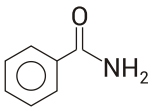
(b) 

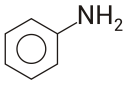
(c) 

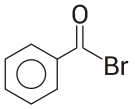
(d) 

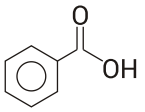
72. The final product A, formed in the following multistep reaction sequence is:



(a) 

(b) 

(c) 

(d) 

73. Cu^{2+} and Ag^{+} are both present in the same solution. To precipitate one of the ions and leaves the other in solution, add

(a) H_2S (aq)

(b) HCl (aq)

(c) $HNO_3(aq)$

(d) $NH_4NO_3(aq)$

74. The correct decreasing order of priority of functional groups in naming an organic compound as per IUPAC system of nomenclature is

(a) $-COOH > -CONH_2 > -COCl > -CHO$

(b) $-SO_3H > -COCl > -CONH_2 > -CN$

(c) $-COOR > -COCl > -NH_2 > \diagdown\!\!\diagup C=O$

(d) $-COOH > -COOR > -CONH_2 > -COCl$

75. Which is the most suitable reagent among the following to distinguish compound (III) from the rest of the compounds

(I) $CH_3-C\equiv C-CH_3$ (II) $CH_2—CH_2—CH_2—CH_3$

(III) $CH_3—CH_2—C\equiv CH$ (IV) $CH_3—CH=CH_2$

(a) Br_2 in CCl_4

(b) cold aq. Alk $KMnO_4$

(c) Ammonical $AgNO_3$ solution

(d) All of these

76. Which of the following can act as an acid and as a base

(a) $HClO_3^-$

(b) $H_2PO_4^-$

(c) HS^-

(d) All of these

77. Rate constant in case of first order reaction is

(a) inversely proportional to the concentration units

(b) independent of concentration units

(c) directly proportional to concentration units

(d) inversely proportional to the square of concentration units.

78. Which reagent can be used to convert, halides, alcohols, carbonyl compounds, acids to alkane

(a) Zn–Hg / HCl

(b) Red P + HI

(c) $LiAlH_4$

(d) None of these

79. Which of the following statements are correct?

(A) The electronic configuration of Cr is [Ar] $3d^5\ 4s^1$.
(B) The magnetic quantum number may have a negative value.
(C) In the ground state of an atom, the orbitals are filled in order of their increasing energies.
(D) The total number of nodes is given by n − 2.

Choose the most appropriate answer from the options given below:

(a) (A), (C) and (D) only

(b) (A) and (B) only

(c) (A) and (C) only

(d) (A), (B) and (C) only

80. The complexes $[Pt(NH_3)_4]$ $[PtCl_6]$ and $[Pt(NH_3)_4Cl_2]$ $[PtCl_4]$ are :

(a) linkage isomers

(b) optical isomers

(c) co-ordination isomers

(d) ionisation isomers

81. **Assertion:** Phenol and benzoic acid can be distinguished by Na_2CO_3.
Reason: Benzoic acid is a stronger acid than phenol, hence reacts with Na_2CO_3.

(a) Both assertion and reason are true, and the reason is the correct explanation for the assertion.

(b) Both assertion and reason are true, but the reason is not the correct explanation for the assertion.

(c) Assertion is true but reason is false.

(d) Both Assertion and reason are false.

82. The expression for equilibrium constant, K_c for the following reaction is $Fe^{3+}_{(aq)} + 3OH^-_{(aq)} \rightleftharpoons Fe(OH)_{3(s)}$

(a) $K_c = \dfrac{[Fe(OH)_3]}{[Fe^{3+}][OH^-]^3}$

(b) $K_c = \dfrac{[Fe(OH)_3]}{[Fe^{3+}][OH^-]}$

(c) $K_c = \dfrac{1}{[Fe^{3+}][OH^-]^3}$

(d) $K_c = [Fe(OH)_3]$

83. The solubility product of AgBr is 4.9×10^{-9}. The solubility of AgBr will be

(a) 7×10^{-4} mole/litre

(b) 7×10^{-5} g/litre

(c) 1.316×10^{-2} g/litre

(d) 1×10^{-3} mole/litre

84. Bromine water reacts with aniline to give

(a) o-Bromoaniline

(b) m-Bromoaniline

(c) p-Bromoaniline

(d) 2, 4, 6-Tribromoaniline

85. Which of the following statements is correct?

(a) Gluconic acid is a dicarboxylic acid

(b) Gluconic acid is a partial oxidation product of glucose

(c) Gluconic acid can form cyclic (acetal/hemiacetal) structure

(d) Gluconic acid is obtained by oxidation of glucose with HNO_3

86. Gaseous system is placed with pressure P_1, volume V_1 and temperature T_1, it has undergone thermodynamic changes where temperature is remaining constant, it is

(a) Adiabatic process

(b) Isothermal process

(c) Isobaric process

(d) Isochoric process

87. **Assertion:** Alkanes containing more than three carbon atoms exhibit chain isomerism.

Reason: In an alkane, all carbon atoms are sp^3 hybridized.

(a) Both assertion and reason are true, and the reason is the correct explanation for the assertion.

(b) Both assertion and reason are true, but the reason is not the correct explanation for the assertion.

(c) Assertion is true but reason is false.

(d) Both Assertion and reason are false.

88. Which of the following gives aldol condensation reaction?

(a) C_6H_5OH

(b) $C_6H_5\overset{\overset{O}{\|}}{C}-C_6H_5$

(c) $CH_3CH_2-\overset{\overset{O}{\|}}{C}-CH_3$

(d) $(CH_3)_3C-\overset{\overset{O}{\|}}{C}-C(CH_3)_3$

89. Match List I with List II

List I Name of reaction		List II Reagent used	
(A)	Hell-Volhard-Zelinsky reaction	(i)	$NaOH + I_2$
(B)	Iodoform reaction	(ii)	(i) CrO_2Cl_2 CS_2 (ii) H_2O
(C)	Etard reaction	(iii)	(i) Br_2/red phosphorus (ii) H_2O
(D)	Gatterman-Koch reaction	(iv)	CO, HCl, anhyd. $AlCl_3$

Choose the correct answer from the options given below:

(a) (A) → (III), (B) → (II), (C) → (I), (D) → (IV)

(b) (A) → (III), (B) → (I), (C) → (IV), (D) → (II)

(c) (A) → (I), (B) → (II), (C) → (III), (D) → (IV)

(d) (A) → (III), (B) → (I), (C) → (II), (D) → (IV)

90. Glucose on oxidation gives the acid containing the C-chiral atoms equal to

(a) 2 (b) 3 (c) 4 (d) 5

Part - C Zoology

Section - I: Single Correct

This section contains a total of 45 questions.
All questions in this section are mandatory.
For every correct response you shall be awarded 4 marks.
For every incorrect response -1 marks shall be deducted.

91. Which statement is true regarding reabsorption?

(a) Nearly 99% of the filtrate has to be reabsorbed by the renal tubules

(b) Nearly all of the essential nutrients are reabsorbed by PCT

(c) DCT is also capable of reabsorption of HCO_3^-

(d) All the above

92. To check the progression of restriction enzyme digestion, ... is used:

(a) PCR

(b) Gel electrophoresis

(c) DNA fingerprinting

(d) Selectable marker gene

93. In breathing movements, air volume can be estimated by:

(a) Stethoscope

(b) Hygrometer

(c) Sphigmomanometer

(d) Spirometer

94. All of the following statements about ZIFT are correct, but one is wrong. Which one is wrong?

(a) It is zygote intra fallopian transfer

(b) Zygote is transferred into the fallopian tube after IVF

(c) Early embryos upto 8 blastomeres can also be transferred into the fallopian tubes

(d) Embryos with more than 8 blastomeres are also transferred into the fallopian tubes

95. Which of the following structure in male reproductive system acts as a link between rete testis and epididymis?

(a) Vas deferens

(b) Vasa efferentia

(c) Ejaculatory duct

(d) Inguinal canal

96. Which of the following situations would result in the greatest degree of O_2 saturation for haemoglobin, assuming pO_2 remains constant?

(a) Increased CO_2 levels, decreased temperature

(b) Increased CO_2 levels, increased temperature

(c) Decreased CO_2 levels, decreased temperature

(d) Decreased CO_2 levels, increased temperature

97. Select the correct statement among the following:

(a) Some scientists believe that life came from outside

(b) Early Greek thinkers thought units of life called spores were transferred to different planets including earth

(c) 'Panspermia' is still a favourite idea for some astronomers

(d) All of the above

98. Which group of animals respire through lungs?

(a) Earthworm and insects

(b) Sponges, coelenterates and flatworms

(c) Fishes and aquatic arthropods

(d) Reptiles, birds and mammals

99. Afferent nerve fibre carries impulses from:

(a) Effector to central neural system

(b) Receptor to central neural system

(c) Central neural system to muscle

(d) Central neural system to receptors

100. The chronological order of human evolution from early to the recent is:

(a) *Australopithecus* > *Ramapithecus* > *Homo habilis* > *Homo erectus*

(b) *Ramapithecus* > *Australopithecus* > *Homo habilis* > *Homo erectus*

(c) *Ramapithecus* > *Homo habilis* > *Australopithecus* > *Homo erectus*

(d) *Australopithecus* > *Homo habilis* > *Ramapithecus* > *Homo erectus*

101. Areolar connective tissue provides:

(a) Connection between bone and bone

(b) Connection between fat body and muscles

(c) Support framework for epithelium

(d) Connection between bone and muscles

102. The colonization of tropical pacific islands by humans have resulted in the extinction of more than ..... species of native birds.

(a) 2000 (b) 3000

(c) 4500 (d) 1000

103. Which of the following animals are true coelomates with bilateral symmetry?

(a) Adult echinoderms

(b) Aschelminthes

(c) Platyhelminthes

(d) Annelids

104. The sperm and the egg make different contributions to zygote.
Which of the following statements about their contributions are true?

(i) Sperm contributes most of the mitochondira.
(ii) Egg contributes most of the cytoplasm.
(iii) Both sperm and egg contribute haploid nucleus.
(iv) Both sperm and egg contribute centrioles.

(a) (i) and (ii)

(b) (ii) and (iii)

(c) (iii) and (iv)

(d) (i), (ii), (iii) and (iv)

105. The total number of biodiversity hotspots in the world is (according to 2004):

(a) 25 (b) 34 (c) 37 (d) 40

106. Which of the following statements is wrong about the human excretory system?

(a) Excretory system consists of one pair of bean shaped kidneys, one pair of ureter, a urinary bladder and a pair of urethra

(b) Kidneys are situated between the 10^{th} thoracic and 1^{st} lumbar vertebrae close to the dorsal wall in abdominal cavity

(c) Outer layer of kidney is a soft, smooth tissue meant for shock absorption

(d) All of the above

107. For imposing a check on increasing female foeticides:

(a) MTP has been legalized

(b) Tubectomy is being practiced

(c) Amniocentesis has been banned

(d) All of these

108. Match List - I with List - II

List - I		List - II	
(A)	Vaults	(i)	Entry of sperm through Cervix is blocked
(B)	IUDs	(ii)	Removal of Vas deferens
(C)	Vasectomy	(iii)	Phagocytosis of sperms within the Uterus
(D)	Tubectomy	(iv)	Removal of fallopian tube

Choose the correct answer from the options given below.

(a) (A) - (ii), (B) - (iv), (C) - (iii), (D) - (i)

(b) (A) - (iii), (B) - (i), (C) - (iv), (D) - (ii)

(c) (A) - (iv), (B) - (ii), (C) - (i), (D) - (iii)

(d) (A) - (i), (B) - (iii), (C) - (ii), (D) - (iv)

109. The partial pressure of O_2 and CO_2 in oxygenated blood is, respectively:

(a) pO_2 = 104 mmHg; pCO_2 = 40 mmHg

(b) pO_2 = 159 mmHg; pCO_2 = 0.3 mmHg

(c) pO_2 = 40 mmHg; pCO_2 = 45 mmHg

(d) pO_2 = 95 mmHg; pCO_2 = 40 mmHg

110. Red muscle fibres

(a) Are also called aerobic muscles

(b) Possess very less myoglobin

(c) Possess less number of mitochondria

(d) Lack myoglobin

111. Choose the correct statements about carcinogens:

(I) Carcinogens transform normal cells into cancerous cells.
(II) These carcinogens could be physical, chemical or biological.
(III) Ionizing radiations like UV-rays damage DNA leading to neoplastic transformation.
(IV) Several proto-oncogenes have been identified in neoplastic cells that get activated under certain conditions.

(a) (I) and (III)

(b) (I) and (II)

(c) (III) and (IV)

(d) All of these

112. Match the following columns:

Column I		Column II	
A.	Hypothalamus	(i)	Inner part of cerebral cortex
B.	White matter	(ii)	Neurosecretory cells
C.	Amygdala	(iii)	Between thalamus and pons
D.	Midbrain	(iv)	Part of limbic system

Select the correct option:

(a) A - (iii), B - (ii), C - (i), D - (iv)

(b) A - (ii), B - (i), C - (iv), D - (iii)

(c) A - (i), B - (iii), C - (ii), D - (iv)

(d) A - (iv), B - (ii), C - (iii), D - (i)

113. Select correct answer regarding blood vascular system:

(a) **Open circulatory system -** Frog, Cockroach
Closed circulatory system - Earthworm, Human

(b) **Open circulatory system -** Cockroach, Housefly
Closed circulatory system - Frog, Earthworm

(c) **Open circulatory system -** Mollusca, Annelida
Closed circulatory system - Arthropoda, Chordata

(d) **Open circulatory system -** Chordata, Arthropoda
Closed circulatory system - Mollusca, Annelida

114. Arrange the steps of mechanism of blood coagulation in sequence.

I. Conversion of prothrombin into thrombin
II. Coagulum formation
III. Thrombokinase formation
IV. Site of injury release tissue thromboplastins.
V. Conversion of fibrinogen into fibrin.

(a) I $\rightarrow$ IV $\rightarrow$ III $\rightarrow$ II $\rightarrow$ V

(b) III $\rightarrow$ IV $\rightarrow$ V $\rightarrow$ I $\rightarrow$ II

(c) IV $\rightarrow$ III $\rightarrow$ I $\rightarrow$ V $\rightarrow$ II

(d) IV $\rightarrow$ III $\rightarrow$ V $\rightarrow$ I $\rightarrow$ II

115. Read the following statements and select the correct option:
Statement I: Tertiary structure of a protein gives a 2-diamensional view of a protein.
Statement II: Tertiary structure is necessary for the many biological activities of proteins.

(a) Both statements I and II are correct

(b) Statement I is correct but statement II is incorrect

(c) Statement I is incorrect but statement II is correct

(d) Both statements I and II are incorrect

116. Which one of the following acts as a physical barrier to the entry of micro organisms in human body?

(a) Skin

(b) Acid in stomach

(c) Tears

(d) Monocytes

117. Arrange the stages of life cycle of *Plasmodium* starting from human host and ending in mosquito host.

I. RBC releases the toxic haemozoin.
II. Parasite reproduces asexually in liver cells.
III. Parasites attack RBC.
IV. Sporozoites enter human body through the mosquito bite.
V. Mature sporozoites escape from intestine and migrate to the mosquito's salivary gland.
VI. Fertilization of gametocytes occur in mosquito's intestine.
VII. Mosquito takes up gametocytes while sucking blood of an infected person.

(a) IV → II → I → III → VII → V → VI
(b) I → II → III → V → VI → IV → VII
(c) IV → II → III → I → VII → VI → V
(d) III → IV → II → I → V → VII → VI

118. Pace maker of human heart is:

(a) AV node
(b) SA node
(c) Av bundle
(d) Bundle of his

119. First cervical vertebra is called ..... vertebra and it articulates with the .....

(a) Axis; superior condyles
(b) Atlas; inferior condyles
(c) Atlas; occipital condyles
(d) Axis; occipital condyles

120. An oocyte is released from the ovary under the influence of LH:

(a) After completing meiosis and before polar bodies are released
(b) After completing meiosis I
(c) After completing meiosis II
(d) After completing mitosis to produce haploid ovum

121. The structural and functional unit between the developing foetus and maternal body is called:

(a) Yolk sac
(b) Cervix
(c) Vagina
(d) Placenta

122. Which of the following option is incorrect?

(a) Hinge joint - between Humerus and Pectoral girdle
(b) Pivot joint - between atlas and axis
(c) Gliding joint - between the carpals
(d) Saddle joint - between carpal and metacarpal of thumb

123. Function of '*ori*' site in a vector is to:

(a) Initiate insertional inactivation
(b) Initiate replication
(c) Codes for the proteins involved in replication of the plasmid
(d) Initiate antibiotic resistance

124. The resting axonal membrane is:
1. Permeable to K^+ ions.
2. Permeable to Na^+ ions.
3. Impermeable to negatively charged proteins of axoplasm.
Select the correct option:

(a) 1 and 2 are correct
(b) 1, 2 and 3 are correct
(c) 2 and 3 are correct
(d) 1 and 3 are correct

125. In female cockroach, the ..... is boat shaped and together with the ..... forms a brood or genital pouch.

(a) 7^{th} sternum; 8^{th} and 9^{th} sterna
(b) 7^{th} tergum; 8^{th} and 9^{th} terga
(c) 7^{th} sternum; 8^{th} and 9^{th} terga
(d) 7^{th} tergum; 8^{th} and 9^{th} sterna

126. ..... is used for silencing of an unwanted gene:

(a) RNA
(b) DNA polymerase
(c) Restriction enzymes
(d) All of the above

127. Read the following statements (assertion-A and reason-R) and select the correct option:

A: Receptors for steroid hormones are present at the cell surface.
R: Receptors for protein hormones are present in the nucleus.

(a) Both A and R are true and R is correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) Both A and R are false

128. Read the following statements (assertion-A and reason-R) and select the correct option:

A: The nervous system produces a delayed response that lasts for a longer period.
R: Neurotransmitters are released from axonal ends.

(a) Both A and R are true and R is correct explanation of A

(b) Both A and R are true but R is not the correct explanation of A

(c) A is true but R is false

(d) A is false but R is true

129. The triangular structure called ..... associated with heart of frog present on the dorsal side receives the blood through major veins called vena cava.

(a) Sinus venosus

(b) Right atrium

(c) Ventricle

(d) Conus arteriosus

130. Match the following columns and select the correct option.

Column - I		Column - II	
(A)	6 - 15 pairs of gill slits	(i)	*Trygon*
(B)	Heterocercal caudal fin	(ii)	Cyclostomes
(C)	Air Bladder	(iii)	Chondrichthyes
(D)	Electric organ	(iv)	Osteichthyes

(a) (A)-(i), (B)-(iv), (C)-(iii), (D)-(ii)

(b) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)

(c) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)

(d) (A)-(i), (B)-(iii), (C)-(iv), (D)-(ii)

131. Select the option with correct pairing:

(a) Golden rice - iron fortified rice

(b) Bt cotton - bio-fertilizer rice

(c) Humulin - Genetically engineered crop

(d) Transgenic animals -$\alpha-1$ antitrypsin

132. Which of the following sequence is correct?

(a) An increase in body fluid volume → switch off the Osmoreceptors → suppresses the ADH release

(b) ADH → Constricting effect on blood vessel → Increase in B. P. And glomerular blood flow → Increase in GFR

(c) Angiotensinogen → Angiotensin I → Angiotensin II → Adrenal cortex → Aldosterone

(d) All of the above

133. Nucleic acid is genetic material of:

(a) Some organisms

(b) No organism

(c) All organisms without exception

(d) Most organisms with some exception

134. The pentose sugar present in RNA is:

(a) Galactose

(b) Sucrose

(c) Ribose

(d) Fructose

135. Some examples are given below:

I. Forelimbs of mammals
II. Thorn of *Bougainvillea* and tendril of *cucurbita*
III. Eyes of the octopus and mammals
IV. Flippers of penguins and dolphins
V. Sweet potato and potato
VI. Wings of birds and butterfly

How many examples given above are of analogous structures?

(a) One (b) Two
(c) Three (d) Four

Part - D Physics

Section - I: Single Correct

This section contains a total of 45 questions.
All questions in this section are mandatory.
For every correct response you shall be awarded 4 marks.
For every incorrect response -1 marks shall be deducted.

136. In a Young's double slit experiment, the fringe width depends upon

(a) the distance between the two slits

(b) the distance between the slits and the screen

(c) the wavelength of light

(d) all the above

137. If two vectors $\vec{P} = \hat{i} - 2m\hat{j} + m\hat{k}$ and $\vec{Q} = 4\hat{i} + 2\hat{j} + m\hat{k}$ are perpendicular to each other. The value of m will be:

(a) -1 (b) 2 (c) 3 (d) 1

138. A ball is thrown vertically upwards from the top of a tower at 4.9 ms^{-1}. It strikes the pond near the base of the tower after 3 seconds. The height of the tower is:

(a) 73.5 m

(b) 44.1 m

(c) 29.4 m

(d) None of these

139. First law of thermodynamics concerns conservation of :

(a) heat

(b) work

(c) momentum

(d) energy

140. What is the flux through a cube of side 'a' if a point charge q is at one of its corners?

(a) $\frac{q}{\in_0}$

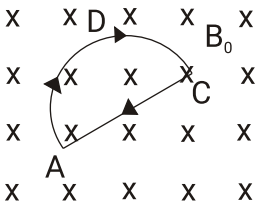
(b) $\frac{q}{2 \in_0} 6a^2$

(c) $\frac{2q}{\in_0}$

(d) $\frac{q}{8 \in_0}$

141. The figure shows a conducting loop ADCA carrying current i and placed in a region of uniform magnetic field B_0. The part ADC forms a semicircle of radius R.

The magnitude of the force on the semicircle part of the loop is equal to



(a) πRiB_0

(b) Zero

(c) $2\pi RiB_0$

(d) $2iRB_0$

142. A logic circuit provides the output Y as per the following truth table :

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

The expression for the output Y is

(a) $A.B + \overline{A}$

(b) $A.\overline{B} + A$

(c) $\overline{B}$

(d) B

143. The ranges and heights for two projectiles projected with the same initial velocity at angles 42° and 48° with the horizontal are R_1, R_2 and H_1, H_2 respectively.

Choose the correct option :

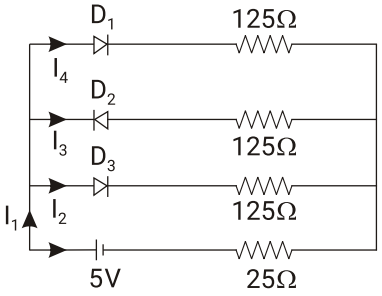
(a) $R_1 > R_2$ and $H_1 = H_2$

(b) $R_1 = R_2$ and $H_1 < H_2$

(c) $R_1 < R_2$ and $H_1 < H_2$

(d) $R_1 = R_2$ and $H_1 = H_2$

144. If each diode has a forward bias resistance of $25\ \Omega$ in the below circuit,



Which of the following options is correct?

(a) $\frac{I_3}{I_4} = 1$

(b) $\frac{I_2}{I_3} = 1$

(c) $\frac{I_1}{I_2} = 1$

(d) $\frac{I_1}{I_2} = 2$

145. A screw gauge has least count of 0.01 mm and there are 50 divisions in its circular scale. The pitch of the screw gauge is:

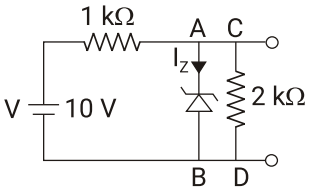
(a) 1.0 mm

(b) 0.01 mm

(c) 0.25 mm

(d) 0.5 mm

146. In the given circuit, the breakdown voltage of the Zener diode is 3.0 V. What is the value of I_z?



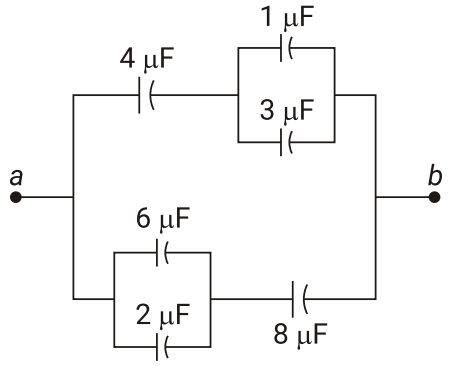
(a) 7 mA

(b) 5.5 mA

(c) 3.3 mA

(d) 10 mA

147. Find out the equivalent capacitance between a and b for the combination of capacitors shown in the figure?



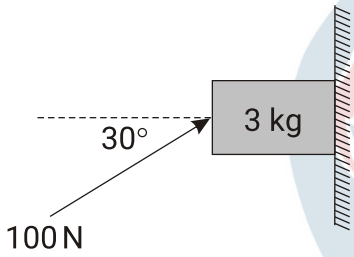
(a) 6.0 μF

(b) 4.0 μF

(c) 2.0 μF

(d) 3.0 μF

148. A force of 100 N is applied on a block of mass 3 kg as shown in the figure. The coefficient of friction between the surface and the block is $\mu = \frac{1}{\sqrt{3}}$. The frictional force acting on the block is:



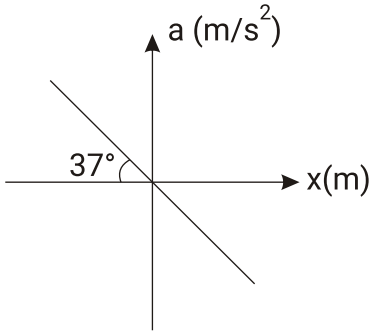
(a) 15 N downwards

(b) 25 N upwards

(c) 20 N downwards

(d) 30 N upwards

149. The acceleration (a) versus the displacement (x) from the mean position graph of an SHM is shown below.



The amplitude of oscillations is 2 m. Find the speed of the particle when it is at $x = 1$ m.

(a) 3 m/s

(b) $\frac{3}{2}$ m/s

(c) $\frac{1}{2}$ m/s

(d) $\frac{1}{4}$ m/s

150. What is the self-inductance of a solenoid 30.0 cm long having 100 turns of wire and a cross-sectional area of 1.00×10^{-4} m^2 ?

(a) 4.19 nH

(b) 4.19 pH

(c) 4.19 μH

(d) 4.19 mH

151. A force $F = 20 + 10y$ acts on a particle along Y-direction where F is in newton and y in meter. Work done by this force to move the particle from $y = 0$ to $y = 1$ m is

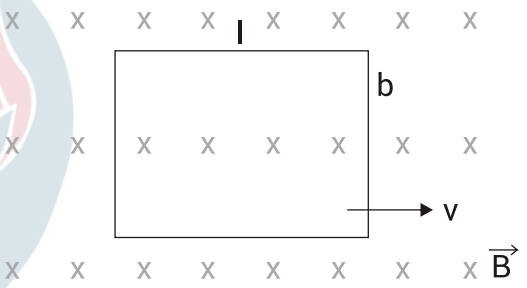
(a) 30 J

(b) 5 J

(c) 25 J

(d) 20 J

152. A conducting rectangular loop moves with constant velocity v through a region of constant magnetic field B as shown in the figure. Resistance of loop is R. The magnitude of induced current in the loop at the above instant is:



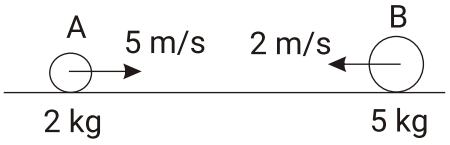
(a) $\frac{Bvl}{R}$

(b) $\frac{Bvb}{R}$

(c) $\frac{2Bvb}{R}$

(d) Zero

153. The velocity of the ball A after collision with the ball B as shown in the figure is (assume a perfectly inelastic and head-on collision). The surface is smooth.



(a) $\frac{3}{7}$ m/s

(b) $\frac{5}{7}$ m/s

(c) $\frac{1}{7}$ m/s

(d) Zero

154. A 10 V battery with internal resistance 0.5 Ω is connected across a variable resistance R. The value of R for which the power delivered to the resistor is maximum, is equal to

(a) 0.5 Ω
(b) 1 Ω
(c) 1.5 Ω
(d) 2 Ω

155. The ratio of the speed of sound in hydrogen gas to the speed of sound in oxygen gas at the same temperature is:

(a) $4:1$
(b) $1:2$
(c) $1:4$
(d) $1:1$

156. Which of the following statements is not true about stopping potential (V_0)?

(a) It depends on the nature of the emitter material.
(b) It depends upon the frequency of the incident light.
(c) It increases with an increase in the intensity of the incident light.
(d) It is $1/e$ times the maximum kinetic energy of photoelectrons emitted.

157. If the wavelength of the first member of the Lyman series of hydrogen is λ, the wavelength of the second member will be

(a) $\frac{5}{27}\lambda$
(b) $\frac{27}{5}\lambda$
(c) $\frac{32}{27}\lambda$
(d) $\frac{27}{32}\lambda$

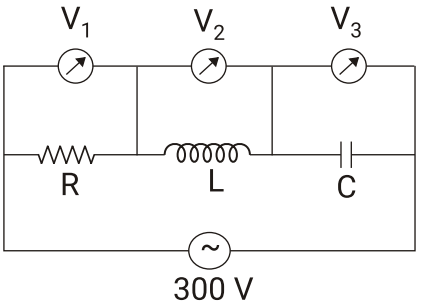
158. If the radius of the earth suddenly contracts by half of its initial value keeping mass constant, then what will be the time period of rotation of the earth about its axis?

(a) 6 hr (b) 12 hr
(c) 3 hr (d) 4 hr

159. A potential difference of 5 V is applied across a conductor of length 10 cm. If drift velocity of electrons is 2.5×10^{-4} m/s, then electron mobility will be

(a) $5 \times 10^{-4}\ m^2\ V^{-1}\ s^{-1}$
(b) $5 \times 10^{-6}\ m^2\ V^{-1}\ s^{-1}$
(c) $5 \times 10^{-2}\ m^2\ V^{-1}\ s^{-1}$
(d) Zero

160. The figure shows an LCR network connected to a 300 V a.c. supply. The circuit elements are such that $R = X_L = X_C = 10\ \Omega$. V_1, V_2 and V_3 are three a.c. voltmeters connected as shown in the figure. Which of the following represents the correct set of readings of the voltmeters?



(a) V_1 = 100 V, V_2 = 100 V, V_3 = 100 V
(b) V_1 = 150 V, V_2 = 0 V, V_3 = 150 V
(c) V_1 = 300 V, V_2 = 100 V, V_3 = 100 V
(d) V_1 = 300 V, V_2 = 300 V, V_3 = 300 V

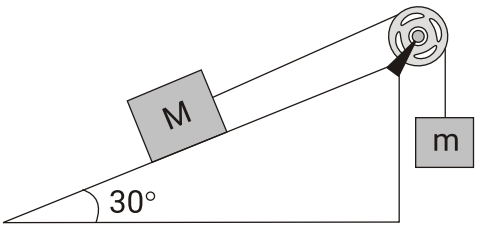
161. The correct expression for Lorentz force is

(a) $q[\vec{E} + (\vec{B} \times \vec{v})]$
(b) $q[\vec{E} + (\vec{v} \times \vec{B})]$
(c) $q(\vec{v} \times \vec{B})$
(d) $q\vec{E}$

162. A source x of unknown frequency produces 4 beats with a source of $250\ Hz$ and 6 beats with a source of $260\ Hz$. The frequency of the source x is

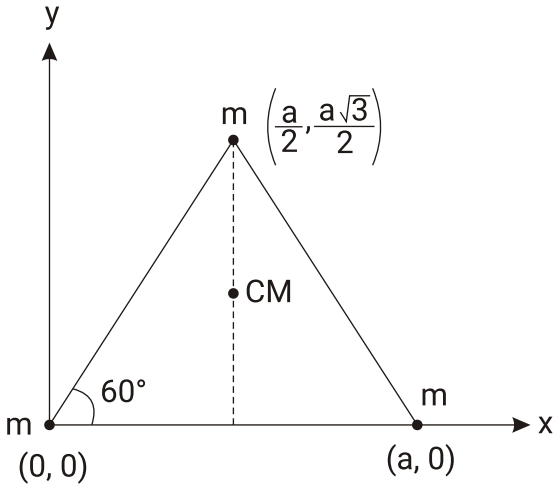
(a) $258\ Hz$
(b) $254\ Hz$
(c) $262\ Hz$
(d) $282\ Hz$

163. In the fig. mass m = 10 kg then in order to keep it at rest, the value of mass M will be:



(a) 10 kg (b) 5 kg
(c) 20 kg (d) 40 kg

164. The coordinate of the centre of mass of a system as show in figure is :



(a) $\frac{a\sqrt{3}}{2}, \frac{a}{2}$

(b) $\frac{a}{2}, \frac{a}{6}\sqrt{3}$

(c) $\frac{a}{4}, \frac{a}{4}\sqrt{3}$

(d) $\frac{a}{2}, \frac{a}{\sqrt{3}}$

165. In calculation of time period using simple pendulum experiment, if percentage error in length of string is 4 % and percentage error in calculation of gravitational acceleration is 2 %, then percentage error in the time period $\left(T = 2\pi\sqrt{\frac{L}{g}}\right)$ is:

(a) 1 %

(b) 2 %

(c) 3 %

(d) 6 %

166. Two bodies of masses m_1 and m_2 are dropped from heights h_1 and h_2 respectively. They reach the ground after time t_1 and t_2 respectively. Which of the following relations is correct? (Ignore air resistance)

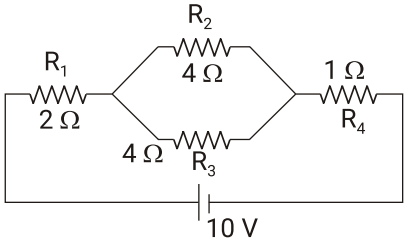
(a) $\frac{t_1}{t_2} = \left(\frac{h_1}{h_2}\right)^{1/2}$

(b) $\frac{t_1}{t_2} = \left(\frac{h_1}{h_2}\right)$

(c) $\frac{t_1}{t_2} = \left(\frac{m_1}{m_2}\right)^{1/2}$

(d) $\frac{t_1}{t_2} = \frac{m_1}{m_2}$

167. In the given circuit, the current in the resistance R_3 is:



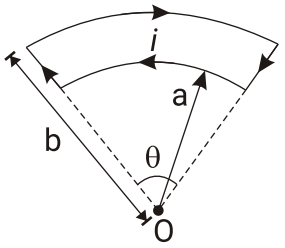
(a) 1.5 A

(b) 1 A

(c) 2.5 A

(d) 2 A

168. The figure below shows a current loop having two circular arcs joined by two radial lines. The magnetic field at O is



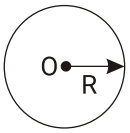
(a) $\frac{\mu_0 i\theta}{2\pi ab}(b-a)$

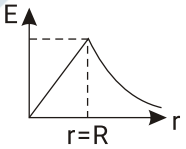
(b) $\frac{\mu_0 i\theta}{4\pi ab}(b-a)$

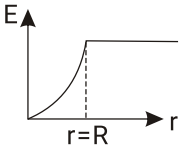
(c) Zero

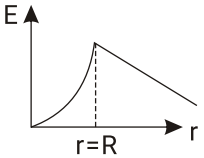
(d) $\frac{\mu_0 i\theta}{3\pi ab}(b+a)$

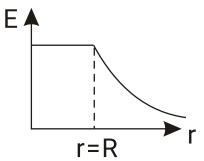
169. The graphical variation of the electric field due to a uniformly charged insulating solid sphere of radius R, with distance r from the centre O is represented by:



(a) 

(b) 

(c) 

(d) 

170. A uniform solid sphere of mass M and radius R cannot have a moment of Inertia equal to,

(a) $\frac{2}{3}MR^2$

(b) $\frac{1}{2}MR^2$

(c) $\frac{2}{5}MR^2$

(d) $\frac{2}{7}MR^2$

171. If Q, E and W denote the heat added, change in internal energy and the work done respectively in a closed cycle process, then: -

(a) $E = 0$

(b) $Q = 0$

(c) $W = 0$

(d) $Q=W= 0$

172. A man is walking on a road with a velocity of 5km/h. When suddenly it starts raining, velocity of rain is 10km/h in vertically downward direction, relative velocity of the rain with respect to man is:

(a) $\sqrt{13}\,\mathrm{km/hr}$

(b) $\sqrt{7}\,\mathrm{km/hr}$

(c) $\sqrt{109}\,\mathrm{km/hr}$

(d) $5\sqrt{5}\,\mathrm{km/hr}$

173. The specific heat at constant volume per mole (gram mole) of an ideal diatomic gas is

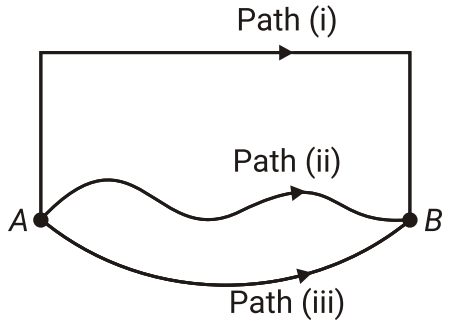
(a) $\frac{5}{2}\mathrm{R}$

(b) $\frac{3}{2}\mathrm{R}$

(c) R

(d) $\frac{7}{2}\mathrm{R}$

174. A gravitational field is present in a region. A point mass is shifted from *A* to *B*, along different paths shown in the figure. If $W_1,\ W_2$ and W_3 represent work done by gravitational force for respective paths. Then



(a) $W_1 = W_2 = W_3$

(b) $W_1 > W_2 > W_3$

(c) $W_1 > W_3 > W_2$

(d) $W_3 > W_1 > W_2$

175. If momentum [P], area [A] and time [T] are taken as fundamental quantities, then the dimensional formula for coefficient of viscosity is:

(a) $[PA^{-1}T^{0}]$

(b) $[PAT^{-1}]$

(c) $[PA^{-1}T]$

(d) $[P\,A^{-1}\,T^{-1}]$

176. Read the following statements:
(A) Volume of the nucleus is directly proportional to the mass number.
(B) Volume of the nucleus is independent of mass number.
(C) Density of the nucleus is directly proportional to the mass number.
(D) Density of the nucleus is directly proportional to the cube root of the mass number.
(E) Density of the nucleus is independent of the mass number.
Choose the correct option from the following options.

(a) (A) and (D) only.

(b) (A) and (E) only.

(c) (B) and (E) only.

(d) (A) and (C) only

177. The time period of oscillation of a simple pendulum of length L suspended from the roof of a vehicle, which moves without friction down an inclined plane of inclination α, is given by:

(a) $2\pi\sqrt{\frac{\mathrm{L}}{\mathrm{g}\cos\alpha}}$

(b) $2\pi\sqrt{\frac{\mathrm{L}}{\mathrm{g}\sin\alpha}}$

(c) $2\pi\sqrt{\frac{\mathrm{L}}{\mathrm{g}}}$

(d) $2\pi\sqrt{\frac{\mathrm{L}}{(\mathrm{g}\tan\alpha)}}$

178. Two capacitors, each having capacitance $40\mu\mathrm{F}$ are connected in series. The space between one of the capacitors is filled with dielectric material of dielectric constant K such that the equivalence capacitance of the system became $24\,\mu\mathrm{F}$. The value of K will be:

(a) 1.5 (b) 2.5

(c) 1.2 (d) 3

179. The de Broglie wavelength of an electron having kinetic energy E is λ. If the kinetic energy of the electron becomes $\frac{\mathrm{E}}{4}$, the new de Broglie wavelength is:

(a) $\frac{\lambda}{\sqrt{2}}$

(b) $\frac{\lambda}{2}$

(c) 2λ

(d) $\sqrt{2}\lambda$

180. Two point charges of $+2\mu\mathrm{C}$ and $+6\mu\mathrm{C}$ repel each other with a force of 12 N. If each is given an additional charge of $-4\mu\mathrm{C}$, then force will become:?

(a) 4 N (attractive)

(b) 60 N (attractive)

(c) 4 N (repulsive)

(d) 12 N (attractive