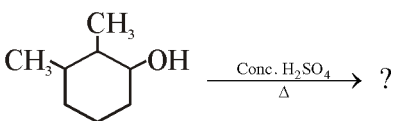
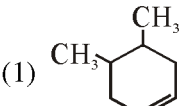
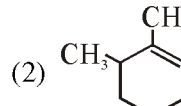
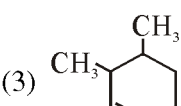
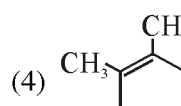
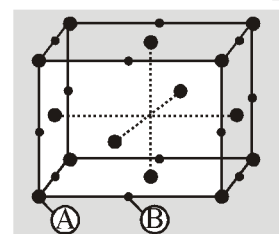


**INSTRUCTIONS**

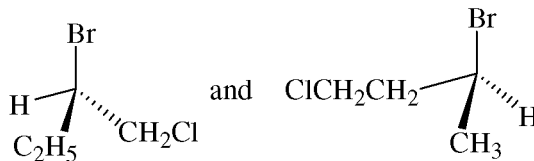
1. A seat marked with Reg. No. will be allotted to each student. The student should ensure that he/she occupies the correct seat only. If any student is found to have occupied the seat of another student, both the students shall be removed from the examination and shall have to accept any other penalty imposed upon them.
2. Duration of Test is **3 Hours** and Questions Paper Contains **180 Questions**. The Max. Marks are **720**.
3. Student can not use log tables and calculators or any other material in the examination hall.
4. Student must abide by the instructions issued during the examination, by the invigilators or the centre incharge.
5. Before attempting the question paper ensure that it contains all the pages and that no question is missing.
6. Each correct answer carries 4 marks, while **1 mark will be deducted for every wrong answer**. Guessing of answer is harmful.
7. A candidate has to write his / her answers in the OMR sheet by darkening the appropriate bubble with the help of **Blue / Black Ball Point Pen only** as the correct answer(s) of the question attempted.
8. **Use of Pencil is strictly prohibited.**

- |  |  |         |         |         |                     |                      |                      |                      |                      |                                     |                                  |                                   |                                  |
|--|--|---------|---------|---------|---------------------|----------------------|----------------------|----------------------|----------------------|-------------------------------------|----------------------------------|-----------------------------------|----------------------------------|
| <ol style="list-style-type: none"> <li>1. The least number of molecules are contained in:-                     <ol style="list-style-type: none"> <li>(1) 2 g hydrogen                (2) 8 g oxygen</li> <li>(3) 4 g nitrogen                (4) 16 g CO<sub>2</sub></li> </ol> </li> <li>2. Which solution will have pH closer to 1.0 :-                     <ol style="list-style-type: none"> <li>(1) 100 mL of (M/10)HCl + 100 mL of (M/10)NaOH</li> <li>(2) 55 mL of (M/10)HCl + 45 mL of (M/10)NaOH</li> <li>(3) 10 mL of (M/10)HCl + 90 mL of (M/10)NaOH</li> <li>(4) 75 mL of (M/5)HCl + 25 mL of (M/5)NaOH</li> </ol> </li> <li>3. Complex does not have tetrahedral geometry:-                     <ol style="list-style-type: none"> <li>(1) Ni(CO)<sub>4</sub>                        (2) [MnCl<sub>4</sub>]<sup>-2</sup></li> <li>(3) [Ni(CN)<sub>4</sub>]<sup>-2</sup>                    (4) [NiCl<sub>4</sub>]<sup>-2</sup></li> </ol> </li> <li>4. The monomer of Teflon is :-                     <ol style="list-style-type: none"> <li>(1) CH<sub>2</sub>=CH-Cl</li> <li>(2) CH<sub>2</sub>=CH-C<sub>6</sub>H<sub>5</sub></li> <li>(3) CF<sub>2</sub>=CF<sub>2</sub></li> <li>(4) CH<sub>2</sub>=CH-CN</li> </ol> </li> </ol> | <ol style="list-style-type: none"> <li>5. Among the following the dissociation constant is highest for -                     <ol style="list-style-type: none"> <li>(1) C<sub>6</sub>H<sub>5</sub>OH</li> <li>(2) C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>OH</li> <li>(3) CH<sub>3</sub>C ≡ CH</li> <li>(4) CH<sub>3</sub><sup>⊕</sup>NH<sub>3</sub>Cl<sup>⊖</sup></li> </ol> </li> <li>6. The compressibility factor for H<sub>2</sub> and He is usually :-                     <table border="0" style="width: 100%;"> <tr> <td>(1) &gt; 1</td> <td>(2) = 1</td> </tr> <tr> <td>(3) &lt; 1</td> <td>(4) either of these</td> </tr> </table> </li> <li>7. K<sub>b</sub> for the hydrolysis reaction,                     <math display="block">B^+ + H_2O \rightleftharpoons BOH + H^+</math>                     is 1.0 × 10<sup>-6</sup>, the hydrolysis constant of the salt is:-                     <table border="0" style="width: 100%;"> <tr> <td>(1) 10<sup>-6</sup></td> <td>(2) 10<sup>-7</sup></td> </tr> <tr> <td>(3) 10<sup>-8</sup></td> <td>(4) 10<sup>-9</sup></td> </tr> </table> </li> <li>8. Boron cannot form which one of the following anions ?                     <table border="0" style="width: 100%;"> <tr> <td>(1) B(OH)<sub>4</sub><sup>-</sup></td> <td>(2) BO<sub>2</sub><sup>-</sup></td> </tr> <tr> <td>(3) BF<sub>6</sub><sup>3-</sup></td> <td>(4) BH<sub>4</sub><sup>-</sup></td> </tr> </table> </li> </ol> | (1) > 1 | (2) = 1 | (3) < 1 | (4) either of these | (1) 10 <sup>-6</sup> | (2) 10 <sup>-7</sup> | (3) 10 <sup>-8</sup> | (4) 10 <sup>-9</sup> | (1) B(OH) <sub>4</sub> <sup>-</sup> | (2) BO <sub>2</sub> <sup>-</sup> | (3) BF <sub>6</sub> <sup>3-</sup> | (4) BH <sub>4</sub> <sup>-</sup> |
| (1) > 1  | (2) = 1  |         |         |         |                     |                      |                      |                      |                      |                                     |                                  |                                   |                                  |
| (3) < 1  | (4) either of these  |         |         |         |                     |                      |                      |                      |                      |                                     |                                  |                                   |                                  |
| (1) 10 <sup>-6</sup>   | (2) 10 <sup>-7</sup>   |         |         |         |                     |                      |                      |                      |                      |                                     |                                  |                                   |                                  |
| (3) 10 <sup>-8</sup>   | (4) 10 <sup>-9</sup>   |         |         |         |                     |                      |                      |                      |                      |                                     |                                  |                                   |                                  |
| (1) B(OH) <sub>4</sub> <sup>-</sup>  | (2) BO <sub>2</sub> <sup>-</sup>   |         |         |         |                     |                      |                      |                      |                      |                                     |                                  |                                   |                                  |
| (3) BF <sub>6</sub> <sup>3-</sup>  | (4) BH <sub>4</sub> <sup>-</sup>   |         |         |         |                     |                      |                      |                      |                      |                                     |                                  |                                   |                                  |

(Take it Easy and Make it Easy)

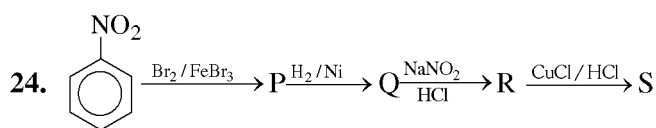
9. 
- (1)  (2) 
- (3)  (4) 
10. Propene and propyne can be distinguished by-
- (1) Cold dil.  $\text{KMnO}_4$  (2)  $\text{Br}_2$  in  $\text{CCl}_4$   
 (3) Ammonical  $\text{Cu}_2\text{Cl}_2$  (4) Conc.  $\text{H}_2\text{SO}_4$
11. For a solid with the following structure, the co-ordination number of the point B is :-
- 
- (1) 3 (2) 4 (3) 5 (4) 6
12. Hydrogen bonding is maximum in :-
- (1) ethanol (2) diethyl ether  
 (3) ethyl chloride (4) Triethyl amine
13. Which is not correct reaction :
- (a)  $\text{HgCl}_2 + \text{NH}_3 \longrightarrow \text{Hg} + \text{Hg} \begin{matrix} \text{NH}_2 \\ \diagup \\ \text{Cl} \end{matrix}$
- (b)  $\text{Hg}_2\text{Cl}_2 + \text{NH}_3 \longrightarrow \text{Hg} \begin{matrix} \text{NH}_2 \\ \diagup \\ \text{Cl} \end{matrix}$
- (c)  $\text{P}_4 \xrightarrow{\text{SO}_2\text{Cl}_2} \text{PCl}_3$
- (d)  $\text{Cl}_2 \xrightarrow{\text{C.NaOH}} \text{NaCl} + \text{NaClO}_2$
- (e)  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O} \xrightarrow[\text{high T}]{\Delta} \text{FeSO}_4 + \text{H}_2\text{O} + \text{SO}_2 + \text{SO}_3$
- (f)  $\text{MgCl}_2 \cdot 6\text{H}_2\text{O} \xrightarrow{\Delta} \text{Mg(OH)}_2$
- (1) b, c, d, e (2) c, d, e, f  
 (3) a, b, c, d, e (4) a, b, f

14. The given pair is :-

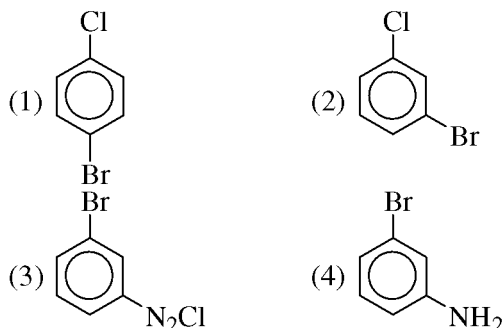


- (1) Enantiomers (2) Identical  
 (3) Diastereomers (4) Structural isomers
15. The reaction of Lucas reagent is fastest with -
- (1)  $\text{CH}_3\text{OH}$  (2)  $\text{CH}_3\text{CH}_2\text{OH}$   
 (3)  $(\text{CH}_3)_2\text{CHOH}$  (4)  $(\text{CH}_3)_3\text{COH}$
16. Which of the following sets of quantum numbers represent the highest energy of an electron :-
- (1)  $n = 3, \ell = 1, m = 1, s = +1/2$   
 (2)  $n = 3, \ell = 2, m = 1, s = +1/2$   
 (3)  $n = 4, \ell = 0, m = 0, s = +1/2$   
 (4)  $n = 3, \ell = 0, m = 0, s = +1/2$
17. The EAN of cobalt in the complex ion  $[\text{Co(en)}_2\text{Cl}_2]^+$
- (1) 27 (2) 36 (3) 33 (4) 35
18. A compound X, of boron reacts with  $\text{NH}_3$  on heating to give another compound Y which is called inorganic benzene. The compound X can be prepared by treating  $\text{BF}_3$  with Lithium aluminium hydride. The compounds X and Y are represented by the formulas :-
- (1)  $\text{B}_2\text{H}_6, \text{B}_3\text{N}_3\text{H}_6$  (2)  $\text{B}_2\text{O}_3, \text{B}_3\text{N}_3\text{H}_6$   
 (3)  $\text{BF}_3, \text{B}_3\text{N}_3\text{H}_6$  (4)  $\text{B}_3\text{N}_3\text{H}_6, \text{B}_2\text{H}_6$
19. Which of the following do not give Cannizaro reaction :-
- (1)  $\text{HCHO}$  (2)  $\text{CCl}_3\text{CHO}$   
 (3)  $\text{PhCHO}$  (4)  $(\text{CH}_3)_3\text{CCHO}$
20.  $\text{C H}_3 - \text{C H}_2 - \text{C O O H} \xrightarrow[\text{(ii) Br}_2/\text{CCl}_4]{\text{(i) AgOH}} \text{A}$   
 $\xrightarrow[\text{dry ether}]{\text{Na}} \text{B} \xrightarrow[\Delta]{\text{HCl/AlCl}_3} \text{C C}$  is :-
- (1)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$   
 (2)  $\text{CH}_3 - \overset{\text{CH}_3}{\underset{|}{\text{CH}}} - \overset{\text{CH}_3}{\underset{|}{\text{CH}}} - \text{CH}_3$   
 (3)  $\text{CH}_3 - \overset{\text{CH}_3}{\underset{|}{\text{CH}}} - \text{CH}_3$   
 (4)  $\text{CH}_3 - (\text{CH}_2)_4 - \text{CH}_3$

21. Which aqueous solution has minimum freezing point :-  
 (1) 0.01 M NaCl      (2) 0.005 M C<sub>2</sub>H<sub>5</sub>OH  
 (3) 0.005 M MgI<sub>2</sub>    (4) 0.005 M MgSO<sub>4</sub>
22. Which of the following has regular tetrahedral shape.  
 (1) I<sub>3</sub><sup>-</sup>      (2) SF<sub>4</sub>      (3) [BF<sub>4</sub>]<sup>-</sup>    (4) XeF<sub>4</sub>
23. Incorrect statements about NO<sub>2</sub> :-  
 (1) Disproportionates in NO & HNO<sub>3</sub> in aq. medium  
 (2) Bond angle < 120°  
 (3) Formed in reaction Cu + Conc. HNO<sub>3</sub>  
 (4) Formed in reaction Zn + Conc. HNO<sub>3</sub>

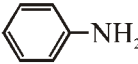
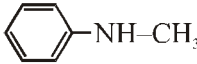
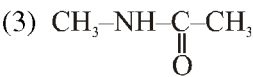
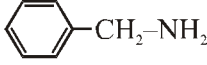


The end product 'S' is :-

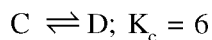
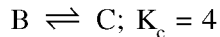
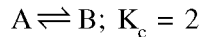


25. The rate constant is doubled when temperature increases from 27°C to 37°C. Activation energy in kJ is  
 (1) 34      (2) 54      (3) 100      (4) 50
26. The occurrence of a reaction is impossible if:  
 (1) ΔH is +ve; ΔS is also +ve but ΔH < TΔS  
 (2) ΔH is -ve; ΔS is also -ve but ΔH > TΔS  
 (3) ΔH is -ve; ΔS is +ve  
 (4) ΔH is +ve; ΔS is -ve
27. The atom having the valence shell electronic configuration 4s<sup>2</sup>4p<sup>2</sup> would be in  
 (1) Group 2 or II A and 3<sup>rd</sup> period  
 (2) Group 12 or II B and 4<sup>th</sup> period  
 (3) Group 14 or IV A and 4<sup>th</sup> period  
 (4) Group 14 or IV A and 3<sup>rd</sup> period

28. Which pair react spontaneously :-  
 (1) FeCl<sub>3</sub> and SnCl<sub>4</sub>    (2) KBr and I<sub>2</sub>  
 (3) CuSO<sub>4</sub> and KI      (4) All
29. Among the following sweetners which has the lowest sweetness value ?  
 (1) Alitame      (2) Aspartame  
 (3) Saccharine    (4) Sucralose
30. In the balanced chemical reaction.  

$$\text{IO}_3^- + a\text{I}^- + b\text{H}^+ \rightarrow c\text{H}_2\text{O} + d\text{I}_2$$
 a, b, c and d respectively correspond to  
 (1) 5, 6, 3, 3      (2) 5, 3, 6, 3  
 (3) 3, 5, 3, 6      (4) 5, 6, 5, 5
31. For conversion C<sub>(graphite)</sub> → C<sub>(diamond)</sub> the ΔS is :-  
 (1) zero      (2) positive  
 (3) negative    (4) unknown
32. Find reaction showing redox changes.  
 (1) Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>  $\xrightarrow{\Delta}$       (2) (NH<sub>4</sub>)<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>  $\xrightarrow{\Delta}$   
 (3) NH<sub>4</sub>Cl  $\xrightarrow{\Delta}$       (4) All
33. Identify correct reaction :-  
 (1) Fe + HCl → FeCl<sub>3</sub> + H<sub>2</sub>  
 (2) Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>  $\xrightarrow{\Delta}$  Fe<sub>2</sub>O<sub>3</sub> + SO<sub>2</sub> + SO<sub>3</sub>  
 (3) H<sub>2</sub>O<sub>2</sub> + I<sub>2</sub>  $\xrightarrow{\text{OH}^-}$  I<sup>-</sup> + O<sub>2</sub> + H<sub>2</sub>O  
 (4) (NH<sub>4</sub>)<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>  $\xrightarrow{\Delta}$  N<sub>2</sub> + CrO<sub>3</sub> + H<sub>2</sub>O
34. Which is most basic compound :-  
 (1)       (2)   
 (3)       (4) 
35. In the electrolysis of acidulated water, It is desired to obtain 1.12 cc of hydrogen per second under S.T.P.condition. The current to be passed is  
 (1) 9.65 A      (2) 19.3 A  
 (3) 0.965 A      (4) 1.93 A

36. For the reactions,



$K_c$  for the reaction,  $A \rightleftharpoons D$  is :

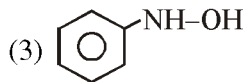
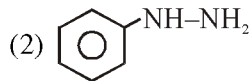
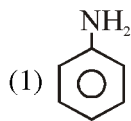
- (1)  $(2 + 4 + 6)$                       (2)  $(2 \times 4)/6$   
(3)  $(4 \times 6)/2$                       (4)  $2 \times 4 \times 6$

37. The brown ring test for nitrates depends on :-

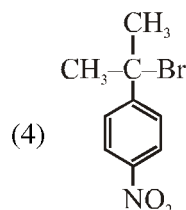
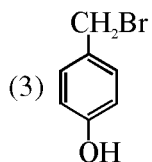
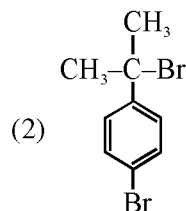
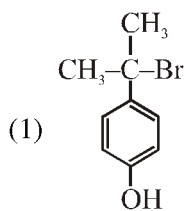
- (1) The reduction of nitrate to nitric oxide  
(2) Oxidation of nitric oxide to nitrogen dioxide  
(3) Reduction of ferrous sulphate to iron  
(4) Oxidizing action of sulphuric acid

38. Glucose + 3[X]  $\longrightarrow$  Glucosazone

The reagent [X] in the above reaction is :-



39. Which is most reactive towards  $\text{SN}^1$  reaction :-



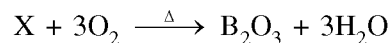
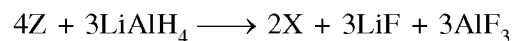
40. At  $25^\circ\text{C}$ , the molar conductance at infinite dilution for the strong electrolytes NaOH, NaCl and  $\text{BaCl}_2$  are  $248 \times 10^{-4}$ ,  $126 \times 10^{-4}$  and  $280 \times 10^{-4} \text{ Sm}^2\text{mol}^{-1}$  respectively.  $\lambda_m^0 \text{Ba(OH)}_2$  in  $\text{Sm}^2\text{mol}^{-1}$  is

- (1)  $52.4 \times 10^{-4}$                       (2)  $524 \times 10^{-4}$   
(3)  $402 \times 10^{-4}$                       (4)  $262 \times 10^{-4}$

41. The equilibrium constant  $K_c$  for  $A_{(g)} \rightleftharpoons B_{(g)}$  is 1.1, gas B will have molar concentration greater than 1 if :-

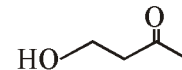
- (1)  $[A] = 0.91$                       (2)  $[A] > 0.91$   
(3)  $[A] > 1$                           (4) All of these

42. Identify X, Y, Z



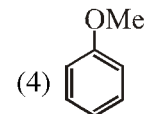
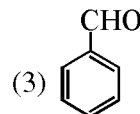
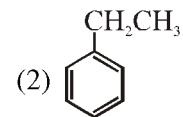
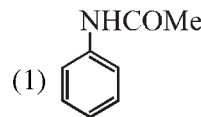
- (1)  $X = \text{BF}_3$ ,  $Z = \text{B}_2\text{H}_6$   
(2)  $X = \text{BF}_3$ ,  $Y = \text{B}_2\text{H}_6$   
(3)  $X = \text{BF}_3$ ,  $Y = \text{H}_3\text{BO}_3$   
(4)  $Y = \text{H}_3\text{BO}_3$ ,  $Z = \text{BF}_3$

43. The IUPAC name of following compound is



- (1) 2-hydroxy- 4-butanone  
(2) 3-oxo- 1-butanol  
(3) 4-hydroxy-2-butanone  
(4) 1-oxo- 3-butanol

44. Which is least reactive towards E.S.R. :-

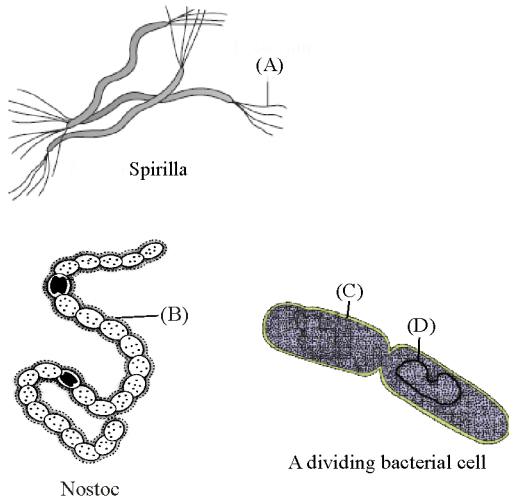


45. Ferric hydroxide sol is positively charged colloid. The coagulating power of  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$  and  $\text{PO}_4^{3-}$  ions would be in the order

- (1)  $\text{NO}_3^- > \text{SO}_4^{2-} > \text{PO}_4^{3-}$   
(2)  $\text{SO}_4^{2-} > \text{NO}_3^- > \text{PO}_4^{3-}$   
(3)  $\text{PO}_4^{3-} > \text{SO}_4^{2-} > \text{NO}_3^-$   
(4)  $\text{NO}_3^- = \text{SO}_4^{2-} > \text{PO}_4^{3-}$

स्वस्थ रहो, मस्त रहो तथा पढ़ाई में व्यस्त रहो ।

46.



Identify A, B, C & D from the given diagram:-

	A	B	C	D
(1)	Pili	Cell wall	Cell wall	Cell membrane
(2)	Flagellum	Mucilagenous sheath	cell membrane	DNA
(3)	Flagellum	Slime layer	DNA	RNA
(4)	Pili	Cell membrane	RNA	Nuclear membrane

47. Which of the following structures are **correct** to be present in a typical monocot seed :-

- (1) Plumule, radicle, scutellum, aleurone
- (2) Plumule, radicle, two cotyledon, aleurone
- (3) Testa, tegmen, epicarp, endocarp
- (4) Testa, tegmen, endosperm, pericarp

48. Read the following statements (A-D) :-

- (A) All species of cockroaches are wild and are not economically important.
- (B) Cockroaches are pests because they destroy food and contaminate it.
- (C) Cockroach is can transmit a variety of bacterial diseases.
- (D) Cockroaches are nocturnal, omnivorous animal that live in dry places through out the world.

Out of these which is/are statement not correctly matched with cockroach?

- (1) Only statements A
- (2) Statements B and C
- (3) Statement C and D
- (4) Statement A and D

49. In cockroach, the first pair of wings are known as:

- (1) Terga
- (2) Sterna
- (3) Tegmeta
- (4) Tegmina

50. The schleiden and schwann famous for :-

- (1) Ultra-structure of cell-membrane
- (2) Cyclins and cdk
- (3) Cell theory
- (4) Mechanism of crossing over

51. Read the following statements

- A. Respiration is a catabolic process during which  $\text{CO}_2$  is released.
- B. Respiration is a amphibolic process during which energy is released.
- C. Respiration is an anabolic process during which  $\text{O}_2$  is utilized.
- D. Respiration is an anabolic process during which glucose is utilized

Which of the following in the correct answer

- (1) A & B are correct
- (2) C & D are correct
- (3) B & C are correct
- (4) A & D are correct

52. Morgan worked with the tiny fruitflies, *Drosophila melanogaster*, which were found very suitable for studies. *How many statements* among following are true for selecting them for the studies of the basis for the variation that sexual reproduction produced ?

- (A) They could be grown on simple synthetic medium in the laboratory.
- (B) They complete their life cycle in about four weeks.
- (C) A single mating could produce a large number of progeny flies.
- (D) There was a clear differentiation of the sexes the male and female flies are easily distinguishable.
- (E) It has many types of heredity variations that can be seen with only high power microscopes.

- (1) Only 3 statements are correct
- (2) Only 4 statements are correct
- (3) Only one statement is correct
- (4) All five statements are correct

53. Select the correct statement :-

- (1) Darwinian variations are small and non-directional
- (2) Fitness is the end result of the ability to adapt and gets selected by nature.
- (3) All mammals except whale and camels have seven cervical vertebrae
- (4) Mutation are random and directional

54. When our body is exposed to antigen for second time a relatively faster and high intensity immune response is produced. What is not true about this response ?
- Main antibody formed is IgM
  - Based on memory cells
  - Also known as anamnestic response
  - Gives effective immunity
55. Which activity of Human responsible for making feild for agriculture :-
- Deforestation
  - Jhum cultivation
  - Chipko movement
  - Joint forest management
- a & b
  - only a
  - a, b & d
  - b & d
56. Some characters/structures are given below. How many of them are found in both bryophyta and pteridophyta ?
- Archegonium
  - Protonema
  - Rhizoids
  - Ovule
  - Vascular tissue
  - Antheridium
- Options :-**
- Two
  - Three
  - Four
  - Five
57. The character that proves that frog have evolved from fishes is :-
- The ability to swim in water
  - The tadpole larva in frogs which resembles the fishes in many character
  - Similarity in the shape of the head
  - The tadpole larva of frogs and fishes are uricotelic
58. Read the following statement and choose the correct option?
- Most of the cartilages of vertebrate embryo are replaced into bones during adult stage.
  - Cartilage are main tissue that provides structural frame to the human adult body.
  - Bones have a hard and non-pliable ground substance rich in magnesium salts.
  - The bone-marrow in all bones is the site of production of blood cells.
- Options :-**
- Statement A and B are correct while C and D are wrong.
  - Statement A is correct while B, C and D are wrong.
  - Statement B, C and D are correct and A is wrong.
  - Statement D is correct while A, B and C are is wrong.
59. Which of the following is/are involve in cyclic photophosphorylation :-
- Only PS-I
  - Only PS-II
  - Both PS-I & PS-II
  - Neither PS-I nor PS-II
60. The shape of guard cells in sugarcane is :-
- Kidney shape
  - Bean seed shape
  - Grape shape
  - Dumbel shape
61. Read the following statements (A-D)
- Noradrenaline and adrenaline are called as catecholamines.
  - Parathyroid hormone stimulates reabsorption of  $Ca^{+2}$  by the renal tubules and increases  $Ca^{+2}$  absorption from the digested food
  - Maintenance of water and electrolyte balance is also influenced by thyroid hormones.
  - Thyroid gland also secretes a thyrocalcitonin which regulates the blood calcium levels.
- How many of the above statements are true :-
- 3
  - 4
  - 2
  - 1
62. How many statements of following, are **not true**, for *Sickle - cell anaemia* :-
- This is an autosome linked recessive trait.
  - The disease is controlled by a single pair of allele,  $Hb^A$  and  $Hb^S$
  - Out of the three possible genotypes usually homozygous individuals for  $Hb^S$  show the diseased phenotype.
  - The defect is caused by substitution of valine (val) by glutamic acid (glu) at the sixth position of the beta globin chain of the haemoglobin molecule.
  - The substitution of amino-acid in the globin protein result due to the single base-substitution at the sixth codon of the beta globin gene from GUG to GAG
- Four statements are not correct
  - Three statements are not correct
  - Two statements are not correct
  - Only one statement is not correct

63. When two species of different genealogy come to resemble each other as a result of adaptation, the phenomenon is termed as :-  
 (1) Divergent evolution (2) Micro evolution  
 (3) Co-evolution (4) Convergent evolution
64. Which of the following statement is not true....  
 (1) Causative organism of pneumonia is streptococcus.  
 (2) Typhoid fever spread by contaminated water and food.  
 (3) Edward syndrome is trisomy of 21<sup>st</sup> chromosome  
 (4) Barr body is present in male with Klinefelter's syndrome
65. What property of substances required for their biomagnification :-  
 (a) The substance should not easily oxidised  
 (b) These should not be toxic at low concentration  
 (c) They should be toxic  
 (d) These should not be degraded by the decomposers  
 (1) a, b, d (2) a, c, d  
 (3) a, b, c, d (4) d only

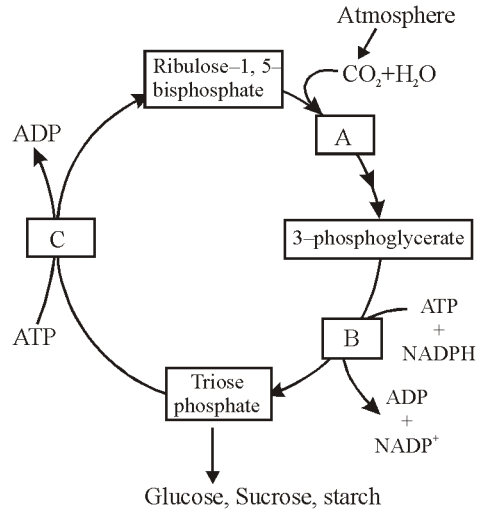
66.

S.N.	Character	Bryophyta	Pterido-phyta	Gymno-sperms
(I)	Main plant body	Gametophyte	Sporophyte	(A)
(II)	Vascular tissue	Absent	(B)	Present
(III)	Embryo formation	(C)	Occurs	Occurs
(IV)	(D)	Archegonium	Arche-gonium	Carpel

Identify A, B, C & D in the above table :-

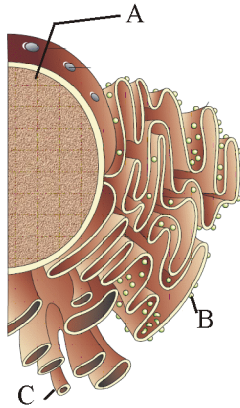
	A	B	C	D
(1)	Sporophyte	Absent	Does not occur	Female reproductive organ
(2)	Gametophyte	Absent	Does not occur	Female reproductive organ
(3)	Sporophyte	Present	Occurs	Female reproductive organ
(4)	Sporophyte	Present	Does not occur	Male reproductive organ

67. Which of the following is incorrectly paired with its function.  
 (1) Ovary → Synthesis and secretion of steroid hormones.  
 (2) Fimbriae → Collection of the ovum after ovulation  
 (3) Seminal vesicle → Produces a sugar containing fluid to nourish sperm.  
 (4) Bartholin glands → Secrete alkaline fluid to destroys the acidity of the urethra.
68. What amount of urea is excreted out per day by healthy person?  
 (1) 40-60 gm (2) 25-30 mg  
 (3) 30-40 mg (4) 25-30 gm
69. Observe the following scheme and give the correct answer :-



	A	B	C
1	Translation	Reduction	Regeneration
2	Regeneration	Reduction	decarboxylation
3	Fixation	Glycolytic reversal	Carboxylation
4	Carboxylation	Reduction	Regeneration

70. The figure below shown three points (A,B,C) of cellular component. Select the option giving correct identification :-



- (1) A = Nuclear pore = Transport
- (2) B = Rough E.R. = Lipid formation
- (3) C = Smooth E.R. = Dark reaction
- (4) B = Ribosome = protein synthesis

71. In the given list how many structures are responsible for maintenance of balance of the body.

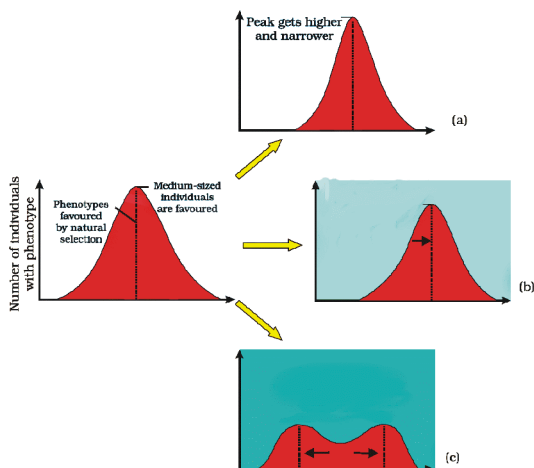
Macula, organ of corti, tectorial membrane, crista, cochlea

- (1) 4      (2) 3      (3) 2      (4) 5

72. "Not all characters show true dominance. Some characters show incomplete and some show co-dominance. When mendel studied the inheritance of two characters together which law was formulated :-

- (1) Law of Dominance
- (2) Law of Segregation
- (3) Law of independent assortment
- (4) Law of purity of gametes

73. Select the correct statement for given figure :-



- (1) b → it operates in stable environment
- (2) a → mean value is changed
- (3) c → mean value shifts in one direction
- (4) b → mean value shifts in one direction

74. Lymphoid organs where immature lymphocytes differentiate into antigen sensitive lymphocytes are ....

- (1) Bone marrow and spleen
- (2) Thymus and Tonsils
- (3) Bone marrow and Thymus
- (4) Spleen and lymph nodes

75. Which thing you will not find in Delhi ?

- (a) Buses running on diesel
- (b) Petrol & diesel having 350-150 ppm sulphur
- (c) Vehicles using CNG as fuel
- (d) Unleaded petrol

- (1) a,b & d      (2) b,c,d
- (3) only a      (4) a,b

76. Find the **incorrect** from the followings :-

- (A) First formed secondary xylem is protoxylem
- (B) Later formed secondary xylem is metaxylem
- (C) Exarch xylem is found in roots
- (D) Ground tissue of leaf is called mesophyll

- (1) A, B      (2) B, C
- (3) A, D      (4) C, D

77. Read the following four statements (A - D) :-

- (A) Removal of gonads cannot be considered as a contraceptive option
- (B) Complete lactation could help as a natural method of contraception
- (C) Surgical methods of contraception prevent gamete formation
- (D) Medical termination of pregnancy is legalised in our country

How many statements are correct?

- (1) Four      (2) Three
- (3) Two      (4) One



78. Select the correct matched pairs from following table?

	Column-A	Column-B
A.	Glycosuria	Presence of glucose in urine
B.	Angina	Acute chest pain due to myocardial ischaemia
C.	Heart failure	Heart stops beating
D.	Heart attack	Heart muscles are suddenly damaged by an inadequate blood supply
E.	Uremia	Accumulation of hippuric acid in blood
F.	Ketonuria	Presence of ketone bodies in blood
G.	Glomerulonephritis	Inflammation of glomeruli of kidney

- (1) Only A, B and G are correct  
 (2) Only A, B and E are correct  
 (3) A, B, D and G are correct  
 (4) Only C, E and F are correct

79. The chemiosmotic theory is applicable for :-

- (1) Synthesis of ATP in thylakoid  
 (2) Synthesis of ATP in mitochondria  
 (3) Synthesis of ATP in bacterial photosynthesis  
 (4) All

80. Nucleotide has :-

- (1) One heterocyclic compound  
 (2) One mono saccharide  
 (3) One phosphate  
 (4) All

81. Which of the following structure contains Centres, which control respiration, cardiovascular reflexes and gastric secretions:-

- (1) Mid brain (2) Cerebellum  
 (3) Pons (4) Medulla oblongata

82. How many alcoholic drinks of following are formed by distillation :-

- (A) Wine (B) Beer (C) Whisky  
 (D) Brandy (E) Rum  
 (1) Only one (2) Only three  
 (3) Only four (4) All five types

83. How many statements are **correct** for mutation:-

- (a) Mutations are discontinuous source for variations  
 (b) Smallest part of DNA which undergoes mutation is called hot spot  
 (c) Muton is one nucleotide  
 (d) Mostly mutations are harmful  
 (1) 1 (2) 2 (3) 3 (4) 4

84. Which of the following is not correctly matched.....

- (1) Activation of oncogene - oncogenic transformation  
 (2) Alpha interferon - Biological response modifiers  
 (3) Biopsy - use of magnetic field  
 (4) Metastasis - property of cancerous cells

85. Choose the incorrect statement :-

- (a) Sunlight drive the ecological cycle  
 (b) Detritus is the dead part of plant only  
 (c) Chemical composition of detritus do not affect the process of decomposition  
 (d) Energy pyramid in detritus food chain is upright  
 (1) a,d (2) b&c (3) b,c&d (4) only b

86. Basidiocarp and ascocarp are the fruiting bodies of fungi. They can be seen in :-

- (1) *Alternaria* & *Agaricus* respectively  
 (2) *Alternaria* & *Ustilago* respectively  
 (3) *Claviceps* & *Agaricus* respectively  
 (4) *Agaricus* & *Claviceps* respectively

87. Match the column-A with column-B :-

	Column-A		Column-B
(A)	Transfer of sperms into the female genital tract	(i)	Ejaculation
(B)	Sperms released from the seminiferous tubules	(ii)	Semination
(C)	Expulsion of semen from body of male	(iii)	Spermiation
(D)	Liberation of sperms from testes	(iv)	Insemination

- (1) A-iv, B-iii, C-ii, D-i (2) A-ii, B-iii, C-i, D-iv  
 (3) A-iv, B-iii, C-i, D-ii (4) A-iii, B-iv, C-ii, D-i

88. "An unique vascular system forms between the digestive tract and liver is known as \_\_\_ (A) \_\_\_

and it is found in \_\_\_ (B) \_\_\_ ."

What are the A and B ?

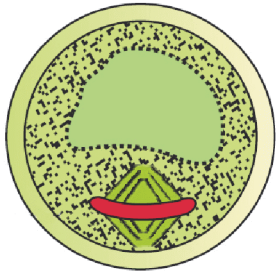
- (1) A = Hepatic portal system  
 B = All invertebrate animals  
 (2) A = Renal portal system  
 B = Fishes and amphibians  
 (3) A = Hepatic portal system  
 B = All vertebrate animals  
 (4) A = Systemic circulation  
 B = All vertebrate animals

89. What is the correct order of electron carrier cytochromes in (ETS) electron transport system of respiration :-  
 (1) (UQ), Cyto C, Cyto a, Cyto b  
 (2) Cyto C<sub>1</sub>, Cyto C, Cyto a<sub>3</sub>, Cyto a  
 (3) Cyto b, Cyto C<sub>1</sub>, Cyto C, Cyto a, Cyto a<sub>3</sub>  
 (4) P.Q., FRS, PC, Cyto b<sub>6</sub>, Cyto-f
90. Amino acids are :-  
 (I) Organic compounds  
 (II) Substituted methanes  
 (III) Containing amino group  
 (IV) Macromolecule  
 (1) I,II,III,IV (2) I,II,III  
 (3) II,III,IV (4) I,II,IV
91. Which of the following structure is under direct control of nervous system :-  
 (1) Thyroid (2) Adrenal cortex  
 (3) Anterior pituitary (4) Adrenal medulla
92. A bioactive molecule, *cyclosporin A* that is used as an immunosuppressive agent in organ-transplant patients, is produced by :-  
 (1) A bacterium (2) A virus  
 (3) A fungus (4) A mycoplasma
93. Potato and sweet potato :-  
 (1) have edible parts which are homologous organs  
 (2) have edible parts that are analogous organs  
 (3) have been introduced in India from the same place  
 (4) are two species of the same genus
94. (a) Long evolutionary time  
 (b) Clear stratification  
 (c) Abundant parasitic plants  
 (d) Maximum leaching  
 The above statement describes which of the following ecosystem :-  
 (1) Tropical savana  
 (2) Tropical deciduous forest  
 (3) Tropical rain forest  
 (4) temperate deciduous forest
95. (a) Pyramid of Number deals with number of individuals in an particular area  
 (b) Nutrient conservation is increased during succession  
 (c) Energy transferred from sun to producer is 1 to 5%  
 (d) Vegetation of biome is decided by climate
- Which is/are correct ?  
 (1) only a (2) a,b (3) a,b,c (4) a,b,c,d
96. How many of the followings are living unicellular structures ?  
 Sieve tube, Vessel, Vessel elements, Companion cell, Bast fibre, Albuminous cell, Sieve cell, Tracheids, Cuticle, Root hair.  
 (1) Two (2) Three (3) Four (4) Five
97. Choose the correct option for filling up the blanks : -  
 The human male ejaculates about \_\_\_\_ million sperms during a coitus of which, for normal fertility, at least \_\_\_\_\_ percent sperms must have normal shape and size and least \_\_\_\_\_ percent of them must show vigorous motility.  
 (1) 100–200, 40, 60 (2) 200–300, 60, 40  
 (3) 300–400, 50, 30 (4) 500, 70, 70
98. Read the following statements :  
 (i) About 20-30 % of the body weight of human adult is contributed by muscles.  
 (ii) Muscle is specialized tissue and is derived from mesoderm.  
 (iii) Activities of nonstriated muscle are under the voluntary control of nervous system.  
 (iv) Non striated muscle are closely associated with the skeletal component of the body.  
 (v) Striated muscles are primarily involved in locomotion and changes of body postures.  
 (vi) Cardiac muscles are striated and are involuntary in nature.  
 Out of these how many statements are incorrect with regards to muscles?  
 (1) Two (2) Three  
 (3) Four (4) One
99. How many statements are correct from a to e:  
 (a) 6 turn of calvin cycle is required for synthesis of one glucose  
 (b) Chl-d found in red algae  
 (c) 12 water molecules forms in ETS of Z-scheme  
 (d) Succinyl CoA is only five carbon intermediate in TCA-cycle  
 (e) FADH<sub>2</sub> contains vitamin niacin  
 (1) Three (2) One  
 (3) Two (4) Four

100. How many statement are correct :-

- (I) Polysaccharide are present in acid insoluble pellet
  - (II) Protein is a homopolymer
  - (III) In Polypeptide chain last amino acid called as N-terminal amino acid
  - (IV) Adenine and Guanine are substituted purines
- (1) 4      (2) 3      (3) 2      (4) 1

101. Represented below is the diagram of one stage of pollen grain development which one of the following condition according to this diagram?



- (1) Mitosis - Symmetric spindle
- (2) Meiosis - Symmetric spindle
- (3) Mitosis - Asymmetric spindle
- (4) Meiosis - Asymmetric spindle

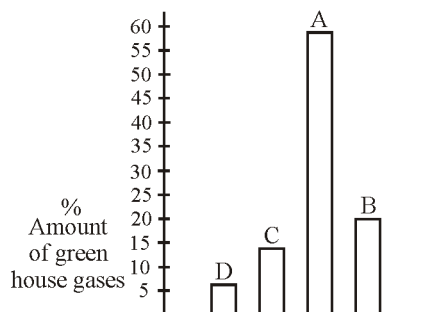
102. The separated bands of DNA are cut from the agarose gel and extracted from the gel piece. This process is known as :-

- (1) Elution                      (2) Transduction
- (3) Down streaming      (4) Transformation

103. First time bipedal locomotion is present in :-

- (1) *Australopithecus*      (2) *Homo habilis*
- (3) *Homo erectus*      (4) *Dryopithecus*

104.



Identify the gases A, B, C, D and point out the 'X' gas responsible for ozone depletion :-

- (i)  $N_2O$                                       (ii) Methane
- (iii) Chlorofluoro carbon      (iv) Carbondioxide

	A	B	C	D	X
(1)	ii	i	iv	iii	iii
(2)	iv	iii	ii	i	ii
(3)	ii	i	iii	iv	iv
(4)	iv	ii	iii	i	iii

105. In a simple food chain the energy will lost in the form of heat. Which statement is correct :-

- (a) Producers loses heat energy
- (b) Herbivors loses heat energy
- (c) Consumers loses heat energy

- (1) all are wrong
- (2) b & c is correct, a is wrong
- (3) all are correct
- (4) only c is correct

106. Find the correct and incorrect statements from followings :-

- (i) Bacteria have most extensive metabolic diversity.
- (ii) Boundary line of protista is not well defined.
- (iii) Alternation of generation is found in bacteria.
- (iv) Virus and viroids are very primitive prokaryotes so included in monera.

Options :-

- (1) i, ii-correct, iii, iv-correct
- (2) i, ii-correct, iii, iv-incorrect
- (3) i, ii-incorrect, iii, iv-correct
- (4) i, ii-incorrect, iii, iv-incorrect

107. What is true for Reptilia ?

- (1) They have external ear opening
- (2) Sexes are separate and fertilization is external
- (3) Homoeothermy and glandular skin
- (4) Snakes and lizards shed their scales as skin cast

108. Match the column-I and II and select the correct option?

Column-A			Column-B
A.	Fibrous Joint	(i)	Between tarsals
B.	Cartilaginous Joint	(ii)	Between the carpals
C.	Pivot Joint	(iii)	Between the cranial bones
D.	Hinge Joint	(iv)	Between the two adjoining vertebrae
E.	Gliding Joint	(v)	Between Atlas and Axis
		(vi)	Between Femur and Tibia
		(vii)	Between humerus and radius

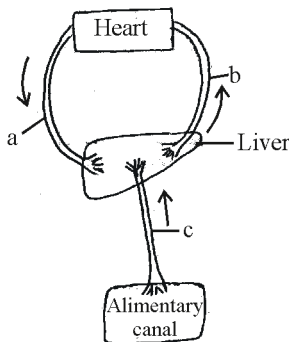
Options :-

	A	B	C	D	E
1	(iii)	(iv)	(i), (ii)	(vi), (vii)	(v)
2	(iv)	(v)	(vi), (vii)	(iii)	(i), (ii)
3	(iii)	(iv)	(v)	(vi), (vii)	(i), (ii)
4	(iv)	(i), (ii)	(v)	(vi), (vii)	(iii)

109. How many pairs are incorrects :-

- Glycolysis → Cytosol
  - Bacteria → Mesosome for respiration
  - Plasmolysis → Hypertonic solution
  - ETS → F<sub>1</sub> particle
  - Succinate dehydrogenase → Cristae
- (1) One (2) Three (3) Two (4) Five

110.



Identify a, b & c in above diagram :-

- a - Hepatic artery, b - Hepatic vein, c - Hepatic portal vein
- a - Hepatic vein, b - Hepatic artery, c - Hepatic portal vein

- a - Hepatic portal vein, b - Hepatic artery, c - Hepatic vein
- a - Hepatic artery, b - Hepatic portal vein, c - Hepatic vein

111. Geitonogamy does not occur in :-

- Unisexual flower (2) Bisexual flower
- Monoecious plant (4) Dioecious plant

112. Raw cheese is known as :-

- Blue cheese (2) Cottage cheese
- Swiss cheese (4) Roquefort cheese

113. In AIDS ,HIV virus infects T helper cells and macrophages. Which of the following statement is wrong related to above statement

- CD8 protein present on these cells acts as HIV receptor
- Viral RNA forms viral DNA
- Macrophage acts as HIV factory
- Person eventually becomes immunodeficient

114. Match the Column :-

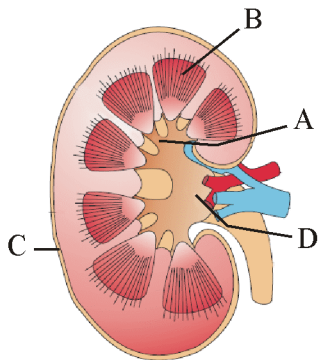
Column - I		Column - II	
(a)	Migration	(i)	Polar Bear
(b)	Hibernation	(ii)	Zooplankton & Seed
(c)	Aestivation	(iii)	Blue Whale
(d)	Diapause	(iv)	Fishes

	(a)	(b)	(c)	(d)
(1)	(i)	(ii)	(iii)	(iv)
(2)	(iii)	(i)	(ii)	(iv)
(3)	(ii)	(iii)	(iv)	(i)
(4)	(iii)	(i)	(iv)	(ii)

115. How many statements are true :-

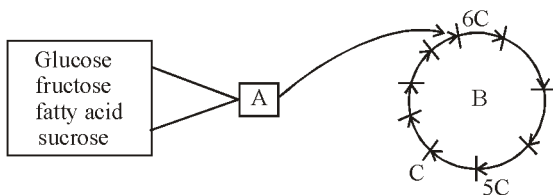
- Pioneer species always invade the bare land initially
  - Succession and evolution is parallel process at primitive earth
  - Earthworm and fungi uses the same mechanism for decomposition
  - Gross primary productivity and net primary productivity both are the rate of biomass production
- a & d are true (2) a & b are true
  - a, b & c are true (4) a, b & d are true

116. Find the **incorrect** from the followings :-
- (1) Zygote produces a sporophyte
  - (2) In pteridophyte water is necessary to transfer male gametes to archegonium
  - (3) Spores germinate to produce sporophyte
  - (4) In bryophytes male sex organ is antheridium
117. The circulatory system of frog is well developed and show following features, except :-
- (1) Heart has three chambers.
  - (2) A triangular structure called sinus venosus is joined to the right atrium
  - (3) The ventricle opens into a sac like conus arteriosus on the dorsal side of the heart
  - (4) Presence of renal portal system
118. Given below is the diagrammatic sketch of a nephron. Identify the parts labelled A, B, C and D and select the correct option about then ?



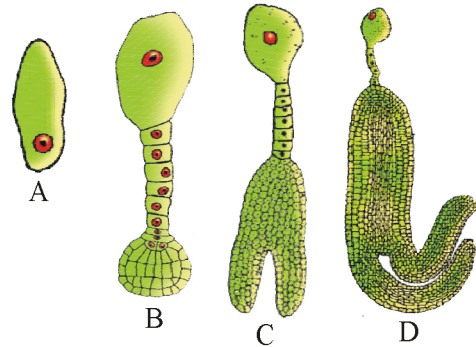
	A	B	C	D
1	Renal capsule	Renal pelvis	Medullary pyramid	Calyx
2	Renal column	Renal pyramid	Renal capsule	Cortex
3	Calyx	Medullary pyramid	Renal capsule	Renal pelvis
4	Renal pelvis	Renal capsule	Medullary pyramid	Calyx

119. The figure below shows ABC point in an important metabolism. Select the correct option:



- (1) A = Glycolysis
- (2) B =  $\beta$ -oxidation
- (3) C = Succinyl Co-A
- (4) B = CAM cycle

120. Blood capillaries are made up of :-
- (1) Tunica externa & Tunica interna
  - (2) Tunica interna & Tunica media
  - (3) Tunica externa & Tunica media
  - (4) Tunica interna only
121. Consider the diagrams given below and select correct option :-



	A	B	C	D
(1)	Zygote	Heart shaped embryo	Globular embryo	Mature embryo
(2)	Zygote	Globular embryo	Heart shaped embryo	Mature dicot embryo
(3)	Zygote	Globular embryo	Heart shaped embryo	Mature Monocot embryo
(4)	Egg	Globular embryo	Heart shaped embryo	Mature Monocot embryo

122. Interferons are :-
- (1) Antiviral proteins
  - (2) Complex proteins
  - (3) Anti-bacterial proteins
  - (4) Anti-fungal proteins
123. Please read following sentences carefully .
- (A) Injection of antiserum is artificial method to induce active immunity.
  - (B) Skin cells forms cellular barriers of non specific immunity.
  - (C) When our body is exposed to antigen for the first time, a slow and low intensity immune response is produced.
  - (D) Blood group and tissue matching is done before transplantation.
  - (E) Blood circulation was discovered by William Harvey.

Which of the above mentioned statements are false.

- (1) Only A and B
- (2) Only A , B and D
- (3) Only A ,C ,D and E
- (4) Only B and E

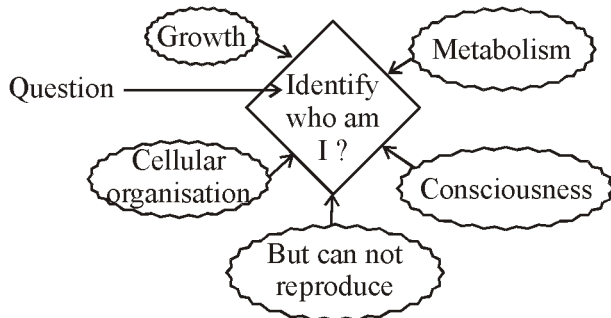
124. How many statement are true :-

- (a) Deep sea hydrothermal vent average temperature exceeds 100°C
  - (b) Deep sea hydrothermal vent the salinity of water is 30-35 percent
  - (c) Hypersaline lagoon salinity is < 100 percent
  - (d) > 500m in sea, environment is perpetually dark
- (1) One incorrect & Three are correct  
 (2) Two correct ; Two Incorrect  
 (3) Three incorrect ; one correct  
 (4) Four correct ; zero incorrect

125. Find out the wrong statement regarding tropical rain forest :-

- (a) Critical link species are abundant in tropical rain forest
  - (b) Tropical rain forest has less seasonal variation
  - (c) In forest the animal are the critical organism for pollination and dispersal of seed.
  - (d) Energy flow is the functional attributs of biotic community
- (1) a, b                                      (2) c, d  
 (3) only c                                    (4) a & d

126. I can perform :-



- (1) A virus
- (2) A living bacterium only
- (3) A living animal only
- (4) May be any living entity

127. Which one of the following statements about *Hyla*, *Rana*, *Rattus* and *Elephas* is correct?

- (1) All are poikilotherms
- (2) All have 12 pairs of cranial nerve
- (3) All have dicondylic skull
- (4) Sexes are separate and fertilisaion is internal

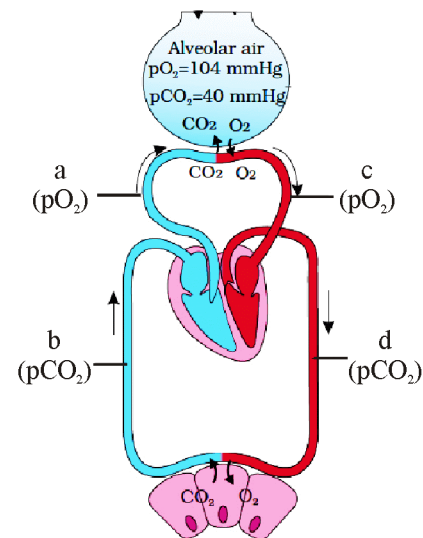
128. Which one is not the significance of inbreeding?

- (1) It increases homozygosity
- (2) It helps in accumulation of superior gene and elimination of recessive gene.
- (3) It helps in aggregation of qualities of two different species in an individual.
- (4) It helps in development of pure line pedigree.

129. Which statement is incorrect :-

- (1) Auxin induces flowering in pineapple plants
- (2) Phenyl mercuric acetate is an antitranspirant
- (3) Gibberellin induces flowering in LDP in short days.
- (4) Tendrils exhibits thigmonastic movement.

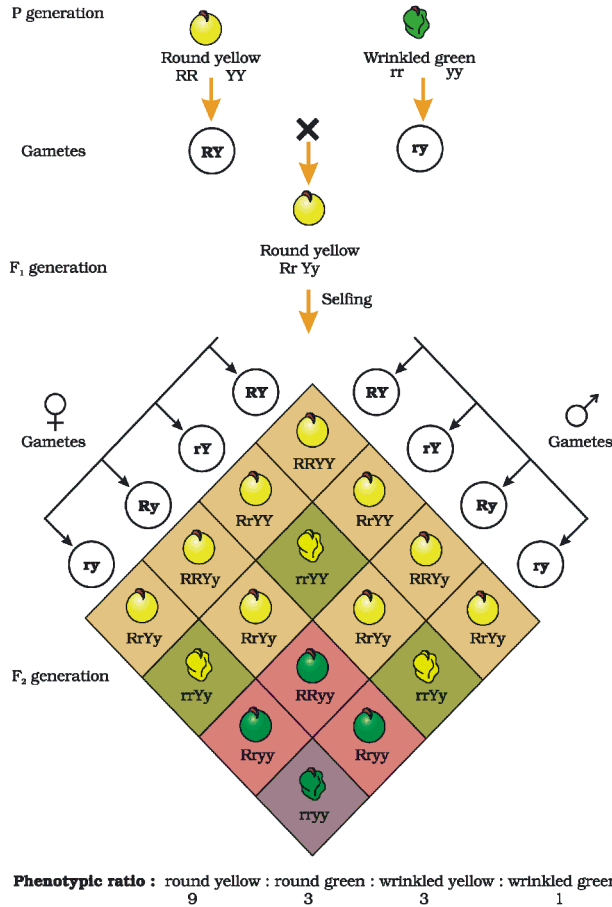
130.



What are correct values of a, b, c, & d in the above diagram.

- (1) a-45, b-40 , c-40 , d-95
- (2) a-40, b-45 , c-95 , d-40
- (3) a-95, b-40 , c-95 , d-45
- (4) a-45, b-40 , c-95 , d-40

131.



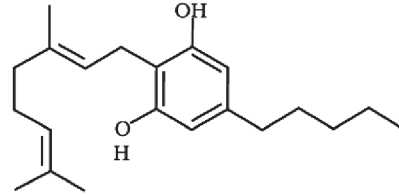
Observe this cross carefully and find out right option :-

- (1) It is result of a dihybrid cross where the two parents differed in two pairs of contrasting traits
- (2) It is result of a dihybrid cross where the two parents differed in two contrasting traits
- (3) It is result of a dihybrid cross where the two parents differed in two pairs of contrasting characters
- (4) It is result of a dihybrid cross where the two parents differed in one contrasting character

132. Ethyl alcohol is commercially manufactured from :-

- (1) Wheat
- (2) Grapes
- (3) Maize
- (4) Sugarcane

133.



Which of the components of following options correctly applies to structural formula shown in above diagram.

(1)	Opium plant	Unripe fruit	Analgesic action
(2)	Hemp plant	Inflorescence	Effects on CVS
(3)	Coca plant	Dopamine inhibition	CNS stimulation
(4)	Datura plant	Atropine	Hallucinations

134. Every winter the famous \_\_\_\_\_ in Rajasthan host thousands of migratory birds from siberia :-

- (1) Joint forest management (JFM)
- (2) Keolado National Park
- (3) Both (1) & (2)
- (4) Udaipur University

135. Which is not the attribute of organism for adaptation ?

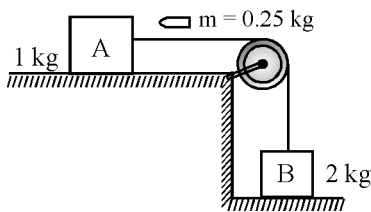
- (1) Morphological
- (2) Physiological
- (3) Behavioral
- (4) Mutation



136.  $X = 3YZ^2$  find dimensions of Y in (MKSA) system. If X and Z are the dimension of capacity and magnetic field respectively :-

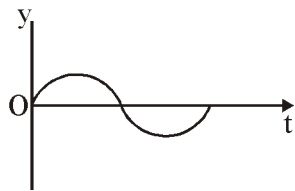
- (1)  $M^{-3}L^{-2}T^{-4}A^{-1}$
- (2)  $ML^{-2}$
- (3)  $M^{-3}L^{-2}T^4A^4$
- (4)  $M^{-3}L^{-2}T^8A^4$

137. In the system shown in figure all surfaces are smooth and the string is massless. A bullet of mass  $m = 0.25$  kg moving horizontally with velocity of  $v = 200$  m/sec penetrates through block A and comes out with a velocity of 100 m/sec. Then velocity of 2 kg block just after the bullet comes out is :-



- (1) 25 m/sec
- (2)  $\frac{25}{3}$  m/sec
- (3)  $\frac{50}{3}$  m/sec
- (4) 50 m/sec

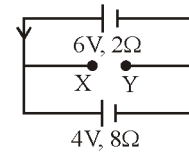
138. The displacement time graph of a particle executing SHM is as shown in figure :-



The corresponding acceleration-time graph of the particle is ?

- (1)
- (2)
- (3)
- (4)

139. Figure shows a circuit with two cells in opposition to each other. One cell has an emf of 6 V and internal resistance of  $2 \Omega$  and the other cell has an emf of 4 V and internal resistance of  $8 \Omega$ . The potential difference across the terminals X and Y is :-



- (1) 5.4 V
- (2) 5.6 V
- (3) 5.8 V
- (4) 6.0 V

140. A plane electromagnetic wave travelling along the X-direction has a wavelength of 3mm. The variation in the electric field occurs in the y-direction with an amplitude 66 V/m. The equations for the electric and magnetic fields as a function of x and t are respectively :-

(1)  $E_y = 33 \cos \pi \times 10^{11} \left( t - \frac{x}{C} \right),$

$B_z = 1.1 \times 10^{-7} \cos \pi \times 10^{11} \left( t - \frac{x}{C} \right)$

(2)  $E_y = 11 \cos 2\pi \times 10^{11} \left( t - \frac{x}{C} \right),$

$B_y = 11 \times 10^{-7} \cos 2\pi \left( t - \frac{x}{C} \right)$

(3)  $E_x = 33 \cos \pi \times 10^{11} \left( t - \frac{x}{C} \right),$

$B_x = 11 \times 10^{-7} \cos \pi \times 10^{11} \left( t - \frac{x}{C} \right)$

(4)  $E_y = 66 \cos 2\pi \times 10^{11} \left( t - \frac{x}{C} \right),$

$B_z = 2.2 \times 10^{-7} \cos 2\pi \times 10^{11} \left( t - \frac{x}{C} \right)$

प्रत्येक प्रश्न को अर्जुन बनकर करो।



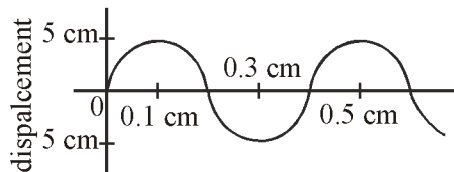
141. A capillary tube of radius 0.2 cm is dipped vertically in a beaker containing liquid. If the liquid rises to a height of 5 cm for which the angle of contact is  $60^\circ$ , then surface tension of the liquid is :-

- (1) 49 dynes/cm  
(2) 98 dyne/cm  
(3) 490 dynes/cm  
(4) 980 dynes/cm

142. A body of mass  $m$  is hanging from a rigid support by an inextensible string of length  $\ell$ . It is struck horizontally perfectly elastically by an identical body with horizontal velocity  $v = \sqrt{2g\ell}$ , the tension in the string increases just after striking by:-

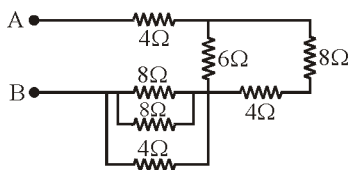
- (1)  $mg$     (2)  $3mg$     (3)  $2mg$     (4)  $mg/2$

143. Figure shows the shape of a part of a long string are produced by attaching one end of string to a tuning fork of frequency 250 Hz. What is the velocity of the waves ?



- (1)  $1 \text{ ms}^{-1}$                       (2)  $1.5 \text{ ms}^{-1}$   
(3)  $2 \text{ ms}^{-1}$                       (4)  $2.5 \text{ ms}^{-1}$

144. The resistance between point A and B in the circuit shown in the following figure is :-



- (1)  $4 \Omega$                               (2)  $6 \Omega$   
(3)  $10 \Omega$                             (4)  $8 \Omega$

145. A convex lens of focal length 20 cm, is placed co-axially with a convex mirror of radius of curvature 20 cm. The two are kept 15 cm apart from each other. A point object is placed 60 cm in front of the convex lens. Find the position of final image formed by combination :- (from mirror)

- (1)  $-30 \text{ cm}$                       (2)  $+20 \text{ cm}$   
(3)  $-20 \text{ cm}$                       (4)  $+30 \text{ cm}$

(Take one refraction/reflection from each device)

146. The position of a particle is given by  $\vec{r} = (\vec{i} + 2\vec{j} - \vec{k})$  momentum  $\vec{P} = (3\vec{i} + 4\vec{j} - 2\vec{k})$ . The angular momentum is perpendicular to :-

- (1) x-axis  
(2) y-axis  
(3) z-axis  
(4) Line at equal angles to all the three axes

147. The instantaneous angular position is a point on a rotating wheel is given by the equation  $\theta(t) = 2t^3 - 6t^2$ . The torque on the wheel becomes zero at :-

- (1)  $t = 2 \text{ sec.}$                       (2)  $t = 1 \text{ sec.}$   
(3)  $t = 0.2 \text{ sec.}$                       (4)  $t = 0.25 \text{ sec.}$

148. A plane progressive wave is represented by the equation  $y = 0.25 \cos (2\pi t - 2\pi x)$ .

The equation of a wave with double the amplitude and half frequency but travelling in the opposite direction will be.

- (1)  $y = 0.5 \cos (\pi t - \pi x)$   
(2)  $y = 0.5 \cos (2\pi t + 2\pi x)$   
(3)  $y = 0.25 \cos (\pi t + 2\pi x)$   
(4)  $y = 0.5 \cos (\pi t + \pi x)$

149. An electric immersion heater of 1.08 kW is immersed in water. After the water has reached a temperature of  $100^\circ\text{C}$ , how much time will be required to produce 100 gm of steam ?

- (1) 50 s    (2) 420 s    (3) 105 s    (4) 210 s

150. The focal length of the objective and the eyepiece of a compound microscope are 2 cm and 3 cm respectively. The distance between the objective and the eyepiece is 15 cm. The final image formed by the eyepiece is at infinity. The distance of the object and the image produced by the objective, measured from the objective lens, are respectively:-

- (1) 2.4 cm and 12 cm  
(2) 2.4 cm and 15 cm  
(3) 2 cm and 12 cm  
(4) 2 cm and 3 cm

- 151.** A particle starts from rest, accelerates at  $2\text{m/s}^2$  for 10s and then goes for constant speed for 30s and then decelerates at  $4\text{m/s}^{-2}$  till it stops. What is the distance travelled by it :-  
 (1) 750 m (2) 800 m  
 (3) 700 m (4) 850 m
- 152.** Which of the following is a vector quantity :-  
 (1) Work (2) Power  
 (3) Torque (4) Gravitational constant
- 153.** The equation of a progressive wave for a wire is :  

$$Y = 4\sin\left[\frac{\pi}{2}\left(8t - \frac{x}{8}\right)\right]$$
 if x and y are measured in cm then velocity of wave is :  
 (1) 64 cm/s along - x direction  
 (2) 32 cm/s along - x direction  
 (3) 32 cm/s along + x direction  
 (4) 64 cm/s along + x direction
- 154.** Two identical coil of turns 'N' and radius 'R' placed in concentric fashion in such a way that their planes are  $60^\circ$  to each other. Both coils carries equal current 'I' in same direction then net magnetic field at their common centre is :-  
 (1)  $\frac{\mu_0 NI}{2R}$  (2)  $\frac{\sqrt{3}\mu_0 NI}{2R}$   
 (3)  $\frac{\mu_0 NI}{R}$  (4) zero
- 155.** A beam of lighth of wavelength  $6000\text{\AA}$  from a distant source falls on a singel slit of width  $\frac{12000}{\sqrt{2}}\text{\AA}$  find width of central maxima an a screen 1.5m away from the slit :-  
 (1) 2.1 m (2) 5.5 m  
 (3) 1.5 m (4) None
- 156.** A student is standing at a distance of 50metres from the bus. As soon as the bus begins its motion with an acceleration of  $1\text{ms}^{-2}$ , the student starts running towards the bus with a uniform velocity u . Assuming the motion to be along a straight road, the minimum value of u , so that the student is able to catch the bus is :-  
 (1)  $5\text{ms}^{-1}$  (2)  $8\text{ms}^{-1}$   
 (3)  $10\text{ms}^{-1}$  (4)  $10\text{ms}^{-1}$
- 157.** When 300 J of heat is added to 25 gm of sample of a material its temperature rises from  $25^\circ\text{C}$  to  $45^\circ\text{C}$ . The thermal capacity of the sample and specific heat of the material are respectively given by :-  
 (1)  $15\text{J}^\circ\text{C}$ ,  $600\text{J/kg}^\circ\text{C}$   
 (2)  $600\text{J}^\circ\text{C}$ ,  $15\text{J}^\circ\text{C-kg}$   
 (3)  $150\text{J}^\circ\text{C}$ ,  $60\text{J/kg}^\circ\text{C}$   
 (4) none of these
- 158.** What should be the angular velocity of rotation of the earth about its own axis so that the weight of the body at the equator reduces to  $\frac{3}{5}$  or its present value ? (Take R as the radius of the earth):-  
 (1)  $\sqrt{\frac{g}{3R}}$  (2)  $\sqrt{\frac{2g}{3R}}$  (3)  $\sqrt{\frac{2g}{5R}}$  (4)  $\sqrt{\frac{2g}{7R}}$
- 159.** A bar magnet of magnetic moment ' $\mu$ ' cuts in three parts perpendicular to its length in ratio 2 : 4 : 6. Now all three parts combined in such a way that their axis are mutually perpendicular to each other then magnetic moment of system is :-  
 (1)  $\sqrt{\frac{7}{18}}\mu$  (2)  $\frac{\sqrt{7}}{6}\mu$  (3)  $\frac{\mu}{12}$  (4) Zero
- 160.** Photoelectric emission is observed from a metallic surface for frequencies  $\nu_1$  and  $\nu_2$  of the incident light rays ( $\nu_1 > \nu_2$ ). If the maximum values of kinetic energy of the photoelectrons emitted in the two cases are in the ratio of 1 : k, then the threshold frequency of the metallic surface is :-  
 (1)  $\frac{\nu_1 - \nu_2}{k - 1}$  (2)  $\frac{k\nu_1 - \nu_2}{k - 1}$   
 (3)  $\frac{k\nu_2 - \nu_1}{k - 1}$  (4)  $\frac{\nu_2 - \nu_1}{k}$
- 161.** An elevator weighing 6000 kg is pulled upward by a cable with an acceleration of  $5\text{ms}^{-2}$ . Taking g to be  $10\text{ms}^{-2}$ . Then the tension in the cable is-  
 (1) 6000 N (2) 9000 N  
 (3) 60000 N (4) 90000 N
- 162.** How many gm of ice at  $-14^\circ\text{C}$  are needed to cool 200 gm of water from  $25^\circ\text{C}$  to  $10^\circ\text{C}$  ?  
 (1) 21 gm (2) 31 gm  
 (3) 41 gm (4) 51 gm

163. Imagine a light planet revolving around a very massive star in a circular orbit of radius  $r$  with a period of revolution  $T$ . If gravitation force of attraction between the planet and the star is proportional to  $r^{-3/2}$  then the square of the time period will be proportional to :-

- (1)  $r^3$       (2)  $r^2$       (3)  $r^{2.5}$       (4)  $r^{3.5}$

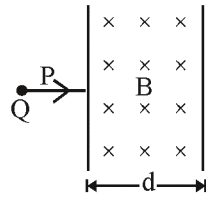
164. A particle with charge 'Q', moving with a momentum 'P', enters in uniform magnetic field has magnitude 'B' normally. Field is confined to a region of width 'd', where  $d < \frac{P}{QB}$ . The particle is deflected by an angle 'θ' in crossing the field then

(1)  $\sin\theta = \frac{BQd}{P}$

(2)  $\sin\theta = \frac{P}{BQd}$

(3)  $\sin\theta = \frac{BP}{Qd}$

(4)  $\sin\theta = \frac{Pd}{BQ}$



165. If  $E_1, E_2, E_3$  are the respective kinetic energies of an electron, an alpha particle and a proton, each having the same de Broglie wavelength, then :-

- (1)  $E_1 > E_3 > E_2$       (2)  $E_2 > E_3 > E_1$   
(3)  $E_1 > E_2 > E_3$       (4)  $E_1 \geq E_3 = E_2$

166. A block of metal is lying on the floor of a bus. The maximum acceleration which can be given to the bus so that the block may remain at rest, will be (a coefficient of friction between floor and block is  $\mu$ ) :-

- (1)  $\mu g$       (2)  $\frac{\mu}{g}$       (3)  $\mu^2 g$       (4)  $\mu g^2$

167. Three objects coloured black, grey & white can withstand hostile conditions upto  $2800^\circ\text{C}$ . If each of them are thrown into a furnace of temperature  $2000^\circ\text{C}$ . Then which object will glow brightest:-

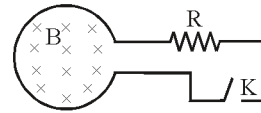
- (1) Black  
(2) Grey  
(3) White  
(4) All will have same brightness

168. An electrical dipole is placed at the origin and is directed along the x-axis. At a point P, far away from the dipole, the electric field is parallel to the y-axis. OP makes an angle  $\theta$  with the x-axis then:-

(1)  $\tan\theta = \sqrt{3}$       (2)  $\tan\theta = \sqrt{2}$

(3)  $\theta = 45^\circ$       (4)  $\tan\theta = \frac{1}{\sqrt{2}}$

169. Shown in the figure is a circular loop of radius  $r$  and resistance  $R$ . A variable magnetic field of induction  $B = B_0 e^{-t}$  is established inside the coil. If the key (K) is closed, the electrical power developed right after closing the switch is equal to



(1)  $\frac{B_0^2 \pi r^2}{R}$

(2)  $\frac{B_0 10r^3}{R}$

(3)  $\frac{B_0^2 \pi^2 r^4 R}{5}$

(4)  $\frac{B_0^2 \pi^2 r^4}{R}$

170. In a radioactive sample, there are  $1.414 \times 10^6$  active nuclei. If they reduce to  $10^6$  within 10 minute the half life (in minute) of this sample will be :-

- (1) 5      (2) 20      (3) 15      (4) 30

171. A ball impinges directly on a similar ball at rest. If  $\frac{1}{4}$  of the Kinetic energy is lost by the impact. The value of coefficient of restitution is :-

- (1)  $\frac{1}{2\sqrt{2}}$       (2)  $\frac{1}{\sqrt{3}}$       (3)  $\frac{1}{\sqrt{2}}$       (4)  $\frac{\sqrt{3}}{2}$

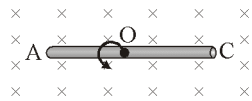
172. A tap supplies water is  $10^\circ\text{C}$  and another at  $100^\circ\text{C}$ . How much hot water must be taken so that we get 20 kg water at  $35^\circ\text{C}$ ?

- (1) 7.2 kg      (2) 10 kg  
(3) 5.6 kg      (4) 14.4 kg

173. A small metal ball is suspended in a uniform electric field with the help of an insulated thread. If a high energy X-ray beam falls on the ball, then:-

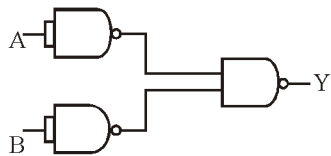
- (1) The ball will deflect in the direction of the field
- (2) The ball will deflect opposite to the direction of the field
- (3) The ball will deflect perpendicular to the direction of field
- (4) The ball will not deflect

174. A conducting rod AC of length  $4l$  is rotated about a point O in a uniform magnetic field  $\vec{B}$  directed into the paper.  $AO = l$  and  $OC = 3l$ . Then



- (1)  $V_A - V_O = \frac{B\omega l^2}{2}$
- (2)  $V_O - V_C = \frac{7}{2}B\omega l^2$
- (3)  $V_A - V_C = 4B\omega l^2$
- (4)  $V_C - V_O = \frac{9}{2}B\omega l^2$

175. The combination of given logic gates is equivalent to :-



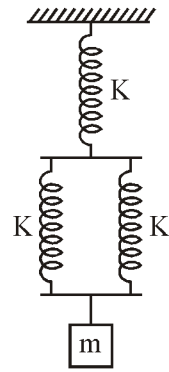
- (1) AND
- (2) OR
- (3) NAND
- (4) NOR

176. A particle is moving in a circular path with a constant speed  $V$ . If  $\theta$  is the angular displacement, then starting from  $\theta = 0^\circ$ , the maximum and minimum change in the linear momentum will occur when value of  $\theta$  is respectively :-

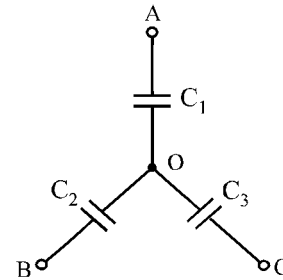
- (1)  $45^\circ$  &  $90^\circ$
- (2)  $90^\circ$  &  $180^\circ$
- (3)  $180^\circ$  &  $360^\circ$
- (4)  $90^\circ$  &  $270^\circ$

177. If the mass shown in fig. is slightly displaced and then released, then the system shall oscillate with a time period of :-

- (1)  $2\pi\sqrt{\frac{m}{3K}}$
- (2)  $2\pi\sqrt{\frac{3m}{2K}}$
- (3)  $2\pi\sqrt{\frac{2m}{3K}}$
- (4)  $2\pi\sqrt{\frac{3K}{m}}$



178. Three uncharged capacitors of capacities  $C_1$ ,  $C_2$  and  $C_3$  are connected as shown in the figure to one another and the points A, B and C are at potentials  $V_1$ ,  $V_2$  and  $V_3$  respectively. Then the potential at O will be:-



- (1)  $\frac{C_1V_1 + C_2V_2 + C_3V_3}{C_1 + C_2 + C_3}$
- (2)  $\frac{V_1 + V_2 + V_3}{C_1 + C_2 + C_3}$
- (3)  $\frac{V_1(V_2 + V_3)}{C_1(C_2 + C_3)}$
- (4)  $\frac{V_1V_2V_3}{C_1C_2C_3}$

179. L, C and R represent physical quantities inductance, capacitance and resistance respectively. The combination representing dimension of frequency is

- (1) LC
- (2)  $(LC)^{-1/2}$
- (3)  $\left(\frac{L}{C}\right)^{-1/2}$
- (4)  $\frac{C}{L}$

180. In an n-p-n transistor  $10^8$  electrons enter the emitter in  $10^{-8}$  s. If 1% electrons are recombine in the base then base current & current amplification factor ( $\beta$ ) are respectively :-

- (1) 0.016 mA & 49
- (2) 0.16 mA & 99
- (3) 1.6 mA & 49
- (4) 0.016 mA & 99