

# AIPMT

## SAMPLE PAPERS WITH SOLUTIONS

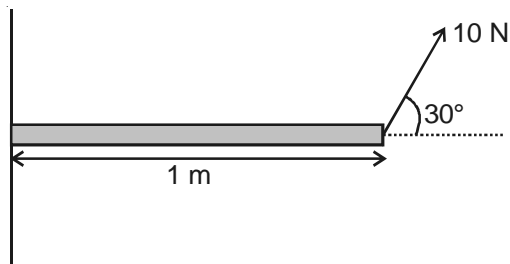
### PHYSICS

Choose the correct answer :

- Which one of the following quantities has not been expressed in proper units?
  - (1)  $\frac{\text{Stress}}{\text{Strain}} = \frac{\text{N}}{\text{m}^2}$
  - (2) Surface tension =  $\frac{\text{N}}{\text{m}}$
  - (3) Energy = kg m/s
  - (4) Pressure =  $\frac{\text{N}}{\text{m}^2}$
- If C and L denote the capacity and inductance, then the dimension of LC are
  - (1)  $M^0L^0T^2$
  - (2)  $ML^2T^{-2}$
  - (3)  $M^2L^2T^{-2}$
  - (4)  $MLT^{-1}$
- For the resultant of two vectors to be maximum, what must be the angle between them?
  - (1)  $0^\circ$
  - (2)  $60^\circ$
  - (3)  $90^\circ$
  - (4)  $180^\circ$
- Two blocks of masses 2 kg and 1 kg are in contact with each other on a frictionless table when a horizontal force of 3 N is applied to the block of mass 2 kg, the value of the force of contact between the two blocks
  - (1) 4 N
  - (2) 3 N
  - (3) 2 N
  - (4) 1 N

(1)

5. Torque acting on rod about an axis, as shown, is



- (1) 5 N m                      (2)  $5\sqrt{3}$  N m  
 (3) 10 N m                    (4)  $10\sqrt{3}$  N m
6. A body of mass 2 kg moving with a velocity of 3 m/s collides head on with a body of mass 1 kg moving with a velocity of 4 m/s in opposite direction. After collision the two bodies stick together and move with a common velocity
- (1)  $\frac{1}{4}$  m/s                    (2)  $\frac{1}{3}$  m/s  
 (3)  $\frac{2}{3}$  m/s                    (4)  $\frac{3}{4}$  m/s
7. Two skaters A and B of masses 50 kg and 70 kg respectively stand facing each other 6 m apart. They pull the rope stretched between them. How far has each moved when they meet?
- (1) Both have moved 3 m  
 (2) Both have moved 2.5 m  
 (3) A moves 3.5 m and B 2.5 m  
 (4) A moves 2 m and B 4 m
8. A particle is moving in a straight line has velocity, displacement equation as  $v = \sqrt{1+s}$ , where  $v$  is in m/s and  $s$  is in m. The initial velocity of the particle
- (1) 2 m/s                      (2) 1 m/s  
 (3) 3 m/s                      (4) 4 m/s
9. A weight is suspended from the roof of a lift by a spring balance. When the lift is stationary the spring balance reads  $W$ . If the lift suddenly falls freely under gravity the reading of the spring balance will be
- (1)  $Wg$                       (2)  $2Wg$   
 (3)  $\frac{W}{2}g$                     (4) Zero

10. The kinetic energy  $E$  of a particle of mass  $m$  moving in a circle of radius  $r$  varies with distance traced  $S$  as  $E = 4KS^2$ . The tangential acceleration of the particle, is
- (1)  $\frac{4K}{m}$                       (2)  $\frac{8KS}{m}$   
 (3)  $\frac{2K}{m}$                       (4)  $\frac{8KS^2}{mr}$
11. A fan of moment of inertia 1.6 kg m<sup>2</sup> is to be run upto a working speed of  $\frac{1}{2}$  rps. Correct value of the angular momentum of the fan, is
- (1)  $1.6 \pi$  kg m<sup>2</sup>/s            (2)  $2.6 \pi$  kg m<sup>2</sup>/s  
 (3) 6 kg m<sup>2</sup>/s                (4) 3 kg m<sup>2</sup>/s
12. A simple pendulum has an amplitude  $2A$  and time period  $\frac{T}{4}$ . The max velocity will be
- (1)  $\frac{\pi A}{T}$                       (2)  $\frac{3\pi A}{T}$   
 (3)  $\frac{16\pi A}{T}$                     (4)  $\frac{32\pi A}{T}$
13. Which of the following graphs represents the motion of a planet moving around the sun?
- (1)      (2)   
 (3)      (4)
14. Two pieces of metal when immersed in a liquid have equal upthrust on them, then
- (1) Both the pieces must have equal weights  
 (2) Both the pieces must have equal densities  
 (3) Both the pieces must have equal volume  
 (4) Both are floating to the same depth

15. A copper wire of length 1 m and cross-section  $\frac{1}{16}$  m<sup>2</sup> stretched by a load of 2 kg. Young's modulus for copper is  $2 \times 10^{11}$  N/m<sup>2</sup> and  $g = 10$  m/s<sup>2</sup>. The extension of the wire

- (1)  $1.6 \times 10^{-10}$  m      (2)  $16 \times 10^{-10}$  m  
 (3)  $8 \times 10^{-8}$  m      (4)  $16 \times 10^{-11}$  m

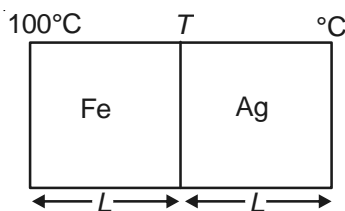
16. The speed of sound in air is

- (1)  $\propto$  pressure of air  
 (2)  $\propto$  square of pressure  
 (3)  $\propto \sqrt{\text{pressure}}$   
 (4) Independent of pressure if temperature is constant

17. An open organ pipe has fundamental frequency of 400 Hz. The frequency of first overtone of this pipe is same as that of 1st overtone of a closed organ pipe. The length of the closed organ pipe is nearly

- (1) 31 cm      (2) 39 cm  
 (3) 28 cm      (4) 34 cm

18. Two cylinders of same diameter one of iron and other of silver, are placed in closed contact as shown in figure. If  $K_{\text{Iron}} = 12 K_{\text{Ag}}$  what will the temperature of the interface nearly?



- (1) 92°C  
 (2) 94°C  
 (3) 95°C  
 (4) 96°C

19. If 2 moles of a monatomic gas  $\gamma = \frac{5}{3}$  is mixed with 1 mole of diatomic gas  $\gamma = \frac{7}{5}$ , the value of  $\gamma$  for the mixture is

- (1)  $\frac{17}{11}$       (2)  $\frac{11}{17}$   
 (3)  $\frac{16}{11}$       (4)  $\frac{11}{16}$

20. In a particular experiment, a gas undergoes adiabatic expansion, satisfying the equation  $VT^3 = \text{constant}$ . The ratio of specific heats is equal to

- (1) 4      (2) 3  
 (3)  $\frac{5}{3}$       (4)  $\frac{4}{3}$

21. A concave mirror of focal length  $f$  (in air) is immersed in water ( $\mu = \frac{4}{3}$ ). The focal length of mirror in water will be

- (1)  $f$       (2)  $\frac{4}{3}f$   
 (3)  $\frac{3}{4}f$       (4)  $\frac{7}{3}f$

22. A convex lens and a concave lens, each having same focal length of 30 cm are put in contact to form a combination of lenses. The power in diopters of the combination is

- (1) Zero      (2) 25  
 (3) 50      (4) Infinite

23. The refractive indices of violet and red light are 1.54 and 1.52 respectively if the angle of prism is 10°. The angular dispersion is

- (1) 0.02°      (2) 0.2°  
 (3) 3.06°      (4) 30.6°

24. The least distance of distinct vision for a long-sighted person is  $x$  m. He wants to read a newspaper placed at a distance of  $\left(\frac{x}{2}\right)$  m. The power of the spectacle lens used by him is  $x$  diopter. What is the value of  $x$ ?

- (1) 0.5      (2) 1  
 (3) 1.5      (4) 2

25. The fringe width in Young's double slit experiment increases when

- (1) Wavelength increases  
 (2) Distance between source and screen decreases  
 (3) Distance between slit increases  
 (4) The width of the slit increases

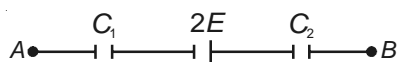
26. If a spherical hollow conductor encloses a charge  $q$ , then the total flux coming out of the surface will be

- (1)  $\frac{1}{\epsilon_0} \times$  the charge enclosed by the surface
- (2)  $\epsilon_0 \times$  charge enclosed by surface
- (3)  $\frac{1}{4\pi\epsilon_0} \times$  charge enclosed by surface
- (4) Zero

27. Two point charges  $q$  and  $-q$  are at a positions  $(0, 0, d)$  and  $(0, 0, -d)$  respectively. What is the electric field at  $(a, 0, 0)$ ?

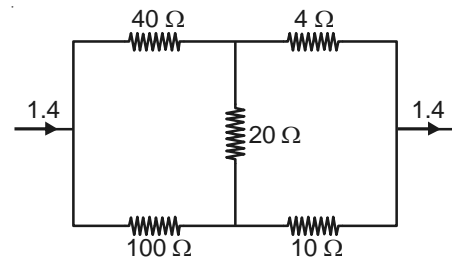
- (1)  $\frac{2qd}{4\pi\epsilon_0(a^2 + d^2)^{3/2}} \hat{k}$
- (2)  $\frac{qd}{4\pi\epsilon_0(a^2 + d^2)^{3/2}} \hat{k}$
- (3)  $\frac{-2qd}{4\pi\epsilon_0(a^2 + d^2)^{3/2}} \hat{k}$
- (4)  $\frac{-qd}{4\pi\epsilon_0(a^2 + d^2)^{3/2}} \hat{k}$

28. A circuit has a section  $AB$  and shown in the figure. If the potential difference between points  $A$  and  $B$  is  $V$  volt, then the potential difference across  $C_1$  is



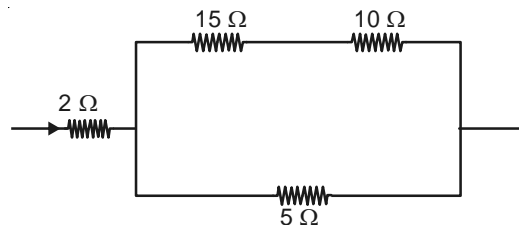
- (1)  $\frac{(V + 2E)C_2}{C_1 + C_2}$
- (2)  $\frac{(V - 2E)C_2}{C_1 + C_2}$
- (3)  $\frac{(V + E)C_2}{C_1 + C_2}$
- (4)  $\frac{(V - E)C_2}{C_1 + C_2}$

29. In the given figure the current through 4 ohm resistor is



- (1) 0.4 A
- (2) 0.7 A
- (3) 1 A
- (4) 1.4 A

30. In the circuit shown below, if the resistance  $5 \Omega$  develops heat of 45 J/s, heat developed in  $2 \Omega$  must be about



- (1) 26 J/s
- (2) 20 J/s
- (3) 30 J/s
- (4) 35 J/s

31. An insulating rod of  $L$  carries a charge  $Q$  distributed uniformly on it. The rod is pivoted at one end and is rotated at a frequency  $f$  and about a fixed perpendicular axis. The magnetic dipole moment of the system is

- (1)  $\frac{\pi Q}{L^2}$
- (2)  $\frac{QL^2\pi f}{3}$
- (3)  $QL\pi f$
- (4)  $\frac{QL^2}{3}$

32. Relative permittivity and permeability of a material are  $\epsilon_r$  and  $\mu_r$  respectively which of the following values of these quantities are allowed for a diamagnetic material?

- (1)  $\epsilon_r = 0.5, \mu_r = 1.5$
- (2)  $\epsilon_r = 1.5, \mu_r = 0.5$
- (3)  $\epsilon_r = 0.5, \mu_r = 0.5$
- (4)  $\epsilon_r = 1.5, \mu_r = 1.5$

33. A current of 2 A flows through an inductor of inductance 0.1 H. What is the maximum magnetic energy stored in the inductor ?

- (1) 0.2 J
- (2) 0.1 J
- (3) 0.4 J
- (4) 0.8 J

34. A sinusoidal voltage  $V_0 \sin \omega t$  is applied across a series combination of resistance  $R$  and inductance  $L$ . The amplitude of the current in the circuit is

- (1)  $\frac{V_0}{\sqrt{R^2 + \omega^2 L^2}}$       (2)  $\frac{V_0}{\sqrt{R^2 - \omega^2 L^2}}$   
 (3)  $\frac{V_0}{R + \omega L}$       (4)  $\frac{V_0}{R}$

35. A plane electromagnetic wave,

$E = 200 \sin(2 \times 10^8 t + 1x)$  V/m propagates in a medium of refractive index

- (1) 1.5      (2) 2.0  
 (3) 10      (4) 2.4

36. An  $\alpha$  particle is accelerated through a potential difference of 200 V. The increase in its kinetic energy, in electron volt is

- (1) 100      (2) 200  
 (3) 400      (4) 800

37. The threshold frequency for a certain metal  $\nu_0$ . When light of frequency  $\nu = 2\nu_0$  is incident on it, the maximum velocity of photoelectrons is  $4 \times 10^6$  m/s. If the frequency of incident radiation is increased to  $5\nu_0$ , then the maximum velocity of the photoelectron (in m/s) will be

- (1)  $\frac{4}{5} \times 10^6$       (2)  $2 \times 10^6$   
 (3)  $8 \times 10^6$       (4)  $2 \times 10^7$

38. The angular speed of the electron in the  $n^{\text{th}}$  orbit of Bohr's hydrogen atom is

- (1) Directly proportional to  $n$   
 (2) Inversely proportional to  $\sqrt{n}$   
 (3) Inversely proportional to  $n^2$   
 (4) Inversely proportional to  $n^3$

39. The half life of a radioactive element which has only  $\frac{1}{32}$  of its original mass left after a lapse of 60 days, is

- (1) 12 days      (2) 32 days  
 (3) 60 days      (4) 64 days

40. Fusion reaction takes place at about

- (1)  $3 \times 10^2$  K  
 (2)  $3 \times 10^3$  K  
 (3)  $3 \times 10^4$  K  
 (4)  $3 \times 10^7$  K

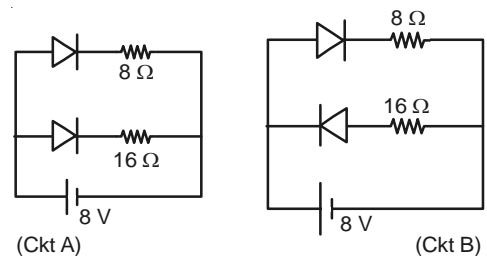
41. In a P-N junction diode, holes diffuse from P region to N region because

- (1) The force electrons in the N region attract them  
 (2) They are swept across the junction by potential difference  
 (3) There is greater concentration of holes in P region as compared to N region  
 (4) Diffuse only when there is reverse biasing

42. The difference in the variation of resistance with temperature in a metal and a semiconductor arises essentially due to the difference in

- (1) Type of bonding  
 (2) Crystal structure  
 (3) Scattering mechanism with temperature  
 (4) Number of charge carries with temperature

43. Current flowing in each of the circuit A and B respectively



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

44. The process of superposition of weak audio signal to a high frequency carrier wave is called

- (1) Transmission      (2) Communication  
 (3) Modulation      (4) Demodulation

45. A TV tower has a height of 50 m. The maximum distance upto which TV transmission can be received is approximately equal to ( $R = 6400$  km)

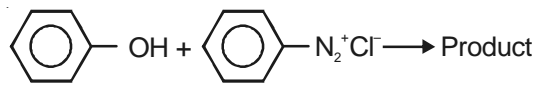
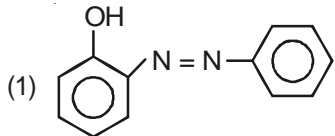
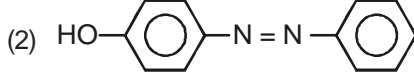
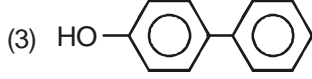
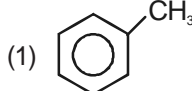
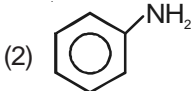
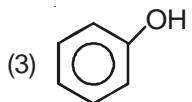
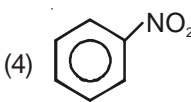
- (1) 5 km      (2) 25 km  
 (3) 100 km      (4) 250 km

## CHEMISTRY

46. Which of the following set contains only intensive variables?
- (1) Volume, energy, enthalpy
  - (2) Area, enthalpy, work
  - (3) Viscosity, surface tension, density
  - (4) Viscosity, density, volume
47. For a reaction,  $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ , the rate of formation of  $NH_3$  is  $34 \text{ g hour}^{-1}$ . The rate at which  $H_2$  is consumed, under similar conditions is
- (1) 12 g/hr
  - (2)  $\frac{4}{3}$  g/hr
  - (3) 6 g/hr
  - (4)  $\frac{1}{2}$  g/hr
48. The number of moles of  $KMnO_4$  which is required to react with one mole of sulphite ion ( $SO_3^{2-}$ ) in acidic medium is
- (1)  $\frac{4}{5}$
  - (2)  $\frac{3}{5}$
  - (3) 1
  - (4)  $\frac{2}{5}$
49.  $Fe^{3+}$ ,  $Zn^{2+}$  and  $Cu^{2+}$  ions are present in a slightly acidic medium. The reagent which when added in excess would separate  $Fe^{3+}$  in one step is
- (1)  $H_2S$
  - (2)  $HCl$
  - (3)  $NaOH$
  - (4)  $NH_3$
50. How many pairs of enantiomers are possible for the molecular formula  $C_5H_{11}Br$ ?
- (1) 2
  - (2) 3
  - (3) 4
  - (4) 5
51. The type of isomerism present in  $[Cr(NH_3)_5NO_2]^{2+}$  is
- (1) Ionisation isomerism
  - (2) Optical isomerism
  - (3) Linkage isomerism
  - (4) Geometrical isomerism
52. Which of the following will not react with acetylene?
- (1)  $NaNH_2$
  - (2) Tollen's reagent
  - (3)  $HCl$
  - (4) Both (2) & (3)
53. Equal weights of two gases separately expands in an isothermal and reversible manner and the work done in both the cases is same. The gases are
- (1)  $F_2, O_2$
  - (2)  $N_2, C_2H_4$
  - (3)  $CH_4, NO_2$
  - (4)  $C_2H_6, N_2O$
54. The volume of 0.1 M of  $KOH$  required to neutralise completely 20 ml of 0.1 M  $H_3PO_3$ , is
- (1) 50 ml
  - (2) 40 ml
  - (3) 30 ml
  - (4) 20 ml
55. The coordination number and oxidation number of Cr in  $K_3[Cr(C_2O_4)_3]$  are respectively
- (1) 6 and +3
  - (2) 3 and +6
  - (3) 4 and +2
  - (4) 3 and +3
56. 2-Methylpentan-2-ol is prepared from acetone and 'x'. 'x' is
- (1)  $(CH_3)_3CMgI/H_2O$
  - (2)  $C_2H_5MgCl/H_2O$
  - (3)  $CH_3CH_2CH_2MgCl/H_2O$
  - (4)  $CH_3MgCl/H_2O$
57. The conjugate acid of formic acid in the given reaction is
- $$HCl + HCOOH \rightleftharpoons HCOOH_2^+ + Cl^-$$
- (1)  $Cl^-$
  - (2)  $HCOO^-$
  - (3)  $HCOOH_2^+$
  - (4)  $HCOOH$
58. Consider the following equimolar solutions
- a. Sugar
  - b. Sodium chloride
  - c. Sodium sulphate
  - d. Sodium phosphate
- The correct order of increasing freezing point of the given solutions is
- (1)  $a < b < c < d$
  - (2)  $b < c < a < d$
  - (3)  $d < c < b < a$
  - (4)  $c < d < a < b$
59. 0.5 ampere current is passed through copper and silver voltameters for 40 seconds. The metal that gets deposited more in gram is
- (1) Cu
  - (2) Ag
  - (3) Both in equal quantities
  - (4) Cannot be predicted



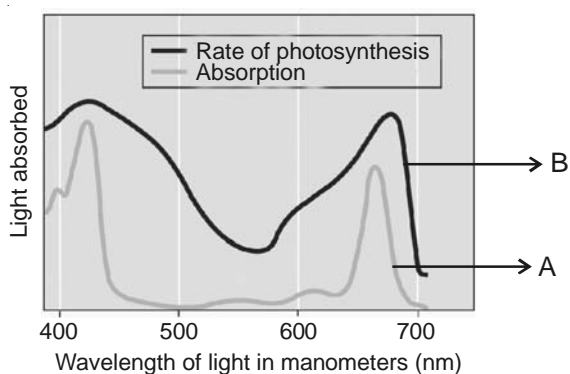


73. Isobutyl bromide reacts with aq. KOH to give (as major product)
- (1) n-Butyl alcohol      (2) t-Butyl alcohol  
(3) Isobutyl alcohol      (4) Isobutene
74. Phenyl salicylate can be used as
- (1) Antipyretic      (2) Antiseptic  
(3) Disinfectant      (4) Analgesic
75. Pyrolusite is an ore of
- (1) Mg      (2) Mn  
(3) Fe      (4) Zn
76. Physical adsorption is favourable at
- (1) High temperature  
(2) Low temperature  
(3) Room temperature  
(4) Independent of temperature
77. Be and Al differ in
- (1) Exhibiting maximum covalency in compounds  
(2) Showing amphoteric nature in their oxides  
(3) Forming covalent halides  
(4) Forming polymeric halides
78. The number of  $\sigma$ -bonds in  $P_4O_{10}$  is
- (1) 12      (2) 14  
(3) 16      (4) 20
79. Which one of the following has a regular tetrahedral structure?
- (1)  $[Ni(CN)_4]^{2-}$       (2)  $BF_4^-$   
(3)  $SF_4$       (4)  $XeF_4$
80. The products formed by the disproportionation reaction of hypochlorous acid are
- (1)  $HClO_2$  and  $HClO_4$       (2)  $HCl$  and  $HClO_3$   
(3)  $HCl$  and  $Cl_2O$       (4)  $HClO_3$  and  $Cl_2O$
81.  $CO_2$  and  $NH_3$  react at 473 K and 220 atmospheric pressure to form
- (1)  $N_2O$  and  $CO$       (2)  $HCONH_2 + H_2O$   
(3)  $CH_3CONH_2$       (4) Urea and  $H_2O$
82. Which of the following is an acidic hydride of nitrogen?
- (1)  $HN_3$       (2)  $NH_3$   
(3)  $N_2H_4$       (4)  $N_2H_2$
83. Ozone oxidises iodine in the presence of moisture to
- (1) Hydroiodic acid      (2) Periodic acid  
(3) Iodic acid      (4) Hypoiodous acid
84. Which pair of metals becomes passive in conc.  $HNO_3$ ?
- (1) Fe, Al      (2) Cu, Pt  
(3) Ni, Mg      (4) Sn, Ni
85.  $CuCl$  is sparingly soluble in water but it dissolves in KCl solution due to the formation of
- (1)  $K_3[CuCl_4]$       (2)  $K_2[CuCl_4]$   
(3)  $K_3[CuCl_2]$       (4)  $K_2[CuCl_2]$
86. Silver chloride dissolves in  $NH_4OH$  forming a compound 'X'. Which of the following is true about 'X'?
- (1) X is a complex compound  
(2) X is a diamagnetic in a nature  
(3) X is a cationic complex  
(4) All of these
87. Hexafluorocobaltate (III) ion is a high spin complex where the hybrid state of cobalt is
- (1)  $sp^3d$       (2)  $sp^3d^2$   
(3)  $d^2sp^3$       (4)  $dsp^2$
88. When an organic compound containing phosphorous is fused with fusion mixture, it forms
- (1)  $Na_2HPO_4$       (2)  $Na_3PO_4$   
(3)  $NaH_2PO_4$       (4)  $Na_3PO_3$
89.  The product can be
- (1)   
(2)   
(3)   
(4) Both (1) & (2)
90. Which of the following compound will be most reactive towards electrophilic substitution reaction?
- (1)       (2)   
(3)       (4) 



## BOTANY

91. Complete oxidation of organic substances in the presence of oxygen
- (1) Is most common in higher organisms
  - (2) Produces alcohol, CO<sub>2</sub> and energy
  - (3) Releases CO<sub>2</sub>, water and small amount of energy
  - (4) Produces lactic acid and large amount of energy
92. When the electrons pass from NADH to oxygen via   A   in the mitochondrial ETS, they are coupled to   B   for the production of ATP from ADP and inorganic phosphate.
- (1) A – Complex I to V  
B – ATP synthase
  - (2) A – Complex V  
B – Complex I to IV
  - (3) A – Complex I to IV  
B – ATP synthase
  - (4) A – Complex I to III  
B – Complex IV and V
93. From tips of coleoptiles of oat seedlings, F.W. Went isolated
- (1) Cytokinin
  - (2) An intercellular factor
  - (3) Gibberellic acid
  - (4) An intracellular factor
94. Examine the figure given below and select the right option giving both of the parts (A & B) **correctly** identified



- (1) A - Action spectrum  
B - Absorption spectrum of chl-a
  - (2) A - Absorption spectrum of  $\beta$ -carotene  
B - Action spectrum
  - (3) A - Action spectrum  
B - Absorption spectrum of  $\beta$ -carotene
  - (4) A - Absorption spectrum of chl-a  
B - Action spectrum
95. Nucleolus disappears and the nuclear envelope breaks down by the end of
- |                |                 |
|----------------|-----------------|
| A - Diakinesis | B - Prophase-II |
| C - Telophase  | D - Pachytene   |
- (1) Only A
  - (2) A, B
  - (3) Only B
  - (4) C, D
96. Evolution of C<sub>4</sub> photosynthetic system is one of the strategies for
- (1) Maximising water loss as well as availability of CO<sub>2</sub>
  - (2) Minimising availability of CO<sub>2</sub> while maximising water loss
  - (3) Minimising water loss as well as availability of CO<sub>2</sub>
  - (4) Maximising availability of CO<sub>2</sub> while minimising water loss
97. Read the following statement having two blanks (A & B)
- “In the case of   A   the F<sub>1</sub> generation resembles both parents but in   B   the F<sub>1</sub> resembled either of the two parents.”
- The one **correct** option for the two blanks is
- (1) A – Dominance  
B – Incomplete dominance
  - (2) A – Incomplete dominance  
B – Co-dominance
  - (3) A – Co-dominance  
B – Dominance
  - (4) A – Co-dominance  
B – Incomplete dominance

98. Heterogamety is shown by  
 (1) Male grasshopper (2) Female chicks  
 (3) Female fruit fly (4) Both (1) & (2)
99. Which of the following disease shows its transmission from unaffected carrier female to some of the male progeny?  
 (1) Haemophilia  
 (2) Myotonic dystrophy  
 (3) Turner's syndrome  
 (4) Down's syndrome
100. How many of the following organisms are chemosynthetic autotrophs?  
 I. *Nostoc*  
 II. *Lactobacillus*  
 III. *Vibrio*  
 IV. *Nitrobacter*  
 (1) Three (2) Four  
 (3) Two (4) One
101. In plants, symptoms like mosaic formation, leaf rolling and vein clearing are produced by  
 (1) Bacteria (2) Nucleoprotein particles  
 (3) Prions (4) Nematodes
102. Ascospores, sporangiospores and basidiospores all the three are  
 (1) Produced in sexual reproduction  
 (2) Produced during reproduction in fungi  
 (3) Produced in asexual reproduction  
 (4) Produced after gametic meiosis
103. In which of the following part(s) of sunflower, vascular cambium is completely secondary in origin?  
 (1) Root, stem (2) Flower, leaf  
 (3) Root (4) Leaf, stem
104. Underground stems of *Colocasia* and ginger are modified to perform  
 (1) Photosynthesis  
 (2) Storage and perenation  
 (3) Respiration and absorption of water  
 (4) Conduction of water and minerals
105. Axonemal microtubules are arranged as 9 + 2 array in the cilia or flagella of  
 (1) *Agaricus* and morels  
 (2) T<sub>2</sub> phage and *Vibrio*  
 (3) *Paramecium* and *Euglena*  
 (4) *Porphyra* and *Polysiphonia*
106. Mark the **mis-matched** pair  
 (1) Medicine – *Aloe*, muliathi  
 (2) Edible oil – Soyabean, groundnut  
 (3) Ornamentals – Lupin, *Petunia*  
 (4) Dyes – *Sesbania*, *Trifolium*
107. Plants with great ecological importance but little economic importance belong to  
 (1) Bryophytes (2) Pteridophytes  
 (3) Gymnosperms (4) Algae
108. Mark the **wrongly** matched pair  
 (1) Yeast – Budding  
 (2) Date palm – Dioecious plant  
 (3) *Agave* – Bulbil  
 (4) *Strobilanthus* – External fertilisation
109. Flowers are not very colourful and do not produce nectar in  
 A. Entomophily  
 B. Anemophily  
 C. Hydrophily  
 D. Ornithophily  
 (1) B, C (2) A, B  
 (3) C, D (4) A, D
110. Which one of the following statements is **true** in respect of post fertilisation structures and events?  
 (1) Perisperm is residual and persistent endosperm in seed  
 (2) Zygote gives rise to the proembryo and subsequently to the heart-shaped, globular and mature embryo in dicots  
 (3) In monocots hypocotyl has a shoot apex and a few leaf primordia enclosed in a hollow foliar structure  
 (4) Transformation of ovules into seed and ovary into fruit proceeds simultaneously

111. Find out the hybrid varieties of crop plants which have been developed in India
- TN-1
  - HD 1553
  - IR-8
  - P 1542
- B, C, D
  - B, D
  - A, B, D
  - A, C
112. Which one of the following is **mis-matched** pair?
- Biomagnification – DDT in aquatic food chain
  - Integrated organic farming – Cyclical zero waste procedure
  - Sanitary landfills – Solid wastes
  - Waste water – Use of phenyl
113. There are several ways of removing particulate matter; the most widely used of which is
- Catalytic converter
  - ESP
  - Bag filters
  - Scrubber
114. The historic convention on Biological Diversity held in
- Rio de Janeiro, 2002
  - Brazil, 1992
  - South Africa, 2002
  - Johannesburg, 1992
115. Large quantity of protein rich food within a short duration is possible by growing
- Sequoia*
  - Spirulina*
  - Toadstool
  - Triticum*
116. The dough, which is used for making bread and idli is fermented by
- Heterotrophic microbes
  - Bacteria and fungi respectively
  - Autotrophic microbes
  - Fungi and BGA respectively
117. Find **correct** one (w.r.t. defining features of all life forms)
- Cellular organisation
  - Extrinsic growth
  - Reproduction
  - Both (1) & (2)
118. Which of the following pair is **wrongly** matched?
- Ethephon – Fruit ripening in apples
  - Bakane disease of rice seedlings – BAP
  - Vernalisation – Chilling treatment
  - NAA – Synthetic auxin
119. Reserve food is very similar to amylopectin and glycogen in structure in
- Dictyota, Fucus*
  - Polysiphonia, Porphyra*
  - Volvox, Cladophora*
  - Euglena, Ulothrix*
120. Pinnate leaves persist for a few years in a gymnosperm with
- Sunken stomata
  - Branched stem
  - Coralloid roots
  - Fungal roots
121. deATP, deCTP, deGTP and deTTP serve as
- Source of energy for polymerisation of amino acids
  - Substrates in replication of DNA
  - Source of energy for transcription
  - Both (1) & (2)
122. If the sequence of the coding strand in a transcription unit is written as follows
- 5'-TGA ACTGTAGCATGC-3'
- Find out the correct sequence in m-RNA.
- 5'-UGAACUGUAGCUUGC-3'
  - 3'-CGUACGAUGACAAGU-5'
  - 3'-CGUACGAUGUCAAGU-5'
  - 5'-UGACUGUAGCUUGC-3'

123. Find out the biomolecule having structural specialities to read the genetic code.
- (1) Amino acids
  - (2) mRNA
  - (3) Adapter molecule
  - (4) Peptidyl transferase
124. RuBisCO as well as PEPcase both are found in the leaves of
- (1) C<sub>3</sub> plants
  - (2) All photosynthetic plants
  - (3) Dry tropical regions
  - (4) More than one option is correct
125. *Pseudomonas* and *Thiobacillus* perform the
- (1) Reduction of nitrate in soil
  - (2) Denitrification and ammonification respectively
  - (3) Oxidation of ammonia in soil
  - (4) Nitrogen fixation and nitrification respectively
126. Read the following statements
- A. Cytoskeleton is involved in mechanical support and motility of the bacterial cell.
- B. In plants cells, centrioles form spindle apparatus during cell division.
- (1) Both A & B are incorrect
  - (2) Only A is correct
  - (3) Only B is correct
  - (4) Both A & B are correct
127. Mature or ripened ovary of mango and coconut resemble in presence of
- (1) Double endosperm
  - (2) Scutellum
  - (3) Stony hard endocarp
  - (4) Undifferentiated pericarp
128. Permanent tissues having all cells similar in structure and function is
- (1) Collenchyma, sclerenchyma
  - (2) Xylem, phloem
  - (3) Parenchyma, xylem
  - (4) Phloem, collenchyma
129. Which one of the following is an **incorrect** statement?
- (1) Root of *Pinus* establishes an obligate association with fungi
  - (2) Translocation in phloem is explained by the pressure flow hypothesis
  - (3) Ions are absorbed from the soil mainly by active transport
  - (4) More the solute molecules in the solution, the higher is the osmotic potential
130. The stage between meiosis I and meiosis II is
- (1) Called as interkinesis
  - (2) Generally short lived
  - (3) Followed by Prophase II
  - (4) More than one option
131. Environmental plasticity is found in
- |              |               |
|--------------|---------------|
| (1) Cotton   | (2) Buttercup |
| (3) Larkspur | (4) Coriander |
132. Anther wall layer meant for synthesis of sporopollenin and incompatibility proteins is
- (1) Endothecium
  - (2) Middle layers
  - (3) Tapetum
  - (4) Tapetum and middle layers
133. Among plants, maximum species global diversity belong to a taxon, known as
- |            |                 |
|------------|-----------------|
| (1) Algae  | (2) Angiosperms |
| (3) Mosses | (4) Lichens     |
134. Pyramid of energy in a forest ecosystem considering GFC is
- |                    |                |
|--------------------|----------------|
| (1) Spindle shaped | (2) Inverted   |
| (3) Upright        | (4) Urn shaped |
135. Read the following statements
- A. A considerable amount of NPP is utilised by plants in respiration.
- B. Trees occupy top vertical strata of a forest, herbs and grasses the second and shrubs occupy the bottom layers.
- (1) Both A & B are correct
  - (2) Only A is correct
  - (3) Only B is correct
  - (4) Both A & B are incorrect

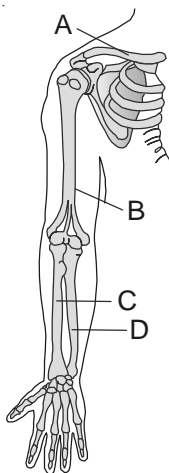


141. Given below are four statements A–D w.r.t. mechanism of muscle contraction. Choose from the options stating them as true (T) and false (F)

- A. The action potential in the sarcolemma is generated by release of calcium ions in the sarcoplasm.
- B. The globular head of meromyosin possesses ATPase enzyme activity which causes hydrolysis of ATP and the energy derived make myosin head bind to exposed active sites on actin.
- C. Cross bridge formation is followed by pulling the attached myosin filaments towards the centre of 'I' band.
- D. The breaking of cross bridge requires binding of new ATP at the myosin head.

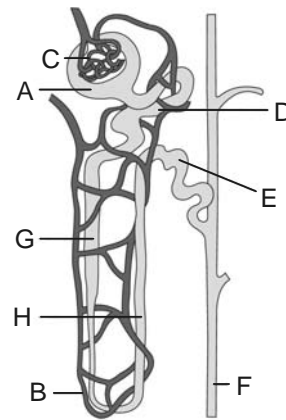
	A	B	C	D
(1)	T	T	F	T
(2)	F	T	F	F
(3)	F	T	F	T
(4)	T	F	F	T

142. Find out the **correct** labelling of bones A, B, C & D in the given figure



- (1) A - Clavicle                      B - Humerus  
      C - Ulna                          D - Radius
- (2) A - Clavicle                      B - Humerus  
      C - Radius                        D - Ulna
- (3) A - Scapula                      B - Humerus  
      C - Ulna                          D - Radius
- (4) A - Clavicle                      B - Femur  
      C - Radius                        D - Ulna

143. Following is a diagrammatic representation of a nephron showing blood vessels, duct and tubule. These structures have been labelled as A, B, C, D, E, F, G, H. Answer the questions that follow.



- (i) Which parts are located in cortical region of kidney
  - (ii) Which structure is highly reduced in cortical nephrons?
  - (iii) Identify the part F.
  - (iv) Which parts collectively form malpighian body?
- (1) (i) A, C, D, E  
(ii) B  
(iii) Collecting duct  
(iv) A & C
- (2) (i) A, C, D, E  
(ii) B  
(iii) Vasa recta  
(iv) A & C
- (3) (i) B, F, G, H  
(ii) F  
(iii) Vasa recta  
(iv) A & D
- (4) (i) B, F, G, H  
(ii) F  
(iii) Collecting duct  
(iv) C & D

144. Which of the following statement is **incorrect**?

- (1) Juxta glomerular apparatus is a special sensitive region formed by cellular modifications in the distal convoluted tubule and the afferent arteriole at the location of their contact
- (2) Nearly 99 percent of the filtrate gets reabsorbed by the renal tubules
- (3) Nitrogenous wastes in the filtrate get reabsorbed through active transport
- (4) Human kidneys can produce urine nearly four times concentrated than the initial filtrate formed



145. All of the following digestive enzymes are secreted as pro-enzymes, **except**

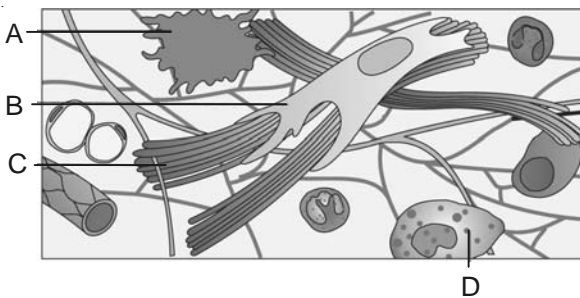
- (1) Pepsin (2) Trypsin  
(3) Carboxypeptidase (4) Sucrase

146. Which of the following statements are **correct**?

- A. The chemical process of digestion is initiated in oral cavity by the hydrolytic action of the carbohydrate splitting enzyme, the salivary amylase.  
B. Lipases are absent in secretion of gastric glands.  
C. Bile helps in emulsification of fats and also activates lipases.  
D. Nucleases in the succus entericus acts on nucleic acids to form nucleotides and nucleosides.

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

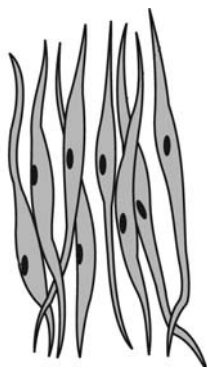
147. Given figure represents a type of connective tissue with certain labelled structures A, B, C & D



Which of the following option correctly defines the labelled structure?

- (1) A - Mast cell - Secretes histamine, heparin and serotonin  
(2) B - Fibroblast - Secrete major amount of matrix  
(3) C - Elastic fibres - Provides tissue tensile strength  
(4) D - Macrophage - Engulf germ particle

148. Given below is a diagram of muscular tissue. Find the **correct** description of this tissue w.r.t. it's type and location

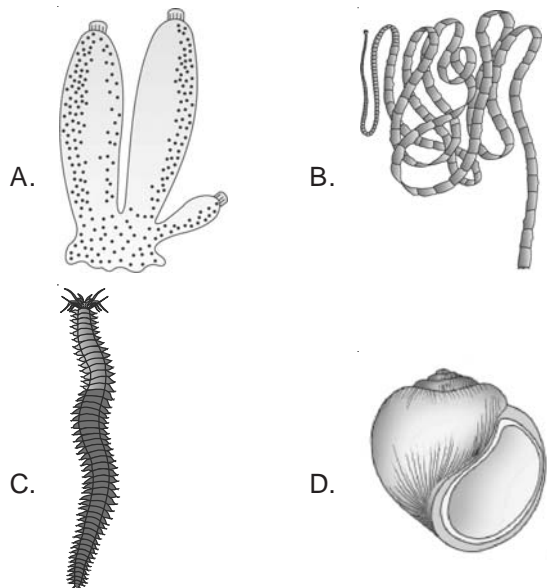


- (1) Striated and voluntary - Found closely attached to skeletal bones  
(2) Non-striated and involuntary - Present only in heart  
(3) Non-striated and involuntary - Present in wall of blood vessels, stomach and intestine  
(4) Non-striated and voluntary - Present in urinary bladder and uterus

149. Which of the phylum is a **correct** match w.r.t. phylum and its three examples?

- (1) Mollusca - *Pinctada, Loligo, Cucumaria*  
(2) Annelida - *Pheretima, Hirudinaria, Ctenoplana*  
(3) Arthropoda - *Laccifer, Limulus, Chaetopleura*  
(4) Cnidaria - *Pennatula, Meandrina, Aurelia*


150. Given below are diagrams of four animals A, B, C & D. Find the **correct** option w.r.t. common features of two of these animals.





- (1) A & C are monoecious animals  
(2) A & B are bilaterally symmetrical  
(3) C & D are eucoelomates  
(4) B & D respire through gills




151. Which of the following animal is **correctly** matched with it's genus and two of its characteristics?

- (1) **Animal :**   
**Genus :** *Scoliodon*  
**Key : characteristics** (a) Placoid scales on skin  
 (b) Air bladder present

- (2) **Animal :**   
**Genus :** *Bufo*  
**Key : characteristics** (a) Body divisible into head and trunk  
 (b) Cloaca absent

- (3) **Animal :**   
**Genus :** *Chelone*  
**Key : characteristics** (a) Epidermal scales present  
 (b) Heart Myogenic

- (4) **Animal :**   
**Genus :** *Struthio*  
**Key : characteristics** (a) Skin is dry without glands  
 (b) Fertilisation external

152. Which of these animals shown are oviparous and viviparous?



**Oviparous**

**Viviparous**

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

- C  
 C, D  
 A, C  
 D

153. Which of the following statement is **incorrect** w.r.t. alimentary canal of cockroach?

- (1) Oesophagus leads into a sac like structure called crop used for storing of food  
 (2) Gizzard has an outer layer of thick circular muscles and thick inner cuticle forming six highly chitinous plate called teeth  
 (3) A ring of 6-8 blind tubules called hepatic or gastric caecae is present at the junction of foregut and midgut  
 (4) The hindgut is narrower than midgut and is differentiated into ileum, colon and rectum

154. Consider the following features

- A. Exclusively marine, radially symmetrical, diploblastic organisms with tissue level of organisation.  
 B. The body bears eight external rows of ciliary comb plates.  
 C. Digestion is both extra cellular and intra cellular.  
 D. Exhibit Bioluminescence.  
 E. Monoecious, fertilisation external with indirect development.

The above mentioned features belong to the animal

- (1) *Physalia*  
 (2) *Euspongia*  
 (3) *Fasciola*  
 (4) *Pleurobrachia*

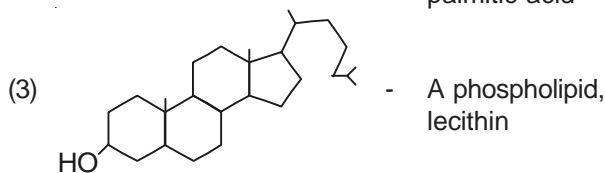
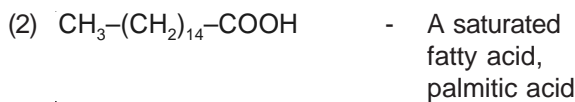
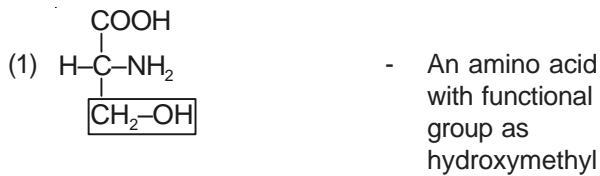
155. Match the following structures of cockroach in column I with their location provided in column II.

**Column I**

**Column II**

- |                       |  |
|-----------------------|--|
| a. Testes in males    | (i) 6 <sup>th</sup> abdominal segment                    |
| b. Mushroom gland     | (ii) 2 <sup>nd</sup> -6 <sup>th</sup> abdominal segment  |
| c. Spermatheca        | (iii) 6 <sup>th</sup> -7 <sup>th</sup> abdominal segment |
| d. Ovaries in females | (iv) 4 <sup>th</sup> -6 <sup>th</sup> abdominal segment  |
- (1) a(ii), b(iii), c(i), d(iv)    (2) a(iv), b(iii), c(i), d(ii)  
 (3) a(ii), b(i), c(iii), d(iv)    (4) a(iii), b(i), c(iv), d(ii)

156. Which of the following is an **incorrect** match w.r.t. organic compound shown and its identification?



157. How many of the given statements are **correct**?

- A. Water is the most abundant chemical in the living organisms.  
 B. A protein is a heteropolymer and not a homopolymer.  
 C. In a polysaccharide, left end is called reducing end and the right end is called non-reducing end.  
 D. A nucleotide is the building block of nucleic acids, which consist of a heterocyclic compound (nitrogenous base), a monosaccharide and a phosphate.

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

158. Which of the following factors can affect the enzymatic activity?

- A. Change in temperature  
 B. Change in pH  
 C. Change in substrate concentration  
 D. Binding of specific chemical to enzyme

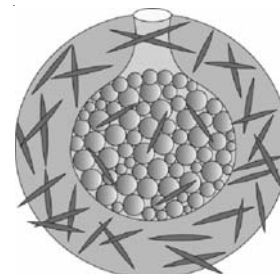
- (1) A, B, C, D  
 (2) A, B, D  
 (3) A, B  
 (4) B, C, D

159. Consider the following statements A–D with certain blanks. Find the option which **correctly** fills up these blanks

- A. The protein portion of enzyme is called (i).  
 B. Prosthetic groups are (ii) bound to the protein part of enzyme.  
 C. (iii) is the prosthetic group of enzyme catalase.  
 D. (iv) are nucleic acids with catalytic power.

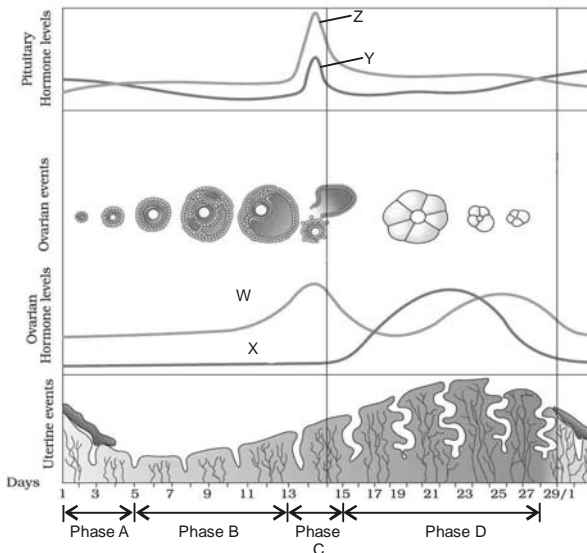
- |                   |                     |
|-------------------|---------------------|
| (1) (i) Co-factor | (ii) Tightly        |
| (iii) Haem        | (iv) Ribozyme       |
| (2) (i) Apoenzyme | (ii) Loosely        |
| (iii) NAD         | (iv) Ribonuclease P |
| (3) (i) Co-factor | (ii) Loosely        |
| (iii) NAD         | (iv) Ribonuclease P |
| (4) (i) Apoenzyme | (ii) Tightly        |
| (iii) Haem        | (iv) Ribozyme       |

160. The given reproductive structure is a method of



- (1) Asexual reproduction in *Hydra*  
 (2) Sexual reproduction in earthworm  
 (3) Asexual reproduction in sponges  
 (4) Sexual reproduction in cockroach

161. Following is diagrammatic representation of menstrual cycle depicting certain events. The uterine events have been labelled as phases A, B, C & D. The ovarian hormones have been labelled as W, X and pituitary hormones as Y and Z. Answer the questions that follow.



- (i) Lack of which phase is indicative of pregnancy?
- (ii) During which phase implantation of blastocyst takes place?
- (iii) Identify the hormones W, X, Y & Z.
- (iv) A preovulatory surge of which hormone is necessary to cause ovulation?

- |                    |                        |
|--------------------|------------------------|
| (1) (i) Phase A    | (2) (i) Phase A        |
| (ii) Phase B       | (ii) Phase D           |
| (iii) W - Estrogen | (iii) W - Estrogen     |
| X - Progesterone   | X - Progesterone       |
| Y - FSH            | Y - FSH                |
| Z - LH             | Z - LH                 |
| (iv) Z             | (iv) Z                 |
| (3) (i) Phase D    | (4) (i) Phase D        |
| (ii) Phase C       | (ii) Phase B           |
| (iii) W - Estrogen | (iii) W - Progesterone |
| X - Progesterone   | X - Estrogen           |
| Y - LH             | Y - FSH                |
| Z - FSH            | Z - LH                 |
| (iv) Y             | (iv) Y                 |

162. Find the **incorrect** statement w.r.t. pregnancy and embryonic development in humans.

- (1) Placenta is a functional unit between developing embryo and maternal body formed by interdigitation of chorionic villi and uterine tissue
- (2) Human chorionic gonadotropin(hCG), human placental lactogen(hPL) and relaxin are produced in women only during pregnancy
- (3) The inner cell mass contain stem cells which have the potency to give rise to all the tissues and organs
- (4) By the end of second trimester, the first movements of the foetus and appearance of hair on head is usually observed

163. According to 2001 census report, the population growth rate of India was

- (1) 17/1000/year
- (2) 25/1000/year
- (3) 33/1000/year
- (4) 8/1000/year

164. Which of the following is **correct** description of the contraceptive device shown?



- (1) Lippes loop - Increase phagocytosis of sperms in uterus
- (2) LNG-20 - Make uterus unsuitable for implantation and cervix hostile to sperms
- (3) CuT - Cu ions released suppress sperm motility and the fertilising capacity of sperms
- (4) Implant - Inhibit ovulation and implantation as well as alter the quality of cervical mucus to retard entry of sperms



173. Fill in the blank

  A   involves mating of animals of two different breeds. *Hisardale*, a new breed of   B   has been developed through this mechanism.

- | A                  | B     |
|--------------------|-------|
| (1) Cross-breeding | Sheep |
| (2) Cross-breeding | Goat  |
| (3) Out-crossing   | Sheep |
| (4) Out-crossing   | Goat  |

174. Hydrochloric acid, saliva and tears are included in

- (1) Physical barriers of innate immunity
- (2) Physiological barriers of innate immunity
- (3) Cytokine barriers of innate immunity
- (4) Cellular barriers of innate immunity

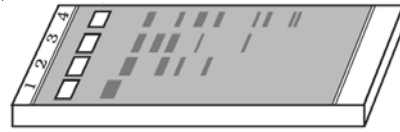
175. Find the **incorrect** match

- |                                |   |   |
|--------------------------------|---|---|
| (1) Colostrum                  | - | IgA antibodies  |
| (2) Recombinant DNA technology | - | Hepatitis B vaccine produced from yeast                               |
| (3) Allergy                    | - | Release of chemicals like histamine and serotonin from the mast cells |
| (4) Auto-immune disease        | - | Adrenaline  |

176. Which of the following limitation of traditional hybridisation procedure has been overcome by rDNA technology?

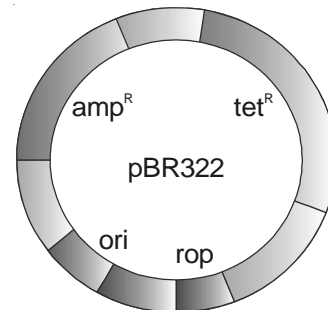
- (1) Introduction of desirable genes without introducing undesirable genes into the target organism
- (2) To permit variation in the target organism
- (3) To produce hybrid vigour
- (4) Both (2) & (3)

177. Which of the following technique has been shown in the given diagram?



- (1) Agarose gel electrophoresis in which smallest DNA fragment moves farther
- (2) Identification and elimination of non-transformants
- (3) Agarose gel electrophoresis in which DNA fragments resolve according to their size
- (4) More than one option is correct

178. In the given *E.coli* cloning vector pBR322, restriction site of *Pvu* II is present in



- |                      |                      |
|----------------------|----------------------|
| (1) amp <sup>R</sup> | (2) tet <sup>R</sup> |
| (3) rop              | (4) ori              |

179. All of the following are significance of using GM plants, **except**

- (1) GM plants are tolerant to abiotic stresses
- (2) GM plants are less dependent on chemical pesticides
- (3) GM plants have increased efficiency of mineral usage
- (4) GM plants help in increasing post harvest losses

180. Which of the following recombinant protein has been used to treat emphysema?

- |                             |                         |
|-----------------------------|-------------------------|
| (1) $\beta$ -galactosidase  | (2) Alpha-lactalbumin   |
| (3) $\alpha$ -1-antitrypsin | (4) Adenosine deaminase |



## ANSWERS

1. (3)	37. (3)	73. (2)	109. (1)	145. (4)
2. (1)	38. (4)	74. (2)	110. (4)	146. (2)
3. (1)	39. (1)	75. (2)	111. (2)	147. (2)
4. (4)	40. (4)	76. (2)	112. (4)	148. (3)
5. (1)	41. (3)	77. (1)	113. (2)	149. (4)
6. (3)	42. (4)	78. (3)	114. (2)	150. (3)
7. (3)	43. (2)	79. (2)	115. (2)	151. (3)
8. (2)	44. (3)	80. (2)	116. (1)	152. (1)
9. (4)	45. (2)	81. (4)	117. (1)	153. (4)
10. (2)	46. (3)	82. (1)	118. (2)	154. (4)
11. (1)	47. (3)	83. (3)	119. (2)	155. (2)
12. (3)	48. (4)	84. (1)	120. (3)	156. (3)
13. (1)	49. (4)	85. (1)	121. (2)	157. (3)
14. (3)	50. (2)	86. (4)	122. (3)	158. (1)
15. (2)	51. (3)	87. (2)	123. (3)	159. (4)
16. (4)	52. (3)	88. (2)	124. (3)	160. (3)
17. (1)	53. (2)	89. (4)	125. (1)	161. (2)
18. (1)	54. (2)	90. (2)	126. (1)	162. (4)
19. (1)	55. (1)	91. (1)	127. (3)	163. (1)
20. (4)	56. (3)	92. (3)	128. (1)	164. (3)
21. (1)	57. (3)	93. (2)	129. (4)	165. (1)
22. (1)	58. (3)	94. (4)	130. (4)	166. (4)
23. (2)	59. (2)	95. (2)	131. (2)	167. (1)
24. (2)	60. (4)	96. (4)	132. (3)	168. (4)
25. (1)	61. (2)	97. (3)	133. (2)	169. (3)
26. (1)	62. (2)	98. (4)	134. (3)	170. (4)
27. (3)	63. (2)	99. (1)	135. (4)	171. (3)
28. (1)	64. (1)	100. (4)	136. (2)	172. (3)
29. (3)	65. (2)	101. (2)	137. (4)	173. (1)
30. (1)	66. (4)	102. (2)	138. (4)	174. (2)
31. (2)	67. (4)	103. (3)	139. (1)	175. (4)
32. (2)	68. (2)	104. (2)	140. (4)	176. (1)
33. (1)	69. (2)	105. (3)	141. (3)	177. (4)
34. (1)	70. (3)	106. (4)	142. (2)	178. (3)
35. (1)	71. (3)	107. (1)	143. (1)	179. (4)
36. (3)	72. (4)	108. (4)	144. (3)	180. (3)