

# AIIMS 2018 MOCK TEST Paper

## For Pre-Medical Entrance Exam Aspirants

Maximum Marks : 200

Time Allowed : 3 Hours

*Read the following instructions carefully before you begin to answer the questions.*

### Instructions to Candidates

1. This booklet contains **200** questions in all comprising the following Four parts:  
**Physics** (60 Questions)  
**Chemistry** (60 Questions)  
**Biology** (60 Questions)  
**General Knowledge** (20) Questions
2. All questions are compulsory and carry equal marks.
3. Each question carries 1 Marks. For each correct answer, the candidate will get 1 marks. For each incorrect answer, one-third Mark will be deducted. There will be no penalty for unanswered questions.
4. Use of Electronic/Manual Calculator is prohibited
5. This is a closed book, closed note test. The use of calculator is not allowed. Mobile phones and wireless communications devices are completely banned in the examination hall.

### Download Answer Key

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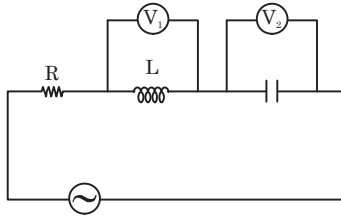


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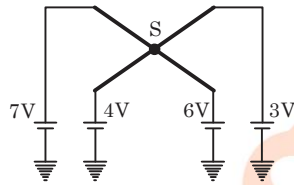
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PHYSICS

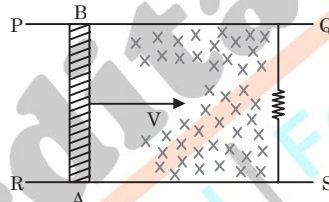
1. In the circuit shown, resistance  $R = 100 \Omega$ , inductance  $L = \frac{2}{\pi}$  H and capacitance  $C = \frac{8}{\pi} \mu\text{F}$  are connected in series with an ac source of 200 volt and frequency 'f'. If the readings of the hot wire voltmeters  $V_1$  and  $V_2$  are same then :



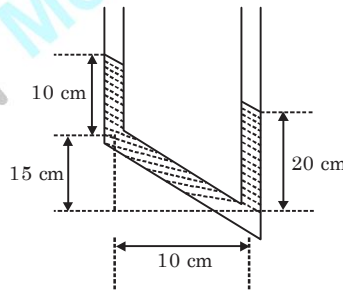
- a.  $f = 125 \text{ Hz}, \frac{V_1}{V_2} = 1$
  - b.  $f = 250 \pi \text{ Hz}, \frac{V_1}{V_2} = 1$
  - c. current through R is 1A,  $\frac{V_1}{V_2} = 1$
  - d. current through R is 2A,  $\frac{V_1}{V_2} = 2$
2. Find out the potential of the junction S (in volts) if all the dark wires are of resistance R and light wires have zero resistance.



- a. 5
  - b. 4
  - c. 3
  - d. None of these
3. A plastic rod AB is moving on a fixed conducting frame PQRS. No other external force is acting. (Consider  $v_{AB} \neq 0$ )

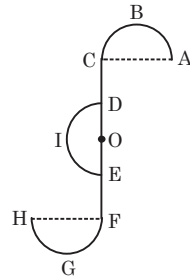


- a. A will be at high potential
  - b. Its velocity will reduce
  - c. Current will flow in clockwise direction
  - d. None of these
4. A U Tube filled with a liquid is accelerating horizontally with an acceleration a. The acceleration of the tube is : ( $g = 10 \text{ m/s}^2$ )

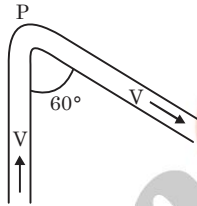


- a.  $5 \text{ m/s}^2$
- b.  $10 \text{ m/s}^2$
- c.  $15 \text{ m/s}^2$
- d.  $20 \text{ m/s}^2$

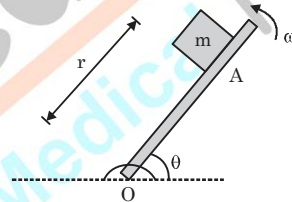
5. A wireframe is made of a wire of uniform cross-section which is shown in figure. ABC, HGF and DIE are semicircular arcs of radius  $r$ .  $CD = DO = OE = EF = r$  and 'O' is the centre of circle. Then centres of mass of frame is :



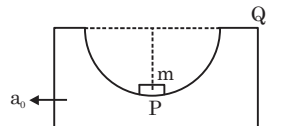
- a. At distance  $\left(\frac{2r}{3\pi + 4}\right)$  towards left of O      b. At distance  $\left(\frac{2r}{3\pi + 4}\right)$  towards right of O  
 c. At distance  $\frac{4r}{3\pi + 4}$  towards left of O      d. At distance  $\frac{4r}{3\pi + 4}$  towards right of O
6. A fire hydrant (as shown in the figure) delivers water of density  $\rho$  at a volume rate  $S$ . The water travels vertically upward through the hydrant and then undergoes  $120^\circ$  turn to emerge at same speed  $V$  at other end. The pipe and nozzle have uniform cross-section throughout. The force exerted by the water on the corner P of the hydrant is : (Neglect gravity everywhere) [speed of water in hydrant is same everywhere]



- a.  $\frac{\sqrt{3} \rho VS}{2}$       b.  $\sqrt{2} \rho VS$       c.  $\sqrt{3} \rho VS$       d. zero
7. The member OA rotates about a horizontal axis through O with a constant counter clockwise velocity  $\omega = 3$  rad/sec. As it passes the position  $\theta = 0$ , a small mass  $m$  is placed upon it at a radial distance  $r = 0.5$  m. If the mass is observed to slip at  $\theta = 37^\circ$ , the coefficient of friction between the mass & the member is \_\_\_\_\_ .



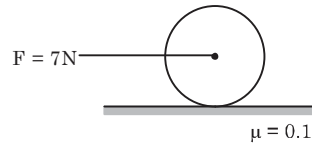
- a.  $\frac{3}{16}$       b.  $\frac{9}{16}$       c.  $\frac{4}{9}$       d.  $\frac{5}{9}$
8. A small block of mass  $m$  is lying at rest at point P of a wedge having a smooth semi circular track of radius  $R$ . The minimum value of horizontal acceleration  $a_0$  of wedge so that mass can just reach the point Q ?



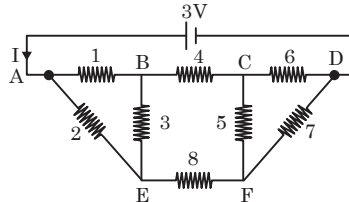
- a.  $g/2$       b.  $\sqrt{g}$       c.  $g$       d. not possible
9. A uniform vertical electric field  $E$  is established in the space between two large parallel plates. A small conducting sphere of mass  $m$  is suspended in the field from a string of length  $L$ . If the sphere is given a positive charge  $q$  and the lower plate is charged positively, the period of oscillation of this pendulum is

- a.  $2\pi\sqrt{\frac{L}{g}}$       b.  $2\pi\sqrt{\frac{L}{g + (qE/m)}}$       c.  $2\pi\sqrt{\frac{L}{g - (qE/m)}}$       d.  $2\pi\sqrt{\frac{L}{[g^2 + (qE/m)^2]^{1/2}}}$

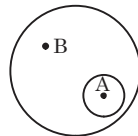
10. A solid sphere of mass 10 kg is placed on rough surface having coefficient of friction  $\mu = 0.1$ . A constant force  $F = 7$  N is applied along a line passing through the centre of the sphere as shown in the figure. The value of frictional force on the sphere is



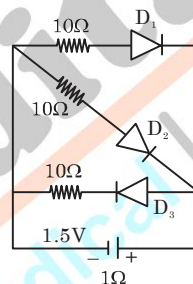
- a. 1N                      b. 2N                      c. 3N                      d. 7N
11. Figure shows a network of eight resistors numbered 1 to 8, each equal to  $2\Omega$ , connected to a 3V battery of negligible internal resistance. The current  $I$  in the circuit is



- a. 0.25A                      b. 0.5A                      c. 0.75A                      d. 1.0A
12. There is an air bubble of radius  $R$  inside a drop of water of radius  $3R$ . Find the ratio of gauge pressure at point B to that at point A.

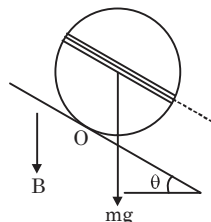


- a. 1/2                      b. 1/4                      c. 1/3                      d. 1
13. In the circuit shown in figure all the diodes are ideal. The current drawn from the battery of 1.5 volts emf and  $1\Omega$  internal resistance is:



- a.  $\frac{1.5}{\left(\frac{10}{3} + 1\right)}$  A                      b.  $\frac{1.5}{\left(\frac{10}{2} + 1\right)}$  A                      c.  $\frac{1.5}{11}$  A                      d.  $\frac{1.5}{10}$  A

14. In figure, a coil of single turn is wound on a sphere of radius  $r$  and mass  $m$ . The plane of the coil is parallel to the inclined plane and lies in the equatorial plane of the sphere. If the sphere is in rotational equilibrium, the value of  $B$  is:



- a.  $\frac{mg}{\pi r}$                       b.  $\frac{mg \sin \theta}{\pi r}$                       c.  $\frac{mg \sin \theta}{\pi r}$                       d. none of these
15. The height of the image formed by a converging lens on a screen is 8 cm. For the same position of the object and screen again an image of size 12.5 cm is formed on the screen by shifting the lens. The height of the object is:
- a. 15 cm                      b. 5 cm                      c. 10 cm                      d. None

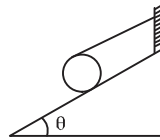
16. A ball of radius  $R$  carries a positive charge whose volume charge density depends only on separation  $r$  from the ball's centre as  $\rho = \rho_0 \left(1 - \frac{r}{R}\right)$  where  $\rho_0$  is a constant. Assuming the relative permittivities of the ball and the environment to be equal to unity. The electric field at distance  $r_1$  from centre (For  $r_1 < R$ ) is:

- a.  $\frac{\rho_0 r_1}{3\epsilon_0} \left(1 - \frac{3r_1}{4R}\right)$       b.  $\frac{\rho_0 r_1}{3\epsilon_0} \left(1 - \frac{r_1}{R}\right)$       c.  $\frac{\rho_0 r_1}{2\epsilon_0} \left(1 - \frac{r_1}{2R}\right)$       d. None

17. A particle of mass  $m$  and carrying charge  $-q_1$  is moving around a charge  $+q_2$  along a circular path of radius  $r$ . Find period of revolution of the charge  $-q_1$  about  $+q_2$

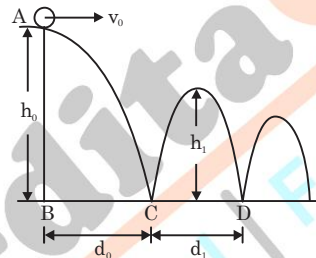
- a.  $\sqrt{\frac{16\pi^3 \epsilon_0 m r^3}{q_1 q_2}}$       b.  $\sqrt{\frac{8\pi^3 \epsilon_0 m r^3}{q_1 q_2}}$       c.  $\sqrt{\frac{q_1 q_2}{16\pi^3 \epsilon_0 m r^3}}$       d. Zero

18. A disc of mass  $m$  and radius  $r$  rests on an inclined surface and is supported by a rope that is tangent to the disc and parallel to the inclined surface as shown in Figure. The minimum value of coefficient of static friction in terms of  $\theta$ , that will prevent the disc from slipping down the inclined surface is



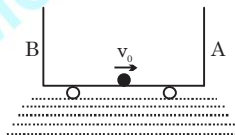
- a.  $\frac{2}{5} \tan \theta$       b.  $\frac{\tan \theta}{2}$       c.  $\frac{2}{3} \tan \theta$       d.  $\tan \theta$

19. A ball moving with a horizontal velocity  $v_0 = 10 \text{ m/s}$  drops from A through a vertical height  $h_0 = 0.625 \text{ m}$  to a frictionless floor. Knowing that the ball hits the floor at a distance  $d_0$  from B and that the height of its first bounce is  $h_1 = 0.4 \text{ m}$ , then the coefficient of restitution between the ball and the floor is



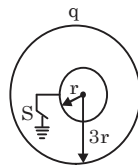
- a. 0.64      b. 0.8      c. 0.32      d. 0.4096

20. A ball of negligible size and mass  $m$  is given a velocity  $v_0$  on the centre of the cart which has a mass  $M$  and is originally at rest. If the coefficient of restitution between the ball and walls A and B is  $e$ , then (just after the ball strikes A)



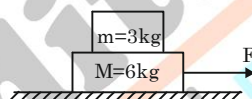
- a. the velocity of ball is  $\frac{(e+1)mv_0}{(M+m)}$       b. the velocity of ball is equal to velocity of cart
- c. the velocity of cart is  $\frac{(e+1)mv_0}{(M+m)}$       d. the cart remains at rest

21. Figure shows two conducting thin concentric shells of radii  $r$  and  $3r$ . The outer shell carries charge  $q$ . Inner shell is neutral. The charges that will flow from inner shell to earth after the switch  $S$  is closed, is

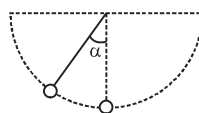


- a.  $3q$       b.  $\frac{q}{3}$       c.  $q$       d.  $-q$

22. In a sample of rock, the ratio of  $^{206}\text{Pb}$  to  $^{238}\text{U}$  nuclei is found to be 0.5. The age of the rock is  $[T_{1/2} = 4.5 \times 10^9 \text{ year}]$
- $2.25 \times 10^9 \text{ year}$
  - $4.5 \times 10^9 \ln 3 \text{ year}$
  - $4.5 \times 10^9 \frac{\ln\left(\frac{3}{2}\right)}{\ln 2} \text{ year}$
  - $2.25 \times 10^9 \ln\left(\frac{3}{2}\right) \text{ year}$
23. A conducting rod of length vector  $\vec{L} = \left(\frac{3}{5}\hat{j} + \frac{4}{5}\hat{k}\right) \text{ m}$  is moving with a velocity  $\vec{v} = 2\hat{i} \text{ m/sec}$  in a uniform magnetic field  $\vec{B} = (\hat{j} - 2\hat{k})$  tesla. Then the magnitude of induced emf in volt in the rod will be
- 2
  - 4
  - 6
  - 8
24. In a fixed smooth hemispherical shell of radius R, a uniform rod of mass  $\left(\frac{\sqrt{3}}{2}\right) \text{ kg}$  is placed horizontally. The length of rod is R. Find the normal reaction at any end of the rod (in N). ( $g = 10 \text{ m/sec}^2$ )
- 5 N
  - 7.5 N
  - 15 N
  - 20 N
25. A skylab of mass  $m \text{ kg}$  is first launched from the surface of the earth in a circular orbit of radius  $2R$  (from the centre of the earth) and then it is shifted from this circular orbit to another circular orbit of radius  $3R$ . The minimum energy required to place the lab in the first orbit and to shift the lab from first orbit to the second orbit are :
- $\frac{3}{4}mgR, \frac{mgR}{6}$
  - $\frac{3}{4}mgR, \frac{mgR}{12}$
  - $mgR, mgR$
  - $2mgR, mgR$
26. Two blocks of  $M=6 \text{ kg}$  and  $m = 3 \text{ kg}$  are placed as shown in the figure. Coefficient of friction between  $M$  and  $m$  is 0.5. Coefficient of friction between  $M$  and the surface is 0.4. The maximum horizontal force that can be applied to the mass  $M$  so that they move without separation is : ( $g = 10 \text{ ms}^{-2}$ )

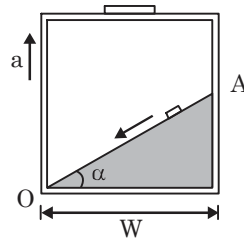


- 41 N
  - 61 N
  - 81 N
  - 101 N
27. One mole of an ideal gas whose adiabatic exponent  $\gamma = \frac{4}{3}$  undergoes process  $P = \left(200 + \frac{1}{V}\right) \text{ N/m}^2$  then change in internal energy of gas when volume changes from  $2 \text{ m}^3$  to  $4 \text{ m}^3$  is
- 400 J
  - 800 J
  - 1200 J
  - 1600 J
28. The poisson's ratio of a material is 0.1. If the longitudinal strain of a rod of this material is  $10^{-3}$ , then the percentage change in the volume of the rod will be
- 0.008%
  - 0.08%
  - 0.8%
  - 8%
29. A pendulum is vibrating with an amplitude of  $\frac{\pi}{2}$  radian. Value of  $\alpha$  for which resultant acceleration of the bob directs along the horizontal is



- $\sin^{-1} 1/\sqrt{3}$
- $\cos^{-1} 1/\sqrt{3}$
- $\cos^{-1} \sqrt{3}$
- $\sin^{-1} \sqrt{3}$

30. A body of mass  $m$  starting from rest slides down a frictionless inclined surface of gradient  $a$  fixed on the floor of a lift accelerating upwards with acceleration  $a$ . Taking width of inclined plane as  $W$ , the time taken by body of slide from top to bottom of the plane is

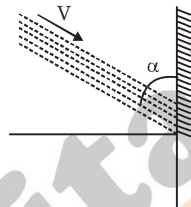


- a.  $\left(\frac{2W}{(g+a)\sin\alpha}\right)^{\frac{1}{2}}$     b.  $\left(\frac{4W}{(g+a)\sin\alpha}\right)^{\frac{1}{2}}$     c.  $\left(\frac{4W}{(g+a)\sin 2\alpha}\right)^{\frac{1}{2}}$     d.  $\left(\frac{W}{(g+a)\sin 2\alpha}\right)^{\frac{1}{2}}$

31. A car of mass  $M$  starting from rest. Velocity of the car is given by  $v = \left(\frac{2Pt}{M}\right)^{\frac{1}{2}}$ , where  $P$  is the constant power supplied by the engine. The position of car as a function of time is given as

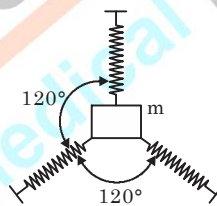
- a.  $\left(\frac{8P}{9M}\right)^{\frac{1}{2}} t^{3/2}$     b.  $\left(\frac{9P}{8M}\right)^{\frac{1}{2}} t^{3/2}$     c.  $\left(\frac{8P}{M}\right)^{\frac{1}{2}} t^{3/2}$     d.  $\left(\frac{9P}{8M}\right) t^3$

32. A water jet of area  $A$  hits a partition at an angle  $\alpha$  and rebounds with same speed  $V$ . Taking density of water as  $D$ , the normal thrust on partition is



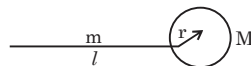
- a.  $2 ADV^2 \sin\alpha$     b.  $2 ADV^2 \cos\alpha$     c.  $ADV^2 \sin\alpha$     d.  $ADV^2 \sin\alpha$

33. Three springs of force constant  $k$  each are connected to a mass  $m$  such that angle between any two springs is  $120^\circ$ . The time period of vibrations of the mass is



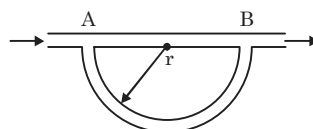
- a.  $2\pi\sqrt{mk}$     b.  $2\pi\sqrt{\frac{2k}{m}}$     c.  $\pi\sqrt{\frac{m}{k}}$     d.  $2\pi\sqrt{\frac{2m}{3k}}$

34. A thin rod of length  $l$  and mass  $m$  has a disc with attached to one of its ends such that rod and disc are coplanar. Mass of the disc is  $M$  and radius is  $r$ . C.M. from the centre of disc is



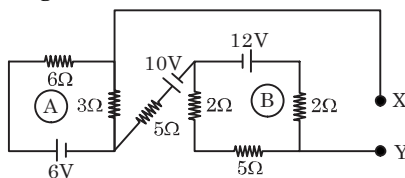
- a.  $\frac{lM}{2(m+M)}$     b.  $\frac{lmM}{2(M+m)}$     c.  $\frac{lm}{M+m}$     d.  $\frac{lm}{2(M+m)}$

35. Sound signal is sent through a composite tube as shown in the fig. The radius of the semicircular portion of the tube is  $r$ . Speed of sound in air is  $v$ .



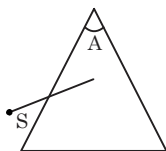
- a.  $\frac{nv}{r}$     b.  $\frac{nv}{r(\pi-2)}$     c.  $\frac{nv}{\pi r}$     d.  $\frac{nv}{(r-2)\pi}$

36. Potential difference between X and Y of given circuit is



- a.  $\frac{2}{5}V$       b.  $\frac{3}{5}V$       c.  $\frac{8}{3}V$       d.  $\frac{3}{8}V$

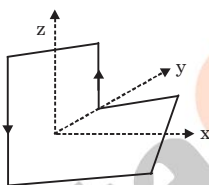
37. A thin prism of angle A and refractive index  $\mu$  for sodium light is placed at a distance S from a slit illuminated by sodium light. Distance between slit and image formed by prism is



- a.  $AS(1-\mu)$       b.  $AS(1+\mu)$       c.  $AS(\mu-1)$       d.  $\frac{A}{S}(1-\mu)$

38. A non planar loop of conducting wire carrying a current I is placed as shown in the figure.

Each of the straight sections of the loop is of length 2a. The magnetic field due to this loop at the point P (a, 0, a) points in the direction.



- a.  $\frac{1}{\sqrt{2}}(-\hat{j} + \hat{k})$       b.  $\frac{1}{\sqrt{3}}(-\hat{j} + \hat{k} + \hat{i})$       c.  $\frac{1}{\sqrt{3}}(-\hat{i} + \hat{j} + \hat{k})$       d.  $\frac{1}{\sqrt{2}}(\hat{i} + \hat{k})$

39. If a vector  $2\hat{i} + 3\hat{j} + 8\hat{k}$  is perpendicular to the vector  $4\hat{j} - 4\hat{i} + \alpha\hat{k}$ , then the value of  $\alpha$  is

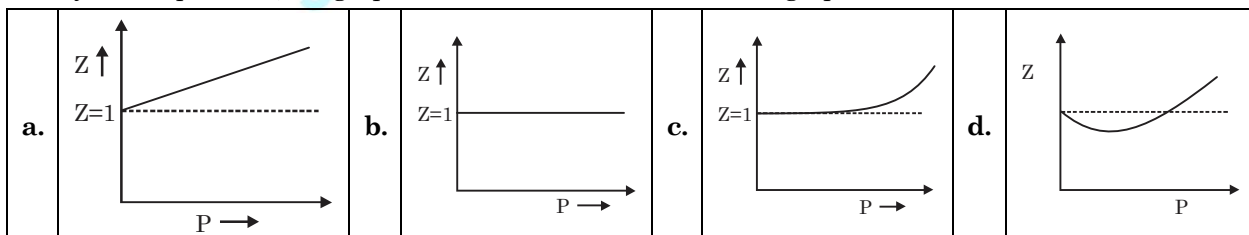
- a.  $\frac{1}{2}$       b.  $-\frac{1}{2}$       c. 1      d. -1

40. Two waves are given by:  $y_1 = \cos(4t - 2x)$  and  $y_2 = \sin\left(4t - 2x + \frac{\pi}{4}\right)$ . The phase difference between the two waves is

- a.  $\frac{\pi}{4}$       b.  $-\frac{\pi}{4}$       c.  $\frac{3\pi}{4}$       d.  $\frac{\pi}{2}$

### CHEMISTRY

41. At Boyle's temperature, the graph of Z v/s P is drawn select correct graph.



42. Number of 2 centre-2-electron bond in  $B_2H_6$ .

- a. 1      b. 2      c. 3      d. 4

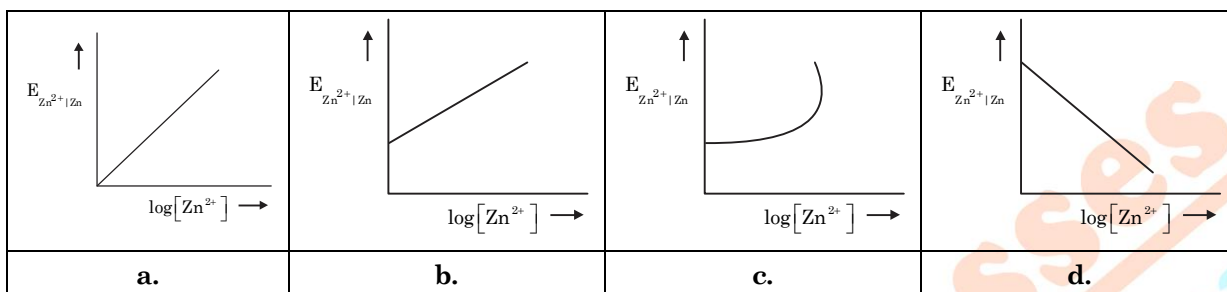


43. Among the following statements which is INCORRECT :
- In the preparation of compounds of Xe, Bartlett had taken  $O_2 PtF_6$  as a base compound because both  $O_2$  and Xe have almost same ionisation enthalpy
  - Nitrogen does not show allotropy
  - A brown ring is formed in the ring test for  $NO_3^-$  ion. It is due to the formation of  $[Fe(H_2O)_5(NO)]^{2+}$
  - On heating with concentrated NaOH solution in an inert atmosphere of  $CO_2$ , red phosphorus gives  $PH_3$  gas

44. Electrode potential for Zn electrode varies according to the equation.

$$E_{Zn^{2+}|Zn} = E_{Zn^{2+}|Zn}^\circ - \frac{0.059}{2} \log \frac{1}{[Zn^{2+}]}$$

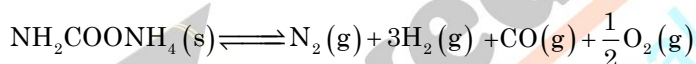
The graph of  $E_{Zn^{2+}|Zn}$  vs  $\log [Zn^{2+}]$  is



45. The edge lengths of the unit cells in terms of the radius of spheres consulting fcc, bcc and simple cubic unit cell are respectively -

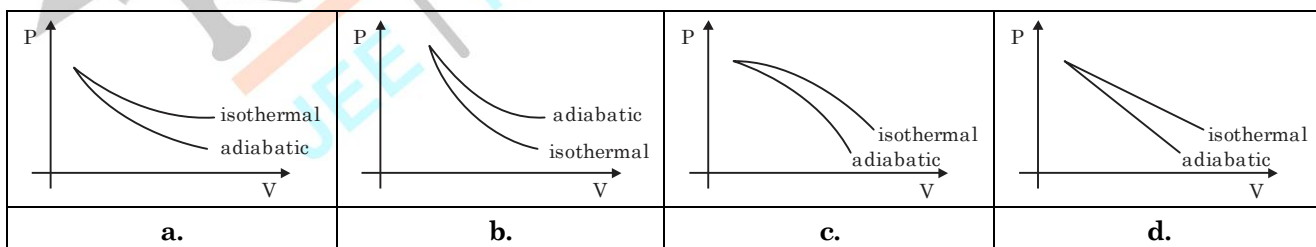
- $2r, \frac{4r}{\sqrt{3}}, 2\sqrt{2}r$
  - $\frac{4r}{\sqrt{3}}, 2\sqrt{2}r, 2r$
  - $2r, 2\sqrt{2}r, \frac{4r}{\sqrt{3}}$
  - $2\sqrt{2}r, \frac{4r}{\sqrt{3}}, 2r$
46. For a given reaction  $A \rightarrow \text{Product}$ , rate is  $1 \times 10^{-4} \text{ M s}^{-1}$  when  $[A] = 0.01 \text{ M}$  and rate is  $1.41 \times 10^{-4} \text{ M s}^{-1}$  when  $[A] = 0.02 \text{ M}$ . Hence, rate law is :
- $-\frac{d[A]}{dt} = k[A]^2$
  - $-\frac{d[A]}{dt} = k[A]$
  - $-\frac{d[A]}{dt} = \frac{k}{4}[A]$
  - $-\frac{d[A]}{dt} = k[A]^{1/2}$

47. If for the equilibrium :



The value of  $K_p$  at 800 K is  $27 \times 2^{\lambda/2}$  and the equilibrium pressure is 22 atm value of  $\lambda$  is :

- 12
  - 21
  - 10
  - 11
48. The correct figure representing isothermal and adiabatic expansions of an ideal gas from a particular initial state is :



49. Identify the false statement :

- The volume of a solution cannot be less than the sum of volumes of the pure solvent and solute used to prepare the solution (binary solution of two liquids)
- At constant T and P,  $\Delta G_{\text{mix}}$  will be necessarily negative for an ideal solution
- An ideal binary solution ( $p_A^0 \neq p_B^0$ ) cannot form an azeotropic mixture
- In binary solutions ideality is more of an exception rather than a rule

50. Select the correct statement :

- Perxenate ion is  $[\text{XeO}_6]^{4-}$  with octahedral geometry
- $\text{XeF}_2$  is bent molecule with 3 lone pairs (l.p)
- $\text{XeF}_2$ ,  $\text{XeF}_4$ ,  $\text{XeO}_2\text{F}_2$  all contains one lone pair only
- None of these

51. For the first order reaction,  $t_{99.99\%} = xt_{90\%}$  then the value of x is :

( $t_{99.99\%}$  = time required for 99.99% completion), ( $t_{90\%}$  = time required for 90% completion)

- 2
- 4
- $\frac{1}{4}$
- $2 \log 2$

52. The major product obtained on acid catalysed hydration of 3-Phenylbut-1-ene is :

- 3-Phenyl butane-2-ol
- 2-Phenyl butane-2-ol
- 2-Phenyl butane-3-ol
- 2-Phenyl butane-1-ol

53. The general order of reactivities of carbonyl compounds towards nucleophilic addition reactions.

- $\text{H}_2\text{C}=\text{O} > (\text{CH}_3)_2\text{C}=\text{O} > \text{Ar}_2\text{C}=\text{O} > \text{CH}_3\text{CHO} > \text{ArCHO}$
- $\text{H}_2\text{C}=\text{O} > \text{CH}_3\text{CHO} > (\text{CH}_3)_2\text{C}=\text{O} > \text{ArCHO} > \text{Ar}_2\text{C}=\text{O}$
- $\text{ArCHO} > \text{Ar}_2\text{C}=\text{O} > \text{CH}_3\text{CHO} > (\text{CH}_3)_2\text{C}=\text{O} > \text{H}_2\text{C}=\text{O}$
- $\text{Ar}_2\text{C}=\text{O} > (\text{CH}_3)_2\text{C}=\text{O} > \text{ArCHO} > \text{CH}_3\text{CHO} > \text{H}_2\text{C}=\text{O}$

54. The correct basic strength order of following anions is :

- $\text{CH}_3 - \overset{\ominus}{\text{C}}\text{H}_2 > \overset{\ominus}{\text{N}}\text{H}_2 > \text{CH}_2 = \overset{\ominus}{\text{C}}\text{H} > \text{CH} \equiv \overset{\ominus}{\text{C}} > \text{H}\overset{\ominus}{\text{O}} > \overset{\ominus}{\text{F}}$
- $\overset{\ominus}{\text{N}}\text{H}_2 > \text{CH}_3 - \overset{\ominus}{\text{C}}\text{H}_2 > \text{CH}_2 = \overset{\ominus}{\text{C}}\text{H} > \text{CH} \equiv \overset{\ominus}{\text{C}} > \overset{\ominus}{\text{F}} > \text{H}\overset{\ominus}{\text{O}}$
- $\text{CH}_3 - \overset{\ominus}{\text{C}}\text{H}_2 > \text{CH}_2 = \overset{\ominus}{\text{C}}\text{H} > \overset{\ominus}{\text{N}}\text{H}_2 > \text{CH} \equiv \overset{\ominus}{\text{C}} > \text{H}\overset{\ominus}{\text{O}} > \overset{\ominus}{\text{F}}$
- $\overset{\ominus}{\text{F}} > \text{H}\overset{\ominus}{\text{O}} > \text{CH} \equiv \overset{\ominus}{\text{C}} > \text{CH}_2 = \overset{\ominus}{\text{C}}\text{H} > \overset{\ominus}{\text{N}}\text{H}_2 > \text{CH}_3 - \overset{\ominus}{\text{C}}\text{H}_2$

55. The correct order of reactivity of following alcohols towards conc.  $\text{HCl}/\text{ZnCl}_2$  is:

I.		II.		III.		IV.	
----	--	-----	--	------	--	-----	--

- $\text{I} > \text{II} > \text{III} > \text{IV}$
- $\text{I} > \text{III} > \text{II} > \text{IV}$
- $\text{IV} > \text{III} > \text{II} > \text{I}$
- $\text{IV} > \text{III} > \text{I} > \text{II}$

56. The degree of dissociation of HI at a particular temperature is 0.8. The volume of 2 M  $\text{Na}_2\text{S}_2\text{O}_3$  solution required to neutralise the iodine present in an equilibrium mixture of a reaction when 2 moles of each  $\text{H}_2$  and  $\text{I}_2$  are heated in closed vessel of 2 litre capacity would be:

- 1.2 lit.
- 1.4 lit.
- 1.6 lit.
- 1.8 lit.

57. How many moles of  $\text{KMnO}_4$  are needed to oxidized a mixture of 1 mole of each  $\text{FeSO}_4$  and  $\text{FeC}_2\text{O}_4$  in acidic medium.

- $4/5$
- $5/4$
- $3/4$
- $5/3$

58. In the given reaction,

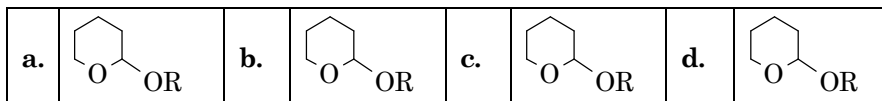
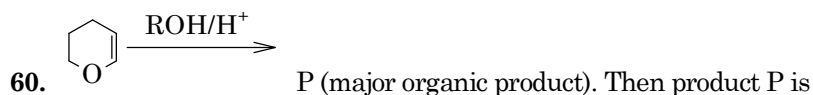


How many monohalogenation products are possible (excluding stereoisomers)?

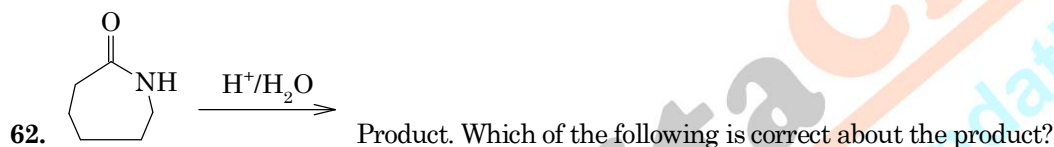
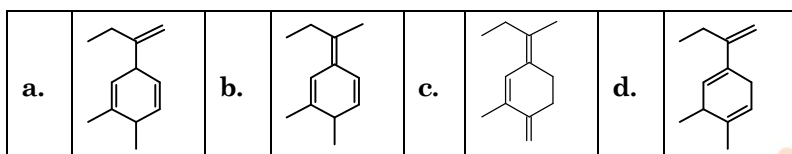
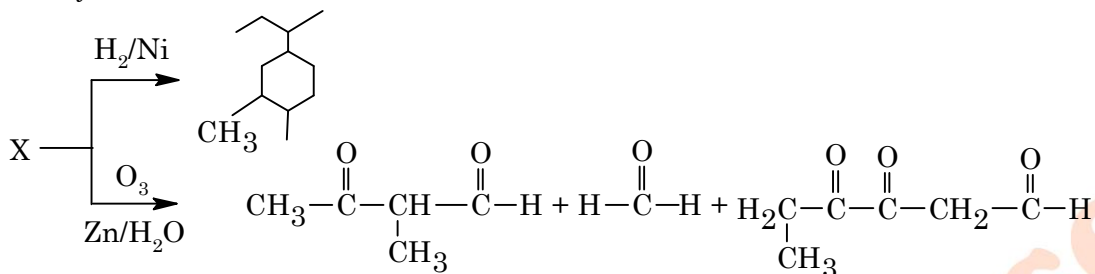
- 2
- 3
- 4
- 5

59.  $\text{O}_2$  and  $\text{SO}_2$  gases are filled in ration of 1 : 3 by mass in a closed container of 3L at temperature of  $27^\circ\text{C}$ . The partial pressure of  $\text{O}_2$  is 0.60 atm, the molar concentration of  $\text{SO}_2$  would be

- 0.36
- 0.036
- 3.6
- 36

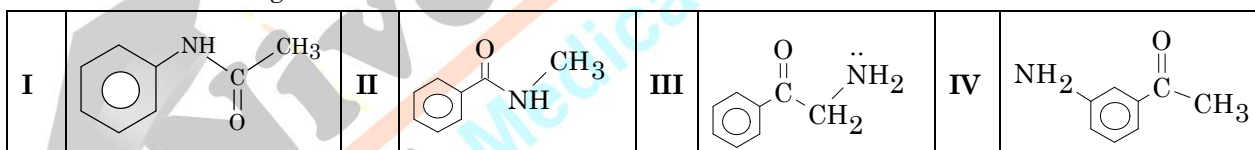


61. Identify the structure of X



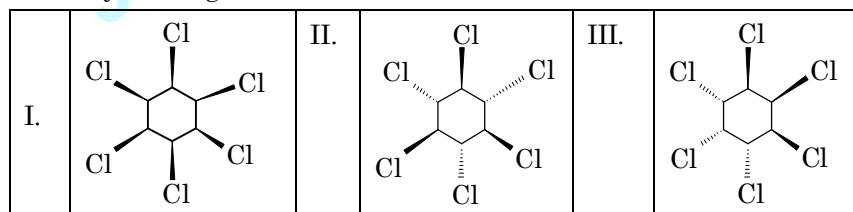
- product obtained is the monomer of polyamide known as nylon-6, 6, which is thermosetting plastic
- product obtained is the monomer of polyamide known as nylon-6, which is thermoplastic.
- product obtained is the monomer of polyamide known as nylon-6, which is thermosetting plastic
- product obtained is the monomer of polyamide known as nylon-6, 6, which is thermo plastic

63. The correct basic strength order is



- I > II > IV > III
- IV > III > II > I
- III > II > IV > I
- III > IV > II > I

64. Which one of the following hexachlorocyclohexane is least reactive and which one is most reactive for E2 reactions with a strong base for dehydrohalogenation.

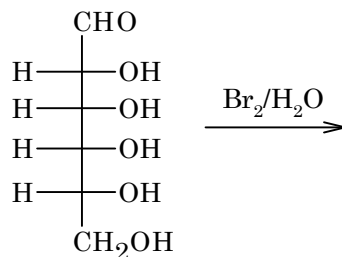


- I least and II most
- II least and I most
- III least and I most
- III least and II most

65. An excited electron of H-atoms emits of photon of wavelength  $\lambda$  and returns in the ground state, the principal quantum number of excited state is given by

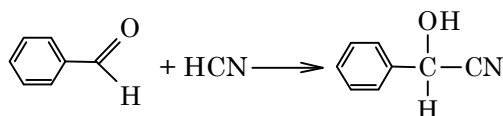
- $\sqrt{\lambda R(\lambda R - 1)}$
- $\sqrt{\frac{\lambda R}{(\lambda R - 1)}}$
- $\frac{1}{\sqrt{\lambda R(\lambda R - 1)}}$
- $\sqrt{\frac{(\lambda R - 1)}{\lambda R}}$

66. Predict the product of the following reaction



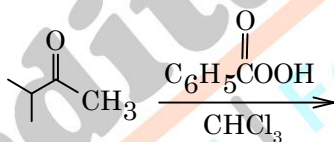
<b>a.</b>	$  \begin{array}{c}  \text{COOH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{COOH}  \end{array}  $	<b>b.</b>	$  \begin{array}{c}  \text{COOH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{CH}_2\text{OH}  \end{array}  $	<b>c.</b>	$  \begin{array}{c}  \text{COOH} \\    \\  \text{HO} - \text{C} - \text{H} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{CH}_2\text{OH}  \end{array}  $	<b>d.</b>	$  \begin{array}{c}  \text{COOH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{H} - \text{C} - \text{OH} \\    \\  \text{CHO}  \end{array}  $
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67. In the reaction below, the product would be



- a. A racemic  
b. Optically active  
c. A meso compound  
d. A mixture of the diastereomers

68. What is product of Baeyer Villiger oxidation below?

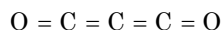


<b>a.</b>	$  \begin{array}{c}  \text{O} \\     \\  \text{CH}_3 - \text{C} - \text{O} - \text{CH}_3 \\    \\  \text{CH}_3  \end{array}  $	<b>b.</b>	$  \begin{array}{c}  \text{O} \\     \\  \text{CH}_3 - \text{C} - \text{O} - \text{CH}_2 - \text{CH}_3 \\    \\  \text{CH}_3  \end{array}  $	<b>c.</b>	$  \begin{array}{c}  \text{O} \\     \\  \text{CH}_3 - \text{C} - \text{OH} \\    \\  \text{CH}_3  \end{array}  $	<b>d.</b>	$  \begin{array}{c}  \text{O} \\     \\  \text{C} - \text{OH} \\    \\  \text{CH}_3  \end{array}  $
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69. The shape of  $\text{O}_2\text{F}_2$  is similar to that of:

- a.  $\text{C}_2\text{F}_2$       b.  $\text{H}_2\text{O}_2$       c.  $\text{H}_2\text{F}_2$       d.  $\text{C}_2\text{H}_2$
70. In which of the following octahedral complexes of Co (at. no. 27), will the magnitude of  $\Delta_0$  be highest?  
a.  $[\text{Co}(\text{NH}_3)_6]^{3+}$       b.  $[\text{Co}(\text{CN})_6]^{3-}$       c.  $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$       d.  $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$
71. If  $10^{20}$  molecules are removed from 220 mg of  $\text{CO}_2$ , then the number of moles of  $\text{CO}_2$  left are  
a.  $4.83 \times 10^3$       b.  $4.83 \times 10^{-4}$       c.  $4.83 \times 10^{-3}$       d.  $4.83 \times 10^5$
72. A radioactive substance shows an intensity of 2.4 millicurie initially and an intensity of 0.6 millicurie 602 seconds later. The decay constant of the radioactive substance is  
a.  $2.303 \times 10^{-3} \text{ sec}^{-1}$       b.  $2.303 \times 10^{-2} \text{ sec}^{-1}$       c.  $2.303 \times 10^{-3} \text{ min}^{-1}$       d.  $2.303 \times 10^3 \text{ sec}^{-1}$
73. If  $\left(\frac{dx}{dt}\right) = k[\text{H}^+]^n$  and the rate becomes 10 times when pH changes from 2 to 1 the order is  
a. 3      b. 2      c. 1      d. 0

74. The structure of carbon suboxide is



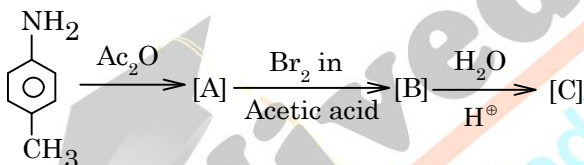
The oxidation state and hybridisation state of carbon attached to oxygen in the above molecule are

- a. +4 and  $sp^2$       b. +2 and sp      c. +4 and sp      d. +2 and  $sp^2$
75.  $PbI_4$  does not exist because of
- a. high oxidising power of  $Pb^{4+}$  ion      b. high reducing power of  $I^-$  ion
- c. small size of  $Pb^{4+}$  and larger size of  $I^-$  ions      d. Both (a) and (b)
76.  $CH_3 - C \equiv C - CH_3 \xrightarrow[\text{liq. } NH_3]{Na} X \xrightarrow{Br_2} Y$  X and Y are respectively

a.	$CH_3 - CH = CH - CH_3$ (trans) and $CH_3 - CH - CH - CH_2$ (meso)
b.	$CH_3 - CH = CH - CH_3$ (trans) and $CH_3 - CH - CH - CH_3$ (dl)
c.	$CH_3 - CH = CH - CH_3$ (cis) and $CH_3 - CH - CH - CH_3$ (meso)
d.	$CH_3 - CH = CH - CH_3$ (cis) and $CH_3 - CH - CH - CH_3$ (dl)

77.  $CH_3 - CH_2 - CH = CH_2$  can be converted into butanol-1. Which set of reagents among the following is ideal to effect the conversion?
- a. Alkaline  $KMnO_4$       b. Conc.  $H_2SO_4$
- c. Mercuric acetate in THF and alkaline  $NaBH_4$       d.  $B_2H_6$  and alkaline  $H_2O_2$

78. The final product [C] obtained in the reaction



would be

a.		b.		c.		d.	
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79. The correct order of ionic radii of Ce, La, Pm and Yb in +3 oxidation state is

- a.  $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$       b.  $La^{3+} < Pm^{3+} < Ce^{3+} < Yb^{3+}$
- c.  $La^{3+} < Ce^{3+} < Pm^{3+} < Yb^{3+}$       d.  $Yb^{3+} < Ce^{3+} < Pm^{3+} < La^{3+}$
80.  $(A) \xrightarrow{KOH} (B)$  (gas turns red litmus to blue)  $(C) \xrightarrow{Zn+KOH} (B)$  (gas)  $(A) \xrightarrow[\text{gas}]{Heat} (D)$  (does not support for combustion)
- a.  $A = NH_4NO_3$ ;  $B = N_2$ ;  $C = KNO_3$       b.  $A = NH_4NO_2$ ;  $B = NH_3$ ;  $C = KNO_3$
- c.  $A = (NH_4)_2SO_4$ ;  $B = NH_3$ ;  $C = KNO_2$       d.  $A = (NH_4)Cl$ ;  $B = N_2$ ;  $C = KNO_3$

**BIOLOGY**

81. Genes for 7 pairs of characters studied by Mendel are such that:
- they are situated on seven different chromosomes
  - some of them are chloroplast DNA
  - all of them are on the same chromosome
  - some of them are on the chromosome but are not linked
82. Which one of the following is a rod shaped bacterium?
- Bacillus subtilis
  - Pneumococcus pneumoniae
  - Streptococcus nigricans
  - Vibrio cholerae
83. Consider the following statements:
- Anabaena lives symbiotically with Azolla.
  - Azotobacter is a free living organism in the soil.
- 1 only
  - 2 only
  - Both 1 and 2
  - Neither 1 nor 2
84. Match List - I with List -II and select the correct answer using the codes given below the lists:

List-I		List-II	
A.	Operator gene	1.	Provides a site for binding of activator proteins and RNA polymerase
B.	Promoter gene	2.	Makes enzymes that control metabolism, such as, lactose in the cell
C.	Regulator gene	3.	Switches on cistron activity
D.	Structural gene	4.	Synthesizes a molecule that blocks a gene adjacent to structural genes

	A	B	C	D
a.	2	1	3	4
b.	3	1	4	2
c.	2	3	4	1
d.	3	4	1	2

85. Match List - I (Chromosome aberrations) with List-II the codes given below the lists:

List-I		List-II	
A.	Intercalary deficiency	1.	Chromosome ring formation at metaphase
B.	Duplication	2.	Bridge and fragment
C.	Paracentric inversion	3.	Change in gene order
D.	Translocation	4.	Two breaks followed by reunion and deletion

	A	B	C	D
a.	4	3	2	1
b.	4	3	1	2
c.	3	4	1	2
d.	3	4	2	1

86. Match List - I (Enzyme) with List-II (Function) and select the correct answer using the codes given below the lists:

List-I		List-II	
A.	DNA Ligase	1.	Catalyses the covalent union of segments of an interrupted sugar phosphate strand in double stranded DNA
B.	DNA polymerase	2.	Endonuclease that digest either single-stranded or doublestranded DNA
C.	D NaseI	3.	Produces single or double stranded breaks in DNA during replication to release tension brought about by the separation of double strands
D.	DNA topoisomerase	4.	Catalyses the formation of DNA from deoxyribonucleotides using from deoxyribonucleotides using one strand of DNA as templete

	A	B	C	D
a.	1	4	3	2
b.	4	1	2	3
c.	1	4	2	3
d.	4	1	3	2

87. Which of the following photosynthetic characteristics are present in  $C_3$  plants but not in  $C_4$  plants?

1.  $CO_2$  compensation point of 45 ppm.
2. Relatively higher rate of photorespiratory  $CO_2$  evolution.
3. Presence of well developed bundle sheath.
4. Initial involvement of RuBP carboxylase (RuBisCO) in  $CO_2$  assimilation.

- a. 1, 2 and 3                      b. 1, 2 and 4                      c. 1, 3 and 4                      d. 2 and 4

88. Match List \_ I with List- II and select the correct answer using the codes given below the lists:

List-I (Significance of the phenomenon in cell water relation)		List-II (Quantity)	
A.	Degree of hydration of protoplasm	1.	Wall pressure
B.	Stretches cell walls and may lead to their enlargement if the walls are sufficiently plastic	2.	Water potential
C.	Increases the free energy of water molecule	3.	Turgor pressure
D.	Indicates direction of diffusion of water	4.	Osmotic potential

	A	B	C	D
a.	1	3	2	4
b.	4	3	1	2
c.	4	1	2	3
d.	3	4	2	1

89. Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I		List-II	
A.	richmond lang effect	1.	Reversal of red-drop
B.	Emerson effect	2.	Inhibition of glycolysis by oxygen
C.	Pasteur effect	3.	Inhibition of photosynthesis by oxygen
D.	Warburg effect	4.	Senescence retradation in detached leaves

	A	B	C	D
a.	1	4	2	3
b.	4	1	3	2
c.	1	4	3	2
d.	4	1	2	3

90. Match List-I (Compound oxidized during kreb's cycle) with List-II (Compound formed on oxidation) and select the correct answer using the codes given below the lists:

List-I (Compound oxidized during Kreb's cycle)		List-II (Compound formed on oxidation)	
A.	Pyruvic acid	1.	Acetyl Co-A
B.	Isocitric acid	2.	Succinyl Co-A
C.	$\alpha$ -ketogulatric acid	3.	oxaloacetic acid
D.	Succinic acid	4.	$\alpha$ -ketogulatric acid
		5.	Fumaric acid

	A	B	C	D
a.	1	4	3	2
b.	2	1	3	4
c.	3	1	2	5
d.	1	4	2	5

91. Potato, tomato, cabbage, cauliflower, radish, soyabean and pea belong to:

- a. two different families                      b. there different families  
c. four different families                      d. five different families

92. Match List-I (Characteristics) with List-II (Name of Family) and select the correct answer using the code given below the lists:

List-I (Characteristics)		List-II (Name of fruit family)	
A.	Inflorescence umbel, 2-carpellary inferior ovary fruits of 2-mericarps	1.	Solanaceae
B.	Inflorescence capitulum, 2-carpellary inferior ovary, fruit cypsela with pappus hairs	2.	Apiaceae
C.	Inflorescence cyme, flowers regular, 2-carpellary superior ovary with swollen and oblique placenta fruits berry	3.	Lamiaceae
D.	Inflorescence verticillaster, flowers irregular 2-carpellary superior ovary with gynobasic style, fruits of 4 nutlets	4.	Asteraceae

	A	B	C	D
a.	3	1	4	2
b.	2	4	1	3
c.	3	4	1	2
d.	2	1	4	3



93. Lysozyme that is present in saliva and tears destroys  
**a.** certain fungi **b.** certain types of bacteria  
**c.** all viruses **d.** most virus infected cells
94. Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I		List-II	
A.	Nitrogen fixation	1.	Conversion of into nitrite and nitrate
B.	Denitrification	2.	Conversion of nitrite or nitrate into atmospheric nitrogen
C.	Nitrification	3.	Conversion of atmospheric nitrogen into ammonia
D.	Ammonification	4.	Conversion of organic nitrogen into ammonia

	A	B	C	D
<b>a.</b>	3	2	1	4
<b>b.</b>	2	1	3	4
<b>c.</b>	3	2	4	1
<b>d.</b>	2	4	1	3

95. Match List-I (Distinguishing features based on chromosomal appearance) with List-II (Stage of meiosis) and select the correct answer using the codes given below the list:

List-I		List-II	
A.	Terminalized chiasmata	1.	Pachytene
B.	Exchange of segments of chromatids	2.	Zygotene
C.	Synapsis of homologous chromosomes	3.	Diakinesis
D.	Appearance of chiasmata	4.	Diplotene

	A	B	C	D
<b>a.</b>	4	2	3	1
<b>b.</b>	3	1	2	5
<b>c.</b>	2	5	1	3
<b>d.</b>	2	4	3	1

96. Choose the schematic diagram, which properly represents pulmonary circulation in humans

- a.** Right ventricle  $\xrightarrow[\text{Blood}]{\text{Deoxygenated}}$  Lungs  $\xrightarrow[\text{Blood}]{\text{Oxygenated}}$  Left auricle
- b.** Right ventricle  $\xrightarrow[\text{Blood}]{\text{Oxygenated}}$  Lungs  $\xrightarrow[\text{Blood}]{\text{Deoxygenated}}$  Left auricle
- c.** Left ventricle  $\xrightarrow[\text{Blood}]{\text{Oxygenated}}$  Lungs  $\xrightarrow[\text{Blood}]{\text{Deoxygenated}}$  Right ventricle
- d.** Right auricle  $\xrightarrow[\text{Blood}]{\text{Deoxygenated}}$  Lungs  $\xrightarrow[\text{Blood}]{\text{Oxygenated}}$  Right ventricle

97. Match List-I (Structure) with List-II (Explanation/Definition) and select the correct answer using the codes given below the lists:

List-I		List-II	
A.	Nucleolus	1.	Deeply stained body containing r-RNA
B.	Nucleosome	2.	Portion of a DNA or RNA composed of one deoxyribose (in DNA) or ribose (in RNA) plus a purine or a pyrimidine
C.	Nucleoside	3.	Short disk-shaped cylinders composed of nucleoproteins and spaced at roughly 100 intervals on chromosomes
D.	Nucleotide	4.	Portion of DNA or RNA composed of purine or pyrimidine base, a deoxyribose (in DNA) or a ribose (in RNA) and phosphoric acid
		5.	A large class of chromosomal protein probably in specific gene regulation

	A	B	C	D
a.	1	3	2	4
b.	2	1	3	5
c.	1	3	2	5
d.	2	4	3	1

98. Match the following columns

Column-I		Column -II	
A.	Kupffer's cells	1.	Islets of Langerhans
B.	$\beta$ -cells	2.	Liver sinusoids
C.	Brush border cells	3.	Thyroid gland
D.	Paneth cells	4.	Proximal convoluted tubule
		5.	Small intestine

	A	B	C	D
a.	3	1	4	2
b.	4	5	1	2
c.	2	1	4	5
d.	3	5	4	1

99. Match the following columns

Column-I		Column -II	
A.	Tidal volume	1.	2500 to 3000 mL of air
B.	Inspiratory reserve volume	2.	100 mL of air
C.	Expiratory reserve volume	3.	500 mL of air
D.	Residual volume	4.	3400 to 4800 mL of air
E.	Vital capacity	5.	1200 mL of air

	A	B	C	D	E
a.	3	4	2	1	5
b.	3	1	2	5	4
c.	3	1	4	5	4
d.	5	4	2	1	2

100. Which one of the following correctly explains the function of a specific part of a human nephron?

a.	Henle's loop	Most reabsorption of the major substances from the glomerular filtrate
b.	Distal convoluted tubule	Reabsorption of ions into the surrounding blood capillaries
c.	Afferent arteriole	Carries the blood away from the glomerulus towards renal vein
d.	Podocytes	Create minute spaces (slit pores) for the filtration of blood into the Bowman's capsule

101. Choose the correct suequence in the hierarchy of taxonomic categories in descending order

- a. Species–genus–family–order–class–division    b. Division–order–class–family–genus–species  
c. Division–class–family–order–genus–species    d. Division–class–order–family–genus–species

102. Which of the following option shows correct order of some stages of muscle contraction from the beginning to the end of the process?

- a. Stimuli → Neurotransmitter secretion → Release of  $Ca^{2+}$  → Cross bridges formation → Excitation of T-system → sliding of actin filaments  
b. Stimuli → Neurotransmitter excitation of T-system → Release of  $Ca^{2+}$  → Cross bridges formation → Sliding or actin filaments → 'H' band diminishes  
c. Stimuli → Excitation of T-system → Neurotransmitter secretion → cross bridges formation → Sliding of actin filaments → 'H' band diminishes  
d. Stimuli → Neurotransmitter secretion → Cross bridges formation → Excitation of T-system → Sliding of actin filaments

103. Match the following columns

Column-I		Column -II	
A.	Cerebrum	1.	Controls the pituitary
B.	Cerebellum	2.	Controls vision and hearing
C.	Hypothalamus	3.	Controls the rate of heart beat
D.	Midbrain	4.	Seat of intelligence
		5.	Maintains body posture

	A	B	C	D
a.	5	4	2	1
b.	4	5	2	1
c.	5	4	1	2
d.	4	5	1	2

104. Match the following columns

Column-I		Column -II	
A.	Calcitonin	1.	Treatment of diabetes mellitus
B.	Gonadotropin	2.	Treatment of rickets
C.	Erythropoietin	3.	Diabetes insipidus
D.	Insulin	4.	Formation of erythrocytes
E.	ADH	5.	Treatment of infertility

	A	B	C	D	E
a.	3	1	4	2	5
b.	3	2	1	5	4
c.	4	3	2	1	5
d.	2	5	4	1	3

105. Binomial nomenclature means that every organism has
- two names one scientific and order popular
  - one scientific name consisting of a generic and a specific epithet
  - one name given by two scientists
  - two names, one latinize and other of the person
106. HIV is classified as a retrovirus because its genetic information is carried in
- DNA instead of RNA
  - DNA
  - RNA instead of DNA
  - Protein coat
107. The amphibians of plant kingdom are
- multicellular non-motile algae
  - bryophytes with simple internal organization
  - unicellular motile algae
  - pteridophytes with complex
108. Salient feature of Arthropoda is
- aquatic and free living
  - chitinous exoskeleton and jointed appendages
  - Both (a) and (b)
  - None of the above
109. One advantage of cleistogamy is
- it leads to greater genetic diversity
  - seed dispersal is more efficient and widespread
  - seed set is not dependent on pollinators
  - each visit of a pollinator results in transfer of hundreds of pollen grains
110. When gynoecium is present in the topmost position of thalamus, the flower is known as
- inferior
  - epigynous
  - Perigynous
  - hypogynous
111. An angiospermic plant has 24 chromosomes in 'microspore mother cells'. The number of chromosome in its endosperm will be
- 12
  - 24
  - 36
  - 48
112. In dicot stem, vascular bundles are
- numerous scattered
  - arranged in a ring
  - without cambium
  - surrounded by bundle sheath
113. Identify the palindromic sequence in the following
- $\frac{GAATTC}{GAATTC}$
  - $\frac{GAATTC}{CTTUUG}$
  - $\frac{GAATTC}{CUUAAG}$
  - $\frac{GAATTC}{CTTAAG}$
114. An analysis of a DNA (double stranded) sample yielded 18% cytosine. What would be the percentage of other bases in this sample?
- T-32%, A-32%, G-18%
  - T-32%, A-18%, G-32%
  - T-18%, A-32%, G-32%
  - T-40%, A-22%, G-20%
115. With reference to enzymes, which one of the following statements is true?
- Apoenzyme = Holoenzyme + Coenzyme
  - Holoenzyme = Apoenzyme + Coenzyme
  - Coenzyme = Apoenzyme + Holoenzyme
  - Holoenzyme = Coenzyme + Apoenzyme
116. Arrange the following events of meiosis in the correct sequence
1. Terminalization
  2. Crossing over
  3. Synapsis
  4. Disjunction of genomes
- The correct sequence is
- 4, 3, 2, 1
  - 3, 2, 1, 4
  - 2, 1, 4, 3
  - 1, 4, 3, 2
117. RBC and a plant cell (with thick cell wall) are placed in distilled water. The solute concentration is the same in both cells. What changes would be observed in them?
- Both plant cell and RBC would not undergo any change
  - The RBC would increase in size and burst, while the plant cell would remain about the same size
  - The plant cell would increase in size and burst, while the RBC would remain about the same size
  - Both plant cell and RBC would decrease in size and collapse

118. Path of water movement from soil to xylem is
- soil → root hair → cortex → pericycle → endodermis → metaxylem → protoxylem
  - soil → root hair → cortex → endodermis → pericycle → protoxylem → metaxylem
  - soil → root hair → epidermis → endodermis → phloem → xylem
  - soil → root hair → cortex → protoxylem → phloem → metaxylem

119. Select the match ones

I.	Nitrosomonas	Nitrite to nitrate
II.	Thiobacillus	Denitrification
III.	Nostoc	Free-living nitrogen-fixer
IV.	Azotobacter	Anaerobic nitrogen -fixer

- I and II
  - II and IV
  - II and III
  - I and IV
120. Kranz anatomy is a morphological diversity in the leaves of
- C<sub>3</sub>-plants
  - C<sub>4</sub>-plants
  - Both (a) and (b)
  - CAM-plants

### Assertion Reason

**Direction Q. No. 121–180):** Read the assertion and reason carefully to mark the correct option out of the options given below:

- If both assertion and reason are true and the reason is the correct explanation of the assertion.
  - If both assertion and reason are true but reason is not the correct explanation of the assertion.
  - If assertion is true but reason is false.
  - If the assertion and reason both are false.
121. **Assertion:** In circular motion, the centripetal and centrifugal force acting in opposite direction balance each other.  
**Reason:** Centripetal and centrifugal forces don't act at the same time.
122. **Assertion:** Work done by or against gravitational force in moving a body from one point to another is independent of the actual path followed between the two points.  
**Reason:** Gravitational forces are conservative forces.
123. **Assertion:** Even when orbit of a satellite is elliptical, its plane of rotation passes through the centre of earth.  
**Reason:** According to law of conservation of angular momentum plane of rotation of satellite always remain same.
124. **Assertion:** Hot soup tastes better than the cold soup.  
**Reason:** Hot soup has high surface tension and it does not spread properly on our tongue.
125. **Assertion:** To float, a body must displace liquid whose weight is greater than the actual weight of the body.  
**Reason:** The body will experiences no net downward force, in the case of floating.
126. **Assertion:** When a bottle of cold carbonated drink is opened, a slight fog forms around the opening.  
**Reason:** Adiabatic expansion of the gas causes lowering of temperature and condensation of water vapours.
127. **Assertion:** The periodic time of a hard spring is less as compared to that of a soft spring.  
**Reason:** The periodic time depends upon the spring constant, and spring constant is large for hard spring.
128. **Assertion:** The speed of sound in solids is maximum though their density is large.  
**Reason:** The coefficient of elasticity of solid is large.
129. **Assertion:** It is not possible to have interference between the waves produced by two violins.  
**Reason:** For interference of two waves the phase difference between the waves must remain constant.
130. **Assertion:** A direct current flows through a metallic rod, produced magnetic field only outside the rod.  
**Reason:** There is no flow of charge carriers inside the rod.
131. **Assertion:** Capacitor serves as a block for dc and offers an easy path to ac.  
**Reason:** Capacitive reactance is inversely proportional to frequency.
132. **Assertion:** When ac circuit contain resistor only, its power is minimum.  
**Reason:** Power of a circuit is independent of phase angle.
133. **Assertion:** The specific charge of positive rays is not constant.  
**Reason:** The mass of ions varies with speed.

- 134. Assertion:** Neutrons penetrate matter more readily as compared to protons.  
**Reason:** Neutrons are slightly more massive than protons.
- 135. Assertion:** Bohr had to postulate that the electrons in stationary orbits around the nucleus do not radiate.  
**Reason:** According to classical physics all moving electrons radiate.
- 136. Assertion:** Amongst alpha, beta and gamma rays,  $\alpha$ -particle has maximum penetrating power.  
**Reason:** The alpha particle is heavier than beta and gamma rays.
- 137. Assertion:** In transistor common emitter mode as an amplifier is preferred over common base mode.  
**Reason:** In common emitter mode the input signal is connected in series with the voltage applied to the base emitter function.
- 138. Assertion:** By roughening the surface of a glass sheet its transparency can be reduced.  
**Reason:** Glass sheet with rough surface absorbs more light.
- 139. Assertion:** Diamond glitters brilliantly.  
**Reason:** Diamond does not absorb sunlight.
- 140. Assertion:** In everyday life the Doppler's effect is observed readily for sound waves than light waves.  
**Reason:** Velocity of light is greater than that of sound.
- 141. Assertion:** Electrical conductivity of semiconductors increase with increasing temperature.  
**Reason:** With increase in temperature, large number of electrons from the valence band can jump to the conduction band.
- 142. Assertion:** For a cell reaction  $\text{Zn(s)} + \text{Cu}^{2+}(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + \text{Cu(s)}$ ; at the equilibrium, voltmeter gives zero reading.  
**Reason:** At the equilibrium, there is no change in the concentration of  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$ .
- 143. Assertion:** Aqueous gold colloidal solution is red in colour.  
**Reason:** The colour arises due to scattering of light by colloidal gold particle.
- 144. Assertion:** Sulphide ores of Zn and Pb are generally converted into their respective oxides, prior to reduction.  
**Reason:** The zinc oxide and lead oxide are reduced by carbon to their respective free metals.
- 145. Assertion:** The geometry of  $\text{XeO}_3\text{F}_2$  is trigonal bipyramidal.  
**Reason:** Xe shows  $\text{sp}^3\text{d}$  hybridisation with three oxygen atoms at equatorial position and two F atoms at axial positions.
- 146. Assertion:** The number of unpaired electrons present in  $[\text{CuCl}_2]^-$  complex is zero  
**Reason:** The complex is linear in the solid state with  $\text{sp}$ -hybridization.
- 147. Assertion:** Phenol is more reactive than benzene towards electrophilic substitution reaction.  
**Reason:** In the case of phenol, the intermediate carbocation is more resonance stabilized.
- 148. Assertion:** In vulcanisation of rubber, sulphur cross links are introduced.  
**Reason:** Vulcanisation is a free radical initiated chain reaction.
- 149. Assertion:** Laboratory reagents are usually made up to a specific molarity rather than a given molality.  
**Reason:** The volume of a liquid is more easily measured than its mass.
- 150. Assertion:** The cation energy of an electron is largely determined by its principal quantum number.  
**Reason:** The principal quantum number  $n$  is a measure of the most probable distance of finding the electron around the nucleus.
- 151. Assertion:** Compressibility factor for hydrogen varies with pressure with positive slope at all pressures.  
**Reason:** Even at low pressures, repulsive forces dominate hydrogen gas.
- 152. Assertion:** The increase in internal energy ( $\Delta E$ ) for the vaporisation of 1 mole of water at 1 atm and 373 K is zero.  
**Reason:** For all isothermal process  $\Delta E = 0$
- 153. Assertion:** pH of  $10^{-7}$  M HCl is less than 7 at  $25^\circ\text{C}$ .  
**Reason:** At very low concentration of HCl, contribution of  $\text{H}^+$  from water is considerable.
- 154. Assertion:** Fluorine exists only  $-1$  oxidation state.  
**Reason:** Fluorine has  $2\text{s}^22\text{p}^5$  configuration.
- 155. Assertion:** The decreasing order of acidic character of  $\text{CO}_2$ ,  $\text{N}_2\text{O}$ ,  $\text{SiO}_2$  and  $\text{SO}_3$  is  $\text{SO}_3 > \text{N}_2\text{O} > \text{CO}_2 > \text{SiO}_2$ .  
**Reason:** Acidic character of oxides increases on moving top to bottom in a group and decreases on moving left to right in a period in Modern periodic table.

- 156. Assertion:** White precipitate of  $\text{BaSO}_4$  is insoluble in water but readily dissolve in the solution of sodium salt of ethylenediaminetetraacetic acid (EDTA).  
**Reason:**  $\text{Ba}^{2+}$  forms a stable water soluble complex with the anion of the sodium salt of EDTA.
- 157. Assertion:** The order of reactivity of carbonium ions is  $1^\circ > 2^\circ > 3^\circ$ .  
**Reason:** Carbon atoms in carbonium ions is in  $\text{sp}^3$  state of hybridisation.
- 158. Assertion:** Diastereoisomers have different physical properties.  
**Reason:** They are non-superimposable mirror images.
- 159. Assertion:** Ethanol and water mixture can be separated by simple distillation.  
**Reason:** Ethanol and water forms azeotropic mixture.
- 160. Assertion:**  $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$  is more reactive for electrophilic addition reaction than  $\text{CH}_3\text{CH} = \text{CH} - \text{CH}_3$   
**Reason:** Carbocation intermediate formed in alkene is more stable than the alkyne.
- 161. Assertion:** The same specific name can be given to organisms belonging to different genera.  
**Reason:** Two organisms of different species may have same specific names.
- 162. Assertion:** Female Anopheles mosquito is definitive host of malarial parasite.  
**Reason:** Human beings are called intermediate host.
- 163. Assertion:** Bryophytes lack non-motile mitospores.  
**Reason:** Fragmentation is means of vegetative reproduction in bryophytes.
- 164. Assertion:** The bird can maintain a constant body temperature.  
**Reason:** Birds possess feathers covering their body.
- 165. Assertion:** Upper and lower surfaces of a dicotyledonous leaves have different colour.  
**Reason:** Dicotyledonous leaves are directed vertically upwards.
- 166. Assertion:** White fibrous tissue has great tensile strength.  
**Reason:** This due to the presence of thick elastic fibre bundles in the tissue.
- 167. Assertion:** All enzymes are not proteins.  
**Reason:** RNA molecules that possess catalytic activity are called ribozymes.
- 168. Assertion:** The spindle of animal cell is called amphiaster.  
**Reason:** Spindle fibers are attached to asters at both poles.
- 169. Assertion:** In oxidative phosphorylation, the electron flow from  $\text{NADH}$  to  $\text{O}_2$ .  
**Reason:** In photosynthesis, the electrons flow from  $\text{H}_2\text{O}$  to  $\text{NADPH}$ .
- 170. Assertion:** Agent orange is mixture of 2, 4-D and 2, 4, 5-T, used during Vietnam War.  
**Reason:** 2, 4-D and 2, 4, 5-T are used as herbicides.
- 171. Assertion:** One should not sleep in a closed room with a lamp burning inside.  
**Reason:** This can cause the production of carbon monoxide which renders.
- 172. Assertion:** Liquid endosperm in coconut is multinucleated.  
**Reason:** In liquid endosperm of coconut karyokinesis is not followed by cytokinesis.
- 173. Assertion:** In phloem translocation of sugar takes place in the form of sucrose.  
**Reason:** Sucrose is more stable as compared to other sugars since due to presence of 1-2 glycosidic linkage it is protected from oxidative attack.
- 174. Assertion:** Cellulose is the unbranched polymer of  $\beta$ -D-glucose units.  
**Reason:** Cellulose contains only  $\beta$  1-4 linkage.
- 175. Assertion:** The Ti-plasmid of Agrobacterium has now been modified and used as a cloning vector.  
**Reason:** Agrobacterium is a pathogen of several monocot plants and it is able to deliver a piece of DNA to transform normal plant cell into a tumor.
- 176. Assertion:** Regulation of lac operon can also be visualised as regulation of enzyme synthesis by its substrate. Ans.  
**Reason:** Lactose is the substrate for enzyme  $\beta$ -galactosidase and regulates switching on and off of the operon.
- 177. Assertion:** Independent pairs of genes segregate independently from each other.  
**Reason:** Independent pairs of genes are located on different chromosomes.
- 178. Assertion:** The sensitivity of the DNA fingerprinting technique has been increased by the use of PCR.  
**Reason:** DNA from a single cell is not enough to perform DNA fingerprinting analysis.

179. **Assertion:** Plasmodium a tiny protozoan is responsible for malaria.

**Reason:** Malignant malaria is caused by Plasmodium falciparum.

180. **Assertion:** Hemitropous ovule is also called horizontal ovule.

**Reason:** Body of ovule is present in horizontal position on the funiculus.

### General Knowledge

**Directions (Q. No. 181-183):** In each of the following questions, select the related letters/word/number from the given alternative.

181. Amnesia : Memory :: Paralysis : ?

- a. Legs                      b. Movement                      c. Limbs                      d. Handicapped

182. PREMONITION : MONITIONERP :: LINSEEDOIL : ?

- a. SEEDOILNLI              b. SEEDOILLIN              c. SEEDOILNIL              d. SEEDOILILN

183. 9536 : 6203 :: 5873 : ?

- a. 2540                      b. 2343                      c. 2353                      d. 2531

184. Pointing to a man in a photograph, a woman said, "His brother's father is the only son of my grandfather." How is the woman related to the man in the photograph?

- a. Daughter                      b. Mother                      c. Aunt                      d. Sister

185. Mrs Lata was 3 times as old as her son 8 years ago. Their total age is 64 years row. now. How old in years is Mrs Lata now?

- a. 48                      b. 12                      c. 36                      d. 4

**Directions (Q. No. 186-187):** In each of the following questions, select the missing number from the given responses.

186. 4                      7                      9

8                      6                      8

3                      7                      9

35                      49                      ?

- a. 63                      b. 89                      c. 81                      d. 64

187. 15                      225                      30

7                      70                      20

3                      ?                      8

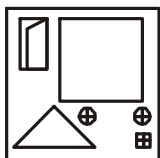
- a. 70                      b. 12                      c. 16                      d. 24

188. Rahul travelled from a point and straightly goes to point 'Y' at a distance of 90 meters. He turned right and walked 40 metres, then again turned right and walked 70 meters. Finally, he turned right and walked 40 meters. How far he is from the starting point?

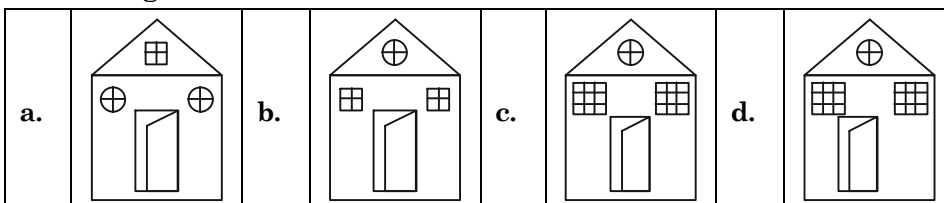
- a. 70 metres                      b. 10 metres                      c. 20 metres                      d. 30 metres

189. Among the four answer figures, which one can be formed from the cut out pieces given below in the question figure?

**Question Figure:**



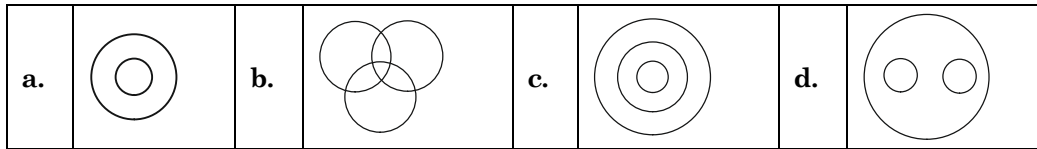
**Answer Figures:**



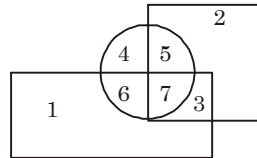


190. In each of the following questions, identify the diagram that best represents the relationship among the classes given below.

Teacher, Writer, Musician



191. In the following diagram, Square represents Doctors, Circle represents Players and Rectangle represents Artists. Which number represents those Doctors who are Players as well as Artists?



- a.** 7                                      **b.** 2                                      **c.** 3                                      **d.** 6

192. If the President of India wants to resign, he has to address the letter of resignation to the

- a.** Chief Justice of India                                      **b.** Prime Minister  
**c.** Vice-President    **d.** Speaker

193. The tomb of Jahangir was built at

- a.** Gujarat                                      **b.** Delhi                                      **c.** Lahore                                      **d.** Agra

194. Largest producer of Bauxite in the world is

- a.** USA                                      **b.** Jamaica                                      **c.** Chile                                      **d.** Australia

195. The Declaration of the Rights of Man is related with

- a.** The Russian Revolution                                      **b.** The French Revolution  
**c.** The American War of Independence                                      **d.** The Glorious Revolution of England

196. The planet which has the highest surface temperature is

- a.** Jupiter                                      **b.** Earth                                      **c.** Pluto                                      **d.** Venus

197. National Science Day in India is celebrated on

- a.** 30th April                                      **b.** 1st February                                      **c.** 28th February                                      **d.** 23rd March

198. Which of the following is India's highest honour in the field of literature?

- a.** Saraswati Samman    **b.** Vyas Samman                                      **c.** Kalidas Samman                                      **d.** Jnanpith Award

199. Golden Globe Awards are associated-with

- a.** Social work                                      **b.** Journalism                                      **c.** Peace initiative                                      **d.** Films

200. Which is the world's cultural capital in India?

- a.** Kolkata                                      **b.** Trivandrum                                      **c.** Madurai                                      **d.** Mumbai