

Sol. $f_0 = 2\text{cm}$ $f_e = 4\text{ cm}$
 $L = 40\text{ cm}$ $D = 25\text{ cm}$
In the condition of normal adjustment.

$$m = \frac{L}{f_0} \cdot \frac{D}{f_e}$$

$$= \frac{40}{2} \times \frac{25}{4}$$

$$= 125$$

- 3.** An electron (mass $9 \times 10^{-31}\text{ kg}$ and charge $1.6 \times 10^{-19}\text{C}$) moving with speed $c/100$ (c = speed of light) is injected into a magnetic field \vec{B} of magnitude $9 \times 10^{-4}\text{ T}$ perpendicular to its direction of motion. We wish to apply an uniform electric field \vec{E} together with the magnetic field so that the electron does not deflect from its path. Then (speed of light $c = 3 \times 10^8\text{ ms}^{-1}$)

- \vec{E} is perpendicular to \vec{B} and its magnitude is $27 \times 10^4\text{ V m}^{-1}$
- \vec{E} is perpendicular to \vec{B} and its magnitude is $27 \times 10^2\text{ V m}^{-1}$
- \vec{E} is parallel to \vec{B} and its magnitude is $27 \times 10^2\text{ V m}^{-1}$
- \vec{E} is parallel to \vec{B} and its magnitude is $27 \times 10^4\text{ V m}^{-1}$

Ans. (2)

Sol. For particle To Remain undeflected

$$\vec{F}_e = -\vec{F}_m$$

$$\Rightarrow |\vec{E}| = VB \sin \theta$$

$$E = \frac{c}{100} \times 9 \times 10^{-4} \sin 90$$

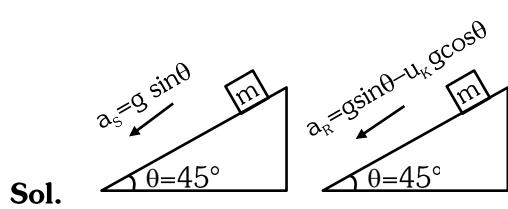
$$E = 27 \times 10^2 \text{ V/m and}$$

$$\vec{E} = \vec{B} \times \vec{V}$$

- 4.** There are two inclined surface of equal length (L) and same angle of inclination 45° with the horizontal. One of them is rough and the other is perfectly smooth. A given body takes 2 times as much time to slide down on rough surface than on the smooth surface. The coefficient of kinetic friction (μ_k) between the object and the rough surface is close to :

- 0.25
- 0.40
- 0.5
- 0.75

Ans. (4)



Sol.

$$L = \frac{1}{2} a_s t_s^2 = \frac{1}{2} a_r t_r^2$$

$$\Rightarrow \left(\frac{t_s}{t_r} \right)^2 = \frac{a_r}{a_s}$$

$$\Rightarrow \left(\frac{1}{2} \right)^2 = \frac{g \sin \theta - \mu_k g \cos \theta}{g \sin \theta}$$

$$\Rightarrow \frac{1}{4} = \frac{\sin 45^\circ - \mu_k \cos 45^\circ}{\sin 45^\circ}$$

$$\Rightarrow \frac{1}{4} = \frac{\left(\frac{1}{\sqrt{2}} \right)}{\left(\frac{1}{\sqrt{2}} \right)} \left(\frac{1 - \mu_k}{1} \right)$$

$$\Rightarrow \frac{1}{4} = 1 - \mu_k \Rightarrow \mu_k = 1 - \frac{1}{4} = \frac{3}{4} = 0.75$$

- 5.** The kinetic energies of two similar cars A and B are 100 J and 225 J respectively. On applying breaks, car A stops after 1000 m and car B stops after 1500 m. If F_A and F_B are the forces applied by the breaks on cars A and B, respectively, then the ratio F_A/F_B is :

- $\frac{3}{2}$
- $\frac{2}{3}$
- $\frac{1}{3}$
- $\frac{1}{2}$

Ans. (2)

Sol. $\because \text{W.D.} = \Delta \text{KE}$

$$\boxed{\vec{F} \cdot \vec{S} = \Delta \text{KE}}$$

$$\frac{(\Delta \text{KE})_A}{(\Delta \text{KE})_B} = \frac{-F_A S_A}{-F_B S_B}$$

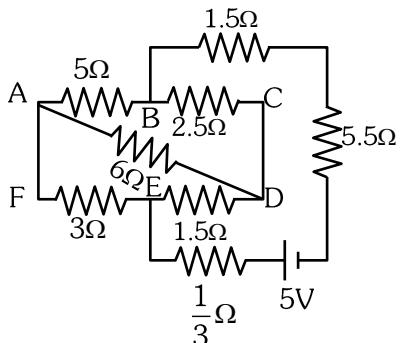
$$\frac{-100}{-225} = \frac{-F_A (1000)}{-F_B (1500)}$$

$$\frac{F_A}{F_B} = \frac{2}{3}$$



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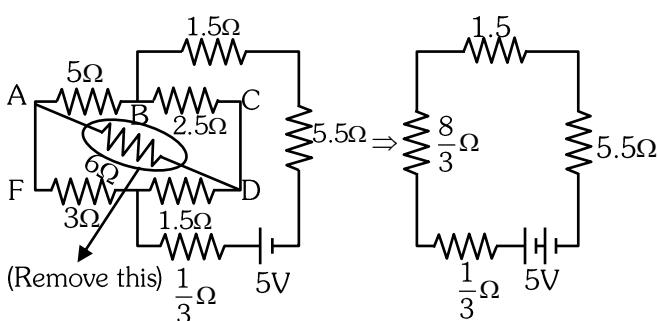
6. The current passing through the battery in the given circuit, is :



- (1) 2.0 A (2) 0.5 A (3) 2.5 A (4) 1.5 A

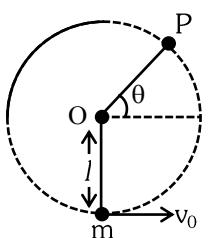
Ans. (2)

Sol. Simplified Diagram



$$i = \frac{V}{R_{eq}} = \frac{5}{\frac{1}{3} + \frac{8}{3} + 1.5 + 5.5} = \frac{5}{10} = 0.5A$$

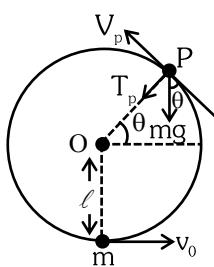
7. A bob of heavy mass m is suspended by a light string of length l . The bob is given a horizontal velocity v_0 as shown in figure. If the string gets slack at some point P making an angle θ from the horizontal, the ratio of the speed v of the bob at point P to its initial speed v_0 is :



- (1) $(\sin \theta)^{\frac{1}{2}}$ (2) $\left(\frac{1}{2+3\sin\theta}\right)^{\frac{1}{2}}$
 (3) $\left(\frac{\cos \theta}{2+3\sin\theta}\right)^{\frac{1}{2}}$ (4) $\left(\frac{\sin \theta}{2+3\sin\theta}\right)^{\frac{1}{2}}$

Ans. (4)

Sol.



$$\text{C.O.M.E. } \frac{1}{2}mv_0^2 = mg\ell(1 + \sin \theta) + \frac{1}{2}mv_p^2 \quad \dots\dots(i)$$

$$\text{At pt P } T_p + mg \sin \theta = \frac{mv_p^2}{\ell} \quad (\text{as } T_p = 0)$$

$$mg \sin \theta = \frac{mv_p^2}{\ell} \Rightarrow mv_p^2 = mg \ell \sin \theta \quad \dots\dots(ii)$$

From (i) & (ii)

$$\frac{1}{2}mv_0^2 = mg\ell(1 + \sin \theta) + \frac{1}{2}mg\ell \sin \theta$$

$$v_0^2 = 2g\ell(1 + \sin \theta) + g\ell \sin \theta$$

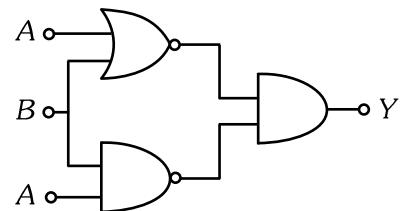
$$v_0 = \sqrt{2g\ell(1 + \sin \theta) + g\ell \sin \theta} \quad \dots\dots(iii)$$

$$v_p = \sqrt{g\ell \sin \theta}$$

$$v_0 = \sqrt{2g\ell + 3g\ell \sin \theta}$$

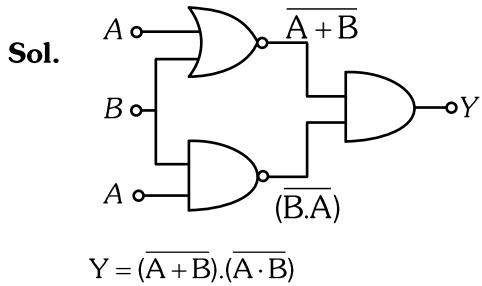
$$\frac{v_p}{v_0} = \sqrt{\frac{\sin \theta}{2 + 3 \sin \theta}}$$

8. The output (Y) of the given logic implementation is similar to the output of an/a _____ gate.



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

Ans. (4)



$$Y = (A + B) \cdot (A \cdot B)$$



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$$\begin{aligned} &\Rightarrow \bar{A} \cdot \bar{B} \cdot (\bar{A} + \bar{B}) \\ &\Rightarrow \bar{A} \cdot \bar{B} \cdot \bar{A} + \bar{A} \cdot \bar{B} \cdot \bar{B} \\ &\Rightarrow \bar{A} \cdot \bar{B} + \bar{A} \cdot \bar{B} \\ &\Rightarrow \bar{A} \cdot \bar{B} = (\bar{A} + \bar{B}) \end{aligned}$$

Behaves as NOR gate

- 9.** The electric field in a plane electromagnetic wave is given by

$$E_z = 60 \cos(5x + 1.5 \times 10^9 t) \text{ V/m.}$$

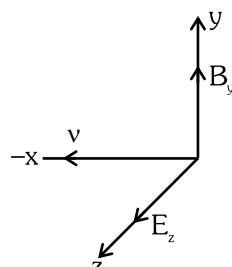
Then expression for the corresponding magnetic field is (here subscripts denote the direction of the field) :

- (1) $B_y = 2 \times 10^{-7} \cos(5x + 1.5 \times 10^9 t) T$
- (2) $B_x = 2 \times 10^{-7} \cos(5x + 1.5 \times 10^9 t) T$
- (3) $B_z = 60 \cos(5x + 1.5 \times 10^9 t) T$
- (4) $B_y = 60 \sin(5x + 1.5 \times 10^9 t) T$

Ans. (1)

$$\text{Sol. } v = \frac{\omega}{k} = \frac{1.5 \times 10^9}{5} = 3 \times 10^8 \text{ m/s}$$

$$B_0 = \frac{F_0}{v} = \frac{60}{3 \times 10^8} = 20 \times 10^{-8} = 2 \times 10^{-7} \text{ T}$$



$$B_y = 2 \times 10^{-7} \cos(5x + 1.5 \times 10^9 t) T$$

- 10.** A ball of mass 0.5 kg is dropped from a height of 40 m. The ball hits the ground and rises to a height of 10 m. The impulse imparted to the ball during its collision with the ground is (Take $g = 9.8 \text{ m/s}^2$)

- (1) 21 NS
- (2) 7 NS
- (3) 0
- (4) 84 NS

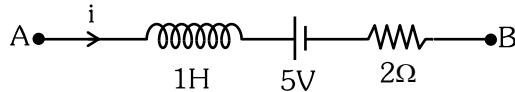
Ans. (1)

$$\text{Sol. } v_i = -\sqrt{2gh_i} = -\sqrt{2 \times 9.8 \times 10} = -28 \text{ m/s}$$

$$v_f = \sqrt{2gh_i} = \sqrt{2 \times 9.8 \times 10} = 14 \text{ m/s}$$

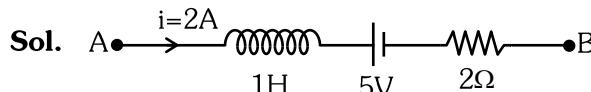
$$\begin{aligned} \vec{I} &= \Delta \vec{P} = m \vec{v}_f - m \vec{v}_i \\ &= m [\vec{v}_f - \vec{v}_i] = 0.5 [14 - (-28)] \\ &= 0.5 \times 42 = 21 \text{ NS} \end{aligned}$$

- 11.** AB is a part of an electrical circuit (see figure). The potential difference " $V_A - V_B$ ", at the instant when current $i = 2 \text{ A}$ and is increasing at a rate of 1 amp/second is :



- (1) 5 volt
- (2) 6 volt
- (3) 9 volt
- (4) 10 volt

Ans. (4)



Apply K.V.L.

$$V_A - \frac{Ldi}{dt} - 5 - IR = V_B$$

$$\begin{aligned} V_A - V_B &= \frac{Ldi}{dt} + 5 + IR \\ &= 1 \times 1 + 5 + 2 \times 2 \\ &= 1 + 5 + 4 \\ &= 10 \text{ V} \end{aligned}$$

- 12.** A 2 amp current is flowing through two different small circular copper coils having radii ratio 1 : 2. The ratio of their respective magnetic moments will be

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

Ans. (1)

Sol. Magnetic moment $M = I(A)$

$$M = I(\pi r^2)$$

$$\frac{M_1}{M_2} = \frac{I\pi r_1^2}{I\pi r_2^2} = \left(\frac{r_1}{r_2}\right)^2 = \left(\frac{1}{2}\right)^2$$

$$\frac{M_1}{M_2} = \frac{1}{4}$$

- 13.** In a certain camera, a combination of four similar thin convex lenses are arranged axially in contact. Then the power of the combination and the total magnification in comparison to the power (p) and magnification (m) for each lens will be, respectively

- (1) $4p$ and $4m$
- (2) p^4 and $4m$
- (3) $4p$ and m^4
- (4) p^4 and m^4

Ans. (3)

Sol. When a combination of lens is used then total power

$$\begin{aligned} P_{\text{net}} &= P + P + P + P \\ &= 4P \end{aligned}$$

$$\text{Total magnification } m_{\text{net}} = m \times m \times m \times m = m^4$$



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- 18.** A model for quantized motion of an electron in a uniform magnetic field B states that the flux passing through the orbit of the electron is $n(h/e)$ where n is an integer, h is Planck's constant and e is the magnitude of electron's charge. According to the model, the magnetic moment of an electron in its lowest energy state will be (m is the mass of the electron)

(1) $\frac{he}{\pi m}$

(2) $\frac{he}{2\pi m}$

(3) $\frac{heB}{\pi m}$

(4) $\frac{heB}{2\pi m}$

Ans. (2)

Sol. Magnetic moment

$$M = IA = I(\pi r^2)$$

$$M = \left(\frac{eu}{2\pi r} \right) (\pi r^2) \dots (1)$$

$$\text{Given } B (\pi r^2) = n \left(\frac{h}{e} \right)$$

$$\Rightarrow r^2 = \frac{h}{B\pi e} \dots (2) \quad (\because n = 1)$$

And when charge moving in external magnetic field

$$\text{then } r = \frac{mu}{qB}$$

$$\left[\frac{v}{r} = \frac{eB}{m} \right] \dots (3) \quad (\because q = e)$$

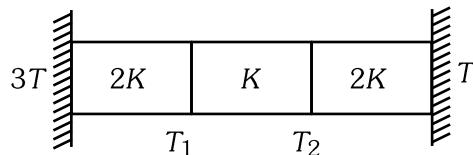
Put value from equation (2) and (3) in equation (1)

$$M = \left(\frac{ev}{2\pi r} \right) (\pi r^2)$$

$$M = \frac{e}{2\pi} \left(\frac{eB}{m} \right) \pi \left(\frac{h}{B\pi e} \right)$$

$$M = \frac{eh}{2\pi m}$$

- 19.** Three identical heat conducting rods are connected in series as shown in the figure. The rods on the sides have thermal conductivity $2K$ while that in the middle has thermal conductivity K . The left end of the combination is maintained at temperature $3T$ and the right end at T . The rods are thermally insulated from outside. In steady state, temperature at the left junction is T_1 and that at the right junction is T_2 . The ratio T_1/T_2 is



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

Ans. (3)

Sol. In steady state $\Rightarrow \left(\frac{dQ}{dt} \right)_1 = \left(\frac{dQ}{dt} \right)_2 = \left(\frac{dQ}{dt} \right)_3$

$$\frac{2KA(3T - T_1)}{L} = \frac{KA(T_1 - T_2)}{L} = \frac{2KA(T_2 - T)}{L}$$

$$6T - 2T_1 = T_1 - T_2 = 2T_2 - 2T$$

$$6T - 2T_1 = T_1 - T_2$$

$$6T + T_2 = 3T_1 \dots (1)$$

$$T_1 - T_2 = 2T_2 - 2T$$

$$2T - 3T_2 = -T_1 \dots (2)$$

Multiply equation (2) By '3'

$$6T - 9T_2 = -3T_1 \dots (3)$$

Equation (1) - (3)

$$10T_2 = 6T_1$$

$$\frac{T_1}{T_2} = \frac{5}{3}$$

- 20.** The plates of a parallel plate capacitor are separated by d . Two slabs of different dielectric constant K_1 and K_2 with thickness $\frac{3}{8}d$ and $\frac{d}{2}$, respectively are inserted in the capacitor. Due to this, the capacitance becomes two times larger than when there is nothing between the plates.
(If $K_1 = 1.25 K_2$, the value of K_1 is :

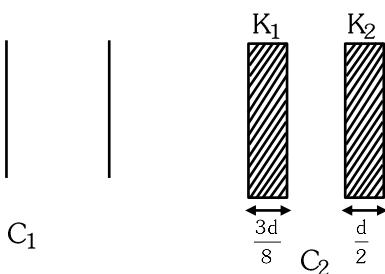
(1) 2.66 (2) 2.33 (3) 1.60 (4) 1.33

Ans. (1)



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Sol. $C_1 = \epsilon_0 A/d$



$$C_2 = \frac{\epsilon_0 A}{\frac{3d}{8K_1} + \frac{d}{2K_2} + \left(d - \frac{3d}{8} - \frac{d}{2}\right)}$$

$$\begin{aligned} C_2 &= \frac{\epsilon_0 A / d}{\frac{3}{8K_1} + \frac{1}{2K_2} + \frac{1}{8}} \\ &= \frac{\epsilon_0 A / d}{\frac{3}{8K_1} + \frac{1}{2\left(\frac{4}{5}K_1\right)} + \frac{1}{8}} \end{aligned}$$

$$C_2 = 2C_1$$

$$\frac{\epsilon_0 A / d}{\frac{3}{8K_1} + \frac{5}{8K_1} + \frac{1}{8}} = 2\epsilon_0 A / d$$

$$\Rightarrow \frac{1}{\frac{1}{K_1} + \frac{1}{8}} = 2 \Rightarrow \frac{1}{K_1} + \frac{1}{8} = \frac{1}{2} \Rightarrow K_1 = \frac{8}{3} = 2.66$$

- 21.** Two cities X and Y are connected by a regular bus service with a bus leaving in either direction every T min. A girl is driving scooty with a speed of 60 km/h in the direction X to Y notices that a bus goes past her every 30 minutes in the direction of her motion, and every 10 minutes in the opposite direction. Choose the correct option for the period T of the bus service and the speed (assumed constant) of the buses.

- (1) 9 min, 40 km/h (2) 25 min, 100 km/h
 (3) 10 min, 90 km/h (4) 15 min, 120 km/h

Ans. (4)

City City
 X Y

$$t_1 = 30 \text{ min} = \frac{1}{2} \text{ hr}$$

$$t_2 = 10 \text{ min} = \frac{1}{6} \text{ hr}$$

V_B = Speed of Bus

V_S = Speed of scooty (girl)

$$d = (V_B - V_S)t_1 = (V_B + V_S)t_2$$

$$\Rightarrow (V_B - 60)\frac{1}{2} = (V_B + 60)\frac{1}{6}$$

$$3V_B - 180 = V_B + 60$$

$$2V_B = 240$$

$$\Rightarrow V_B = 120 \text{ km/hr} \quad \text{Ans.}$$

Distance = $(V_B - V_S)t_1$

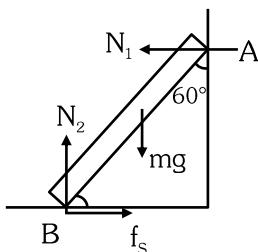
$$D = (120 - 60)\frac{1}{2} = 30 \text{ km}$$

$$t = \frac{d}{V_B} = \frac{30}{120} = \frac{1}{4} \text{ hr} = 15 \text{ min} \quad \text{Ans.}$$

- 22.** A uniform rod of mass 20 kg and length 5 m leans against a smooth vertical wall making an angle of 60° with it. The other end rests on a rough horizontal floor. The friction force that the floor exerts on the rod is (take $g = 10 \text{ m/s}^2$)
 (1) 100 N (2) $100\sqrt{3}$ N
 (3) 200 N (4) $200\sqrt{3}$ N

Ans. (2)

Sol. $N_2 = mg = 200 \text{ N}$



Taking torque about A:

$$f_s L \cos 60^\circ + mg \frac{L}{2} \sin 60^\circ = N_2 L \sin 60^\circ$$

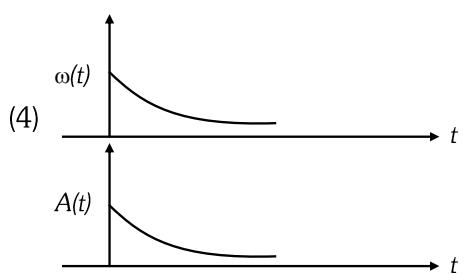
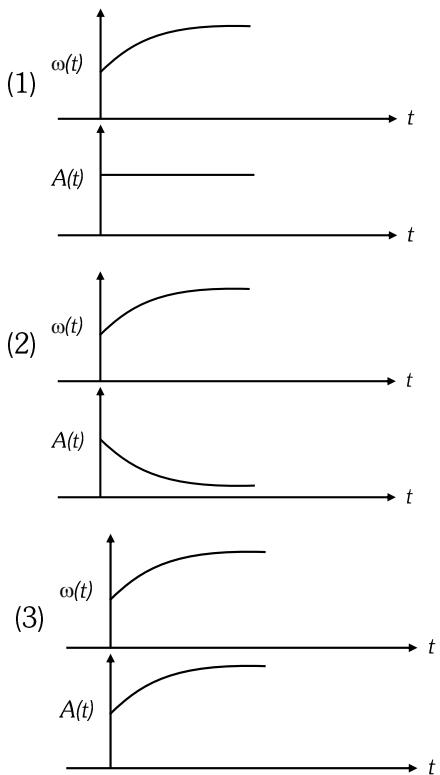
$$f_s \left(\frac{1}{2}\right) + 200 \left(\frac{1}{2}\right) \frac{\sqrt{3}}{2} = 200 \frac{\sqrt{3}}{2}$$

$$f_s = 100\sqrt{3} \text{ N}$$



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23. In an oscillating spring mass system, a spring is connected to a box filled with sand. As the box oscillates, sand leaks slowly out of the box vertically so that the average frequency $\omega(t)$ and average amplitude $A(t)$ of the system change with time t . Which one of the following options schematically depicts these changes correctly?



Ans. (2)

Sol. $\omega = \sqrt{\frac{k}{m}}$
 $\therefore m \downarrow \Rightarrow \omega \uparrow$



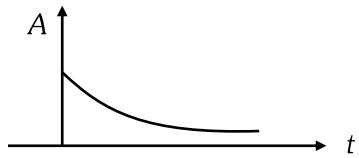
$$\therefore E = \frac{1}{2} k A^2$$

The part of sand being removed takes away a part of energy.

\therefore Total energy decreases.

\therefore Energy of SHM decreases

As a result Amplitude also decreases.



NEET (UG) 2024 में OMKAR JADHAO का STRONG COMEBACK !

180 MARKS 2023 681 MARKS 2024

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Classroom Student of REPEATERS BATCH

Application No. - 240410416192 | D.O.B. - 06.09.2004

- 27.** An unpolarized light beam travelling in air is incident on a medium of refractive index 1.73 at Brewster's angle. Then -

- (1) reflected light is completely polarized and the angle of reflection is close to 60°
- (2) reflected light is partially polarized and the angle of reflection is close to 30°
- (3) both reflected and transmitted light are perfectly polarized with angles of reflection and refraction close to 60° and 30° , respectively
- (4) transmitted light is completely polarized with angle of refraction close to 30°

Ans. (1)

Sol. When unpolarised light is incident on a medium of refractive index 1.73 at Brewster's angle then reflected light is completely polarised.

Using Brewster's Law

$$\mu = \tan(i_p)$$

$$1.73 = \tan(i_p)$$

$$i_p = 60^\circ$$

By Law of reflection,

$$i_p = r = 60^\circ$$

- 28.** Two identical charged conducting spheres A and B have their centres separated by a certain distance. Charge on each sphere is q and the force of repulsion between them is F . A third identical uncharged conducting sphere is brought in contact with sphere A first and then with B and finally removed from both. New force of repulsion between spheres A and B (Radii of A and B are negligible compared to the distance of separation so that for calculating force between them they can be considered as point charges) is best given as :

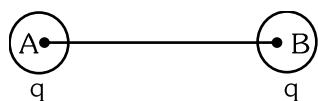
- (1) $\frac{3F}{5}$
- (2) $\frac{2F}{3}$
- (3) $\frac{F}{2}$
- (4) $\frac{3F}{8}$

Ans. (4)

Sol. $F = \frac{kQ^2}{r^2}$

on touching ; $F' = \frac{k(Q/2)(3Q/4)}{r^2}$

$$F' = \frac{3F}{8}$$



After touching \rightarrow

(A) & (C) \rightarrow

Total charge $\rightarrow q + 0 = q$

$$Q'_A = \frac{q}{2}, \quad Q'_C = \frac{q}{2}$$

(B) & (C)

$$\text{Total charge} = q + \frac{q}{2} = \frac{3}{2}q$$

$$Q'_B = \frac{3}{4}q \quad Q'_C = \frac{3}{4}q$$

- 29.** A container has two chambers of volumes $V_1 = 2$ litres and $V_2 = 3$ litres separated by a partition made of a thermal insulator. The chambers contains $n_1 = 5$ and $n_2 = 4$ moles of ideal gas at pressures $p_1 = 1$ atm and $p_2 = 2$ atm, respectively. When the partition is removed, the mixture attains an equilibrium pressure of :

- (1) 1.3 atm
- (2) 1.6 atm
- (3) 1.4 atm
- (4) 1.8 atm

Ans. (2)

Sol. By energy conservation

$$E_1 + E_2 = E_{\text{mix}}$$

$$\frac{n_1 f_1 R T_1}{2} + \frac{n_2 f_2 R T_2}{2} = \frac{(n_1 \times n_2) f R T_{\text{mix}}}{2}$$

$$\Rightarrow \frac{3}{2} P_1 V_1 + \frac{3}{2} P_2 V_2 = \frac{3}{2} P_{\text{mix}} (V_1 + V_2)$$

$$\frac{3}{2} \times 1 \times 2 + \frac{3}{2} \times 2 \times 3 = \frac{3}{2} \times P_{\text{mix}} \quad (5)$$

$$\therefore P_{\text{mix}} = \frac{8}{5}$$

$$P_{\text{mix}} = 1.6 \text{ atm}$$



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- 30.** A particle of mass m is moving around the origin with a constant force F pulling it towards the origin. If Bohr model is used to describe its motion, the radius r of the n^{th} orbit and the particle's speed v in the orbit depend on n as

- (1) $r \propto n^{1/3}$; $v \propto n^{1/3}$
- (2) $r \propto n^{1/3}$; $v \propto n^{2/3}$
- (3) $r \propto n^{2/3}$; $v \propto n^{1/3}$
- (4) $r \propto n^{4/3}$; $v \propto n^{-1/3}$

Ans. (3)

Sol. $\frac{mv^2}{r} = F \quad \dots(1)$

$$mvr = \frac{nh}{2\pi} \Rightarrow v = \frac{nh}{2\pi mr} \quad \dots(2)$$

From equation (1)

$$\frac{m}{r} \left(\frac{nh}{2\pi mr} \right)^2 = F$$

$$\Rightarrow \frac{n^2 h^2}{4\pi^2 m F} = r^3 \Rightarrow r^3 \propto n^2$$

$$\Rightarrow [r \propto n^{2/3}]$$

From (2)

$$v \propto \frac{n}{r} \propto \frac{n}{n^{2/3}} \Rightarrow [v \propto n^{1/3}]$$

- 31.** The radius of Martian orbit around the Sun is about 4 times the radius of the orbit of Mercury. The Martian year is 687 Earth days. Then which of the following is the length of 1 year on Mercury ?

- (1) 88 earth days
- (2) 225 earth days
- (3) 172 earth days
- (4) 124 earth days

Ans. (1)

Sol. $\frac{T_{\text{Mercury}}}{T_{\text{Martian}}} = \left(\frac{r_{\text{Mercury}}}{r_{\text{Martian}}} \right)^{3/2} = \left(\frac{1}{4} \right)^{3/2} = \frac{1}{8}$

$$T_{\text{Mercury}} = \frac{T_{\text{Martian}}}{8} = \frac{687}{8} = 85.875 \text{ days} \approx 88 \text{ days}$$

- 32.** A body weighs 48 N on the surface of the earth. The gravitational force experienced by the body due to the earth at a height equal to one-third the radius of the earth from its surface is :

- (1) 16 N
- (2) 27 N
- (3) 32 N
- (4) 36 N

Ans. (2)

Sol. $W' = mg' = mg \left(\frac{R}{R+h} \right)^2$

$$= 48 \left(\frac{R}{R + \frac{R}{3}} \right)^2 \\ = 48 \times \frac{9}{16} = 27 \text{ N}$$

- 33.** A wire of resistance R is cut into 8 equal pieces. From these pieces two equivalent resistances are made by adding four of these together in parallel. Then these two sets are added in series. The net effective resistance of the combination is :

- (1) $\frac{R}{64}$
- (2) $\frac{R}{32}$
- (3) $\frac{R}{16}$
- (4) $\frac{R}{8}$

Ans. (3)

Sol. Resistance of each part = $R/8$

$$R_{\text{eq}} = \frac{1}{4} \left(\frac{R}{8} \right) + \frac{1}{4} \left(\frac{R}{8} \right) = \frac{R}{16}$$

- 34.** De-Broglie wavelength of an electron orbiting in the $n = 2$ state of hydrogen atom is close to (Given Bohr radius = 0.052 nm)

- (1) 0.067 nm
- (2) 0.67 nm
- (3) 1.67 nm
- (4) 2.67 nm

Ans. (2)

Sol. Given $n = 2$, $Z = 1$

$$2\pi r = n\lambda$$

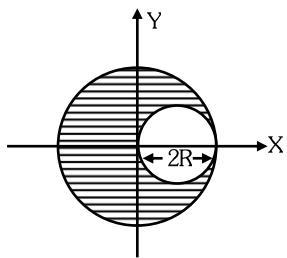
$$2\pi \times \left(0.052 \frac{n^2}{Z} \right) = n\lambda$$

On solving $\lambda = 0.67 \text{ nm}$



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- 39.** A sphere of radius R is cut from a larger solid sphere of radius $2R$ as shown in the figure. The ratio of the moment of inertia of the smaller sphere to that of the rest part of the sphere about the Y-axis is:



- (1) $\frac{7}{8}$ (2) $\frac{7}{40}$
 (3) $\frac{7}{57}$ (4) $\frac{7}{64}$

Ans. (3)

Sol.
$$\text{I}_1 = \text{I}_{\text{large}} - \text{I}_{\text{small}}$$

$$\text{I}_1 = \frac{2}{5} M(2R)^2$$

$$\text{I}_2 = \frac{2}{5} mr^2 + md^2$$

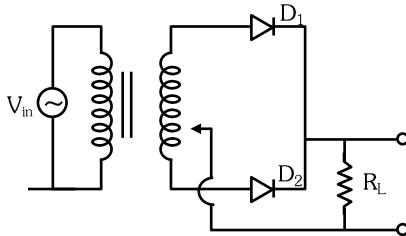
$$= \frac{2}{5} \left(\frac{M}{8}\right) R^2 + \frac{M}{8} (R)^2$$

$$= \frac{7MR^2}{40}$$

$$\text{I} = \text{I}_1 - \text{I}_2 = \frac{8MR^2}{5} - \frac{7MR^2}{40} = \frac{57}{40} MR^2$$

$$\frac{\text{I}_2}{\text{I}_1} = \frac{7}{57}$$

- 40.** A full wave rectifier circuit with diodes (D_1) and (D_2) is shown in the figure. If input supply voltage $V_{\text{in}} = 220 \sin(100\pi t)$ volt, then at $t = 15 \text{ msec}$



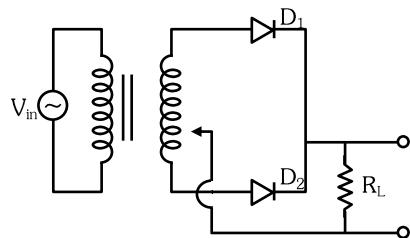
- (1) D_1 is forward biased, D_2 is reverse biased
 (2) D_1 is reverse biased, D_2 is forward biased
 (3) D_1 and D_2 both are forward biased
 (4) D_1 and D_2 both are reverse biased

Ans. (2)

Sol. At $t = 15 \text{ msec}$

$$V_{\text{in}} = 220 \sin(100\pi \times 15 \times 10^{-3})$$

$$= 220 \sin\left(\frac{3\pi}{2}\right) = -220 \text{ V}$$



So diode D_1 is in reverse bias and D_2 is in forward bias

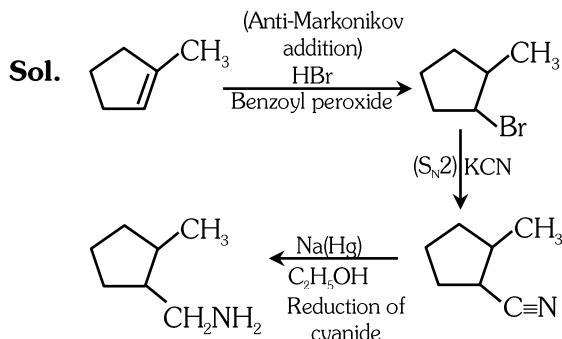
- 41.** Two gases A and B are filled at the same pressure in separate cylinders with movable pistons of radius r_A and r_B , respectively. On supplying an equal amount of heat to both the systems reversibly under constant pressure, the pistons of gas A and B are displaced by 16 cm and 9 cm , respectively. If the change in their internal energy is the same, then the ratio $\frac{r_A}{r_B}$ is equal to

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

Ans. (2)



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50. Energy and radius of first Bohr orbit of He^+ and Li^{2+} are

[Given $R_{\text{H}} = 2.18 \times 10^{-18} \text{ J}$, $a_0 = 52.9 \text{ pm}$]

$$(1) E_n(\text{Li}^{2+}) = -19.62 \times 10^{-18} \text{ J}; \\ r_n(\text{Li}^{2+}) = 17.6 \text{ pm}$$

$$E_n(\text{He}^+) = -8.72 \times 10^{-18} \text{ J};$$

$$r_n(\text{He}^+) = 26.4 \text{ pm}$$

$$(2) E_n(\text{Li}^{2+}) = -8.72 \times 10^{-18} \text{ J};$$

$$r_n(\text{Li}^{2+}) = 26.4 \text{ pm}$$

$$E_n(\text{He}^+) = -19.62 \times 10^{-18} \text{ J};$$

$$r_n(\text{He}^+) = 17.6 \text{ pm}$$

$$(3) E_n(\text{Li}^{2+}) = -19.62 \times 10^{-16} \text{ J};$$

$$r_n(\text{Li}^{2+}) = 17.6 \text{ pm}$$

$$E_n(\text{He}^+) = -8.72 \times 10^{-16} \text{ J};$$

$$r_n(\text{He}^+) = 26.4 \text{ pm}$$

$$(4) E_n(\text{Li}^{2+}) = -8.72 \times 10^{-16} \text{ J};$$

$$r_n(\text{Li}^{2+}) = 17.6 \text{ pm}$$

$$E_n(\text{He}^+) = -19.62 \times 10^{-16} \text{ J};$$

$$r_n(\text{He}^+) = 17.6 \text{ pm}$$

Ans. (1)

Sol. $E_n = -2.18 \times 10^{-18} \times \frac{Z^2}{n^2} \text{ J}$

$$\text{For } \text{He}^+ \Rightarrow E_1 = -2.18 \times 10^{-18} \times \frac{2^2}{1^2} \text{ J} \\ = -8.72 \times 10^{-18} \text{ J}$$

$$\text{For } \text{Li}^{2+} \Rightarrow E_1 = -2.18 \times 10^{-18} \times \frac{3^2}{1^2} \text{ J} \\ = -19.62 \times 10^{-18} \text{ J}$$

$$r_n = 52.9 \times \frac{n^2}{Z} \text{ pm}$$

$$\text{For } \text{He}^+ \Rightarrow r_1 = 52.9 \times \frac{1^2}{2} \text{ pm} = 26.4 \text{ pm}$$

$$\text{For } \text{Li}^{2+} \Rightarrow r_1 = 52.9 \times \frac{1^2}{3} \text{ pm} = 17.6 \text{ pm}$$

51. Which of the following are paramagnetic?

- A. $[\text{NiCl}_4]^{2-}$ B. $\text{Ni}(\text{CO})_4$
 C. $[\text{Ni}(\text{CN})_4]^{2-}$ D. $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$
 E. $\text{Ni}(\text{PPh}_3)_4$

Choose the **correct** answer from the options given below :

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

Ans. (3)

- Sol.** (A) $[\text{NiCl}_4]^{2-} \Rightarrow$ Oxidation state = +2

Electronic configuration = $3d^8 4s^0$

Cl = W.F.L. No Pairing

1	1	1	1	1
---	---	---	---	---

2 unpaired electrons

- (D) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$

Oxidation state = +2, configuration = $3d^8$

H_2O is W.F.L. No pairing

1	1	1	1	1
---	---	---	---	---

2 unpaired electrons

Hence both are paramagnetic

52. Given below are two statements:

Statement I : Like nitrogen that can form ammonia, arsenic can form arsine.

Statement II : Antimony cannot form antimony pentoxide.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) Both Statement I and Statement II are correct
 (2) Both Statement I and Statement II are incorrect
 (3) Statement I is correct but Statement II is incorrect
 (4) Statement I is incorrect but Statement II is correct.

Ans. (3)

- Sol.** $\text{N} = \text{NH}_3$ As \rightarrow AsH_3 are possible correct statement.

All elements of N-family form two type of E_2O_3 & E_2O_5 oxide.

Statement is wrong.

Statement-I is correct & Statement-II is incorrect.



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53. Which among the following electronic configurations belong to main group elements?

A. [Ne]3s¹ B. [Ar]3d³4s²
 C. [Kr]4d¹⁰5s²5p⁵ D. [Ar]3d¹⁰4s¹
 E. [Rn]5f⁰6d²7s²

Choose the **correct** answer from the option given below:

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

Ans. (2)

Sol. Main group elements are s & p-block elements.

A → s-block
 C → p-block

54. Dalton's Atomic theory could not explain which of the following ?

- (1) Law of conservation of mass
 (2) Law of constant proportion
 (3) Law of multiple proportion
 (4) Law of gaseous volume

Ans. (4)

Sol. Dalton's atomic theory could not explain law of gaseous volume.

55. Consider the following compounds:



The oxidation states of the underlined elements in them are, respectively,

- (1) +1, -1, and +6 (2) +2, -2, and +6
 (3) +1, -2, and +4 (4) +4, -4, and +6

Ans. (1)

Sol. $\begin{array}{c} \text{K} \text{O}_2 \\ \downarrow \\ \text{Alkali metals always show +1} \end{array}$ $\begin{array}{c} \text{H}_2\text{O}_2 \\ \downarrow \\ \text{O.S. in its compounds} \end{array}$
 $2(+1) + 2x = 0$
 $x = -1$

$$\begin{array}{c} \text{H}_2\text{S}\text{O}_4 \\ \downarrow \\ 2(+1) + x + 4(-2) = 0 \\ x = +6 \end{array}$$

56. If the half-life ($t_{1/2}$) for a first order reaction is 1 minutes, then the time required for 99.9% completion of the reaction is closest to:

- (1) 2 minutes (2) 4 minutes
 (3) 5 minutes (4) 10 minutes

Ans. (4)

Sol. For 1st order reactions : $t_{99.9\%} = 10 \times t_{1/2}$
 $t_{99.9\%} = 10 \times 1$
 $= 10 \text{ minute}$

57. The correct order of the wavelength of light absorbed by the following complexes is,

- A. [Co(NH₃)₆]³⁺ B. [Co(CN)₆]³⁻
 C. [Cu(H₂O)₄]²⁺ D. [Ti(H₂O)₆]³⁺

Choose the **correct** answer from the options given below:

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

Ans. (2)

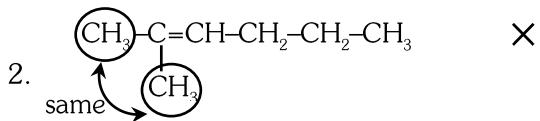
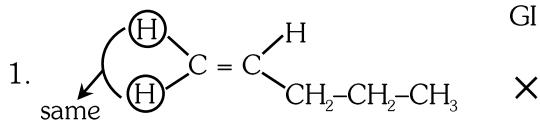
Sol. Strength of ligand $\uparrow \Delta_0 \uparrow$
 Absorbed Energy $\uparrow \lambda_{\text{absorbed}} \downarrow$

58. Which one of the following compounds can exist as cis-trans isomers ?

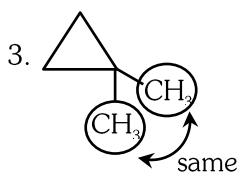
- (1) Pent-1-ene
 (2) 2-Methylhex-2-ene
 (3) 1, 1-Dimethylcyclopropane
 (4) 1, 2-Dimethylcyclohexane

Ans. (4)

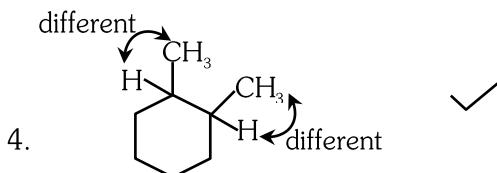
Sol. For GI in alkene, each terminal individually must have different atoms/groups attached to it.
 For GI in cyclo-alkane, at least two sp³C of ring individually must have different atoms/groups attached to it.



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59. Phosphoric acid ionizes in three steps with their ionization constant values

$$K_{a_1}, K_{a_2} \text{ and } K_{a_3}, \text{ respectively,}$$

While K is the overall ionization constant.

Which of the following statements are true?

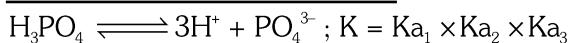
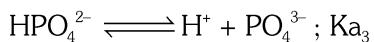
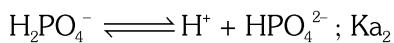
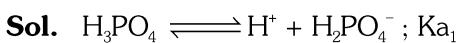
- A. $\log K = \log K_{a_1} + \log K_{a_2} + \log K_{a_3}$
- B. H_3PO_4 is a stronger acid than $H_2PO_4^-$ and HPO_4^{2-}
- C. $K_{a_1} > K_{a_2} > K_{a_3}$

$$D. K_{a_1} = \frac{K_{a_3} + K_{a_2}}{2}$$

Choose the **correct** answer from the options given below:

- (1) A and B only (2) A and C only
 (2) B, C and D only (4) A, B and C only

Ans. (4)



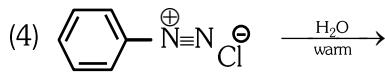
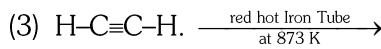
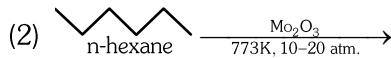
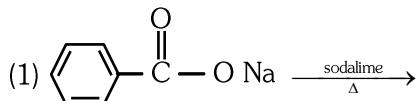
For polybasic acid, order of ionization constant is $K_{a_1} > K_{a_2} > K_{a_3}$ because as negative charge increases, tendency to loose H^+ ions decreases.

Overall $K = K_{a_1} \times K_{a_2} \times K_{a_3}$

Taking log on both sides

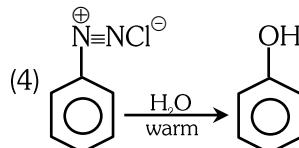
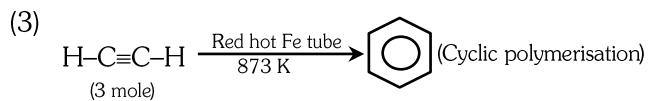
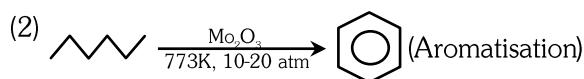
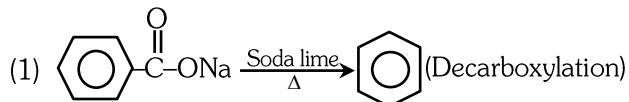
$$\log K = \log K_{a_1} + \log K_{a_2} + \log K_{a_3}$$

60. Which one of the following reactions does **NOT** give benzene as the product?



Ans. (4)

Sol.



61. If the molar conductivity (Λ_m) of a 0.050 mol L^{-1} solution of a monobasic weak acid is $90 \text{ S cm}^2 \text{ mol}^{-1}$, its extent (degree) of dissociation will be

[Assume $\Lambda_+^\circ = 349.6 \text{ S cm}^2 \text{ mol}^{-1}$ and

$$\Lambda_-^\circ = 50.4 \text{ S cm}^2 \text{ mol}^{-1}$$

$$(1) 0.115 \quad (2) 0.125$$

$$(3) 0.225 \quad (4) 0.215$$

Ans. (3)

Sol. Degree of dissociation (α) = $\frac{\Lambda_m}{\Lambda_m^\circ}$

$$\Lambda_m^\circ = \Lambda_+^\circ + \Lambda_-^\circ$$

$$= 349.6 + 50.4 = 400 \text{ Scm}^2 \text{ mol}^{-1}$$

$$\therefore \alpha = \frac{\Lambda_m}{\Lambda_m^\circ} = \frac{90}{400} = 0.225$$



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TOSHNIWAL LAYOUT, SHASTRI NAGAR, AKOLA (M.S.)
8878873188 | 8878873288 | 8788848941

- 62.** Given below are two statements :

Statement I : A hypothetical diatomic molecule with bond order zero is quite stable.

Statement II : As bond order increases, the bond length increase.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) Both Statement I and Statement II are true
- (2) Both Statement I and Statement II are false
- (3) Statement I is true but Statement II are false
- (4) Statement I is false but Statement II are true

Ans. (2)

Sol.

$\left. \begin{array}{l} \text{He}_2 \\ \text{Be}_2 \\ \text{Ne}_2 \end{array} \right\}$ Bond order = 0 (does not exist)
Statement I is false

$$\text{Bond order} \propto \frac{1}{\text{Bond length}}$$

Statement II is false

- 63.** Out of the following complex compounds, which of the compound will be having the minimum conductance in solution?

- (1) $[\text{Co}(\text{NH}_3)_3 \text{Cl}_3]$
- (2) $[\text{Co}(\text{NH}_3)_4 \text{Cl}_2]$
- (3) $[\text{Co}(\text{NH}_3)_6] \text{Cl}_3$
- (4) $[\text{Co}(\text{NH}_3)_5 \text{Cl}] \text{Cl}$

Ans. (1, 2)

Sol. Both (1) & (2) are non-electrolytes that's why they show minimum conductivity among following options.

- 64.** Match **List - I** with **List - II**

- | List-I | List-II |
|--------------------|---|
| A. XeO_3 | I. sp^3d , linear |
| B. XeF_2 | II. sp^3 ; pyramidal |
| C. XeOF_4 | III. sp^3d^3 ; distorted octahedral |
| D. XeF_6 | IV. sp^3d^2 ; square pyramidal |

Choose the **correct** answer from the options given below:

- (1) A-II, B-I, C-IV, D-III
- (2) A-II, B-I, C-III, D-IV
- (3) A-IV, B-II, C-III, D-I
- (4) A-IV, B-II, C-I, D-III

Ans. (1)

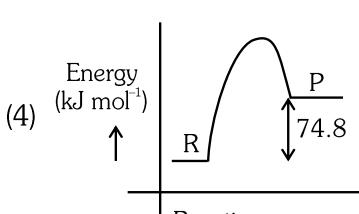
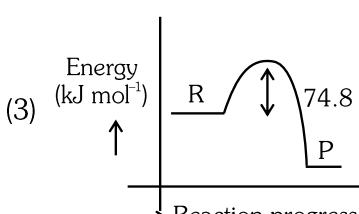
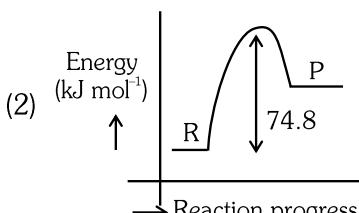
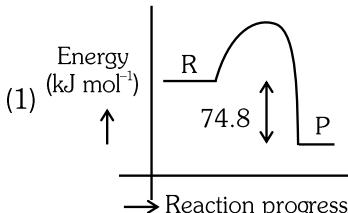
Sol.

- | | |
|-----------------|--|
| XeO_3 | $\rightarrow \text{sp}^3(1\text{LP})$ - Pyramidal |
| XeF_2 | $\rightarrow \text{sp}^3\text{d}$ (3LP) - Linear |
| XeOF_4 | $\rightarrow \text{sp}^3\text{d}^2$ (1LP) - Square pyramidal |
| XeF_6 | $\rightarrow \text{sp}^3\text{d}^3$ (1LP) - Distorted octahedral |

- 65.** $\text{C(s)} + 2\text{H}_2(\text{g}) \rightarrow \text{CH}_4(\text{g}) ; \Delta H = -74.8 \text{ kJ mol}^{-1}$

Which of the following diagrams gives an accurate representation of the above reaction?

[R → reactants; P → products]

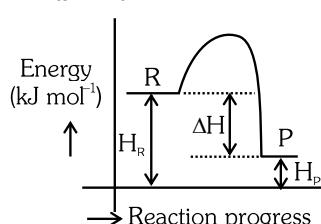


Ans. (1)

Sol. For Exothermic reaction

$$\Rightarrow \Delta H = H_p - H_r = -ve$$

$$\therefore H_r > H_p$$



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66. Match **List – I** with **List – II**

List-I	List-II
(Example)	(Type of Solution)
A. Humidity	I. Solid in solid
B. Alloys	II. Liquid in gas
C. Amalgams	III. Solid in gas
D. Smoke	IV. Liquid in solid

Choose the **correct** answer from the options given below:

- (1) A-II, B-IV, C-I, D-III
- (2) A-II, B-I, C-IV, D-III
- (3) A-III, B-I, C-IV, D-II
- (4) A-III, B-II, C-I, D-IV

Ans. (2)

Sol. A \rightarrow Humidity \Rightarrow Liquid in Gas

B \rightarrow Alloy \Rightarrow Solid in solid

C \rightarrow Amalgams \Rightarrow Liquid in solid

D \rightarrow Smoke \Rightarrow Solid in Gas

67. The correct order of decreasing basic strength of the given amines is :

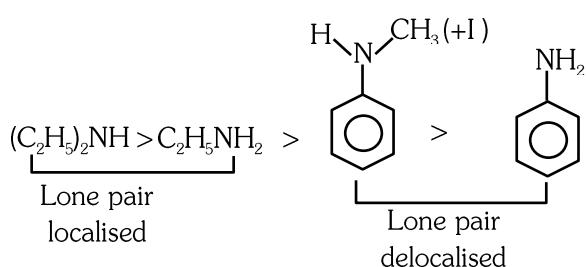
- (1) N-methylaniline > benzenamine > ethanamine
 > N-ethylethanamine
- (2) N- ethylethanamine > ethanamine >
 benzenamine > N- methylaniline
- (3) N- ethylethanamine > ethanamine >
 N- methylaniline > benzenamine
- (4) benzenamine > ethanamine > N-methylaniline
 > N-ethylethanamine

Ans. (3)

Sol. Basic strength order

N-ethylethanamine > Ethanamine

> N-methylaniline > Benzenamine



68. Among the following choose the ones with equal number of atoms.

- A. 212 g of $\text{Na}_2\text{CO}_3(s)$ [molar mass = 106 g]
- B. 248 g of $\text{Na}_2\text{O}(s)$ [molar mass = 62 g]
- C. 240 g of $\text{NaOH}(s)$ [molar mass = 40 g]
- D. 12 g of $\text{H}_2(g)$ [molar mass = 2 g]
- E. 220 g of $\text{CO}_2(g)$ [molar mass = 44 g]

Choose the **correct** answer from the options given below:

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

Ans. (2)

Sol. No. of atoms = Atomicity \times mole $\times N_A$

$$(A) \text{No. of atoms} = 6 \times \frac{212}{106} \times N_A = 12N_A$$

$$(B) \text{No. of atoms} = 3 \times \frac{248}{62} \times N_A = 12N_A$$

$$(C) \text{No. of atoms} = 3 \times \frac{240}{40} \times N_A = 18N_A$$

$$(D) \text{No. of atoms} = 2 \times \frac{12}{2} \times N_A = 12N_A$$

$$(E) \text{No. of atoms} = 3 \times \frac{220}{44} \times N_A = 15N_A$$

69. Match **List – I** with **List – II**

List-I	List-II
(Name of the Vitamin)	(Deficiency disease)
A. Vitamin B_{12}	I. Cheilosis
B. Vitamin D	II. Convulsions
C. Vitamin B_2	III. Rickets
D. Vitamin B_6	IV. Pernicious anaemia

Choose the **correct** answer from the options given below:

- (1) A-I, B-III, C-II, D-IV
- (2) A-IV, B-III, C-I, D-II
- (3) A-II, B-III, C-I, D-IV
- (4) A-IV, B-III, C-II, D-I

Ans. (2)

Sol. Correct match

- A. Vitamin B_{12} IV. Pernicious Anaemia
- B. Vitamin D III. Rickets
- C. Vitamin B_2 I. Cheilosis
- D. Vitamin B_6 II. Convulsions



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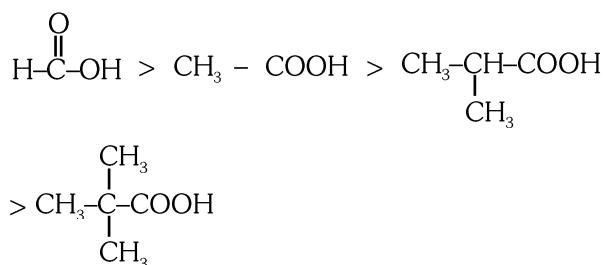
70. The correct order of decreasing acidity of the following aliphatic acids is :-

- (1) $(\text{CH}_3)_3\text{CCOOH} > (\text{CH}_3)_2\text{CHCOOH} > \text{CH}_3\text{COOH}$
 $> \text{HCOOH}$
- (2) $\text{CH}_3\text{COOH} > (\text{CH}_3)_2\text{CHCOOH} > (\text{CH}_3)_3\text{CCOOH}$
 $> \text{HCOOH}$
- (3) $\text{HCOOH} > \text{CH}_3\text{COOH} > (\text{CH}_3)_2\text{CHCOOH}$
 $> (\text{CH}_3)_3\text{CCOOH}$
- (4) $\text{HCOOH} > (\text{CH}_3)_3\text{CCOOH} > (\text{CH}_3)_2\text{CHCOOH}$
 $> \text{CH}_3\text{COOH}$

Ans. (3)

Sol. Acidic strength $\propto -I$ effect

$$\propto \frac{1}{+I \text{ effect}}$$



71. Given below are two statements :

Statement I : Ferromagnetism is considered as an extreme form of paramagnetism.

Statement II : The number of unpaired electrons in a Cr^{2+} ion ($Z = 24$) is the same as that of a Nd^{3+} ion ($Z = 60$).

In the light of the above statements, choose the **correct** answer from the options given below :

- (1) Both Statements I and Statement II are true
- (2) Both Statement I and Statements II are false
- (3) Statement I is true but Statement II is false
- (4) Statement I is false bt Statements II is true

Ans. (3)

Sol. Ferromagnetism > Paramagnetism

Statement-I is true

$$\text{Cr}^{+2} = 3d^4$$

1	1	1	1	
---	---	---	---	--

4 unpaired electrons

$$\text{Nd}^{+3} = 4f^3$$

1	1	1		
---	---	---	--	--

3 unpaired electrons

Statement-II is false.

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180
MARKS 2023

681
MARKS 2024

OMKAR JADHAO
Studying - BJGMC, PUNE
Classroom Student of
REPEATERS BATCH

Application No. - 240410416192 | D.O.B. - 06.09.2004

72. Match **List-I** with **List-II**

List-I (Mixture)	List-II (Method of Separation)
A. $\text{CHCl}_3 + \text{C}_6\text{H}_5\text{NH}_2$	I. Distillation under reduced pressure
B. Crude oil in petroleum industry	II. Steam distillation
C. Glycerol from spent-lye	III. Fractional distillation
D. Aniline-water	IV. Simple distillation

Choose the **correct** answer from the options given below :-

- (1) A-IV, B-III, C-I, D-II (2) A-IV, B-III, C-II, D-I
 (3) A-III, B-IV, C-I, D-II (4) A-III, B-IV, C-II, D-I

Ans. (1)

Sol. Correct Match

- A. $\text{CHCl}_3 + \text{C}_6\text{H}_5\text{NH}_2$ → Simple distillation (IV)
 - B. Crude oil in petroleum industry → Fractional distillation (III)
 - C. Glycerol from spent-lye → Distillation under reduced pressure (I)
 - D. Aniline-water → Steam distillation (II)

- 73.** For the reaction $A(g) \rightleftharpoons 2B(g)$, the backward reaction rate constant is higher than the forward reaction rate constant by a factor of 2500, at 1000 K.

[Given : $R = 0.0831 \text{ L atm mol}^{-1} \text{ K}^{-1}$]

(3)

$$\textbf{Sol. } K_C = \frac{K_f}{K_b}$$

$$= \frac{K_f}{2500 K_f}$$

$$= \frac{1}{2500}$$

$$K_p = K_C (RT)^{\Delta n_g}$$

$$= \frac{1}{2500} (0.0831 \times 1000)^1$$

$$K_p = 0.033$$

74. Given below are two statements :

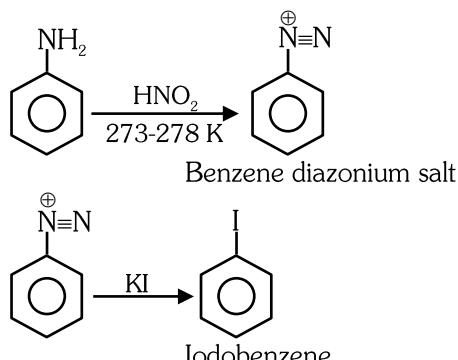
Statement I : Benzenediazonium salt is prepared by the reaction of aniline with nitrous acid at 273-278 K. It decomposes easily in the dry state.

Statement II : Insertion of iodine into the benzene ring is difficult and hence iodobenzene is prepared through the reaction of benzenediazonium salt with KI. In the light of the above statements, choose the **most appropriate** answer from the options given below :

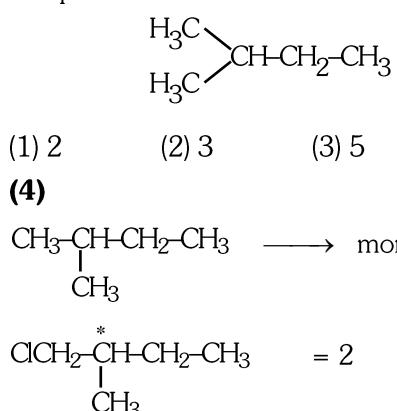
- (1) Both Statement I and Statement II are correct
 - (2) Both Statement I and Statement II are incorrect
 - (3) Statement I is correct but Statement II is incorrect
 - (4) Statement I is incorrect but Statement II is correct

Ans. (1)

Sol. Benzenediazonium chloride is a colourless crystalline solid. It is readily soluble in water and is stable in cold but reacts with water when warmed. It decomposes easily in the dry state.

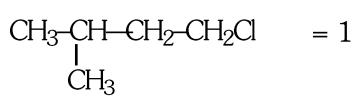
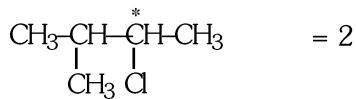
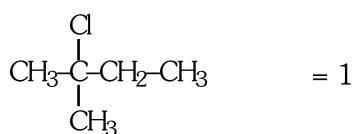


- 75.** How many products (including stereoisomers) are expected from monochlorination of the following compound?



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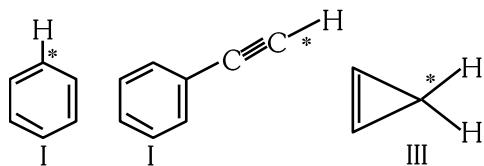
TOSHNIWAL LAYOUT, SHASTRI NAGAR, AKOLA (M.S.)
8878873188 | 8878873288 | 8788848941



* → Chiral Carbon

Total = 6 (including stereo isomers)

- 76.** Among the given compound I-III, the correct order of bond dissociation energy of C-H bond marked with * is :-

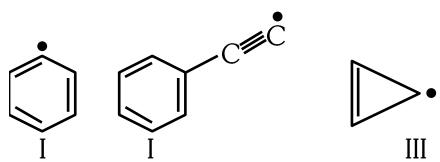


- (1) II > I > III
(3) III > II > I

- (2) I > II > III
(4) II > III > I

Ans. (1)

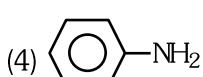
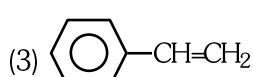
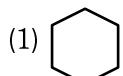
Sol. Bond dissociation energy $\propto \frac{1}{\text{Stability of free radical formed after C-H bond fission homolytically}}$



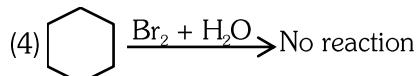
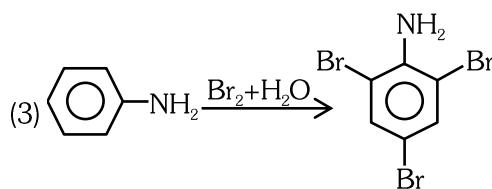
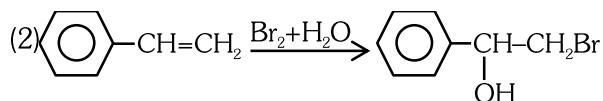
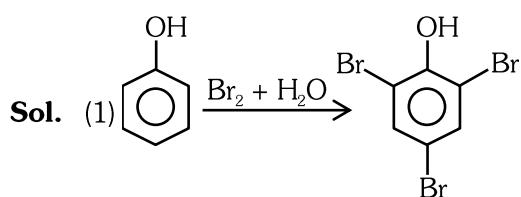
Stability order III > I > II

Bond dissociation energy order \Rightarrow II > I > III.

- 77.** Which one of the following compounds **does not** decolorize bromine water ?

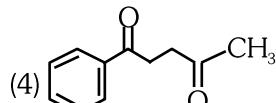
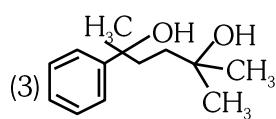
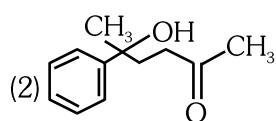
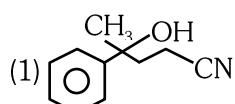
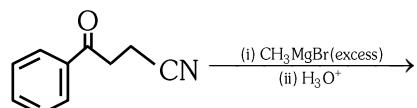


Ans. (1)



∴ Bromine water solution is decolourised in reaction (1), (2), (3) but not in (4).

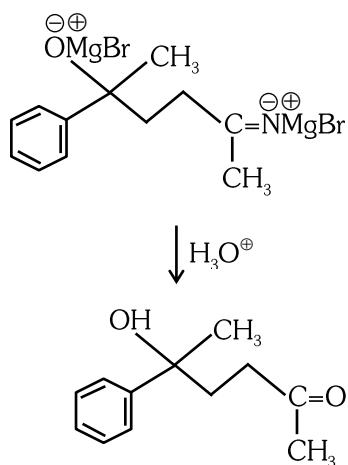
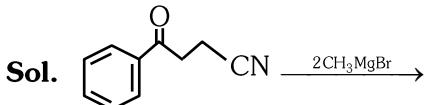
- 78.** The major product of the following reaction is



Ans. (2)



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- 79.** Which of the following aqueous solution will exhibit highest boiling point ?
- 0.01 M Urea
 - 0.01 M KNO_3
 - 0.01 M Na_2SO_4
 - 0.015 M $\text{C}_6\text{H}_{12}\text{O}_6$

Ans. (3)

Sol. $\Delta T_b = iK_b m$

- Consider $m \approx M$
- K_b same for all
 $i \times M$

- $1 \times 0.01 = 0.01$
 - $2 \times 0.01 = 0.02$
 - $3 \times 0.01 = 0.03$
 - $4 \times 0.015 = 0.015$
- $iM \uparrow \Rightarrow \Delta T_b \uparrow \Rightarrow T_b \uparrow$

80. Match **List-I** with **List-II**

- | List-I | List-II |
|-----------------------|---|
| A. Haber process | I. Fe catalyst |
| B. Wacker oxidation | II. PdCl_2 |
| C. Wilkinson catalyst | III. $[(\text{PPh}_3)_3\text{RhCl}]$ |
| D. Ziegler catalyst | IV. TiCl_4 with $\text{Al}(\text{CH}_3)_3$ |
- Choose the **correct** answer from the options given below :
- A-I, B-II, C-IV, D-III
 - A-II, B-III, C-I, D-IV
 - A-I, B-II, C-III, D-IV
 - A-I, B-IV, C-III, D-II

Ans. (3)

Sol. Catalyst according to NCERT.

- 81.** 5 moles of liquid X and 10 moles of liquid Y make a solution having a vapour pressure of 70 torr. The vapour pressures of pure X and Y are 63 torr and 78 torr respectively. Which of the following is true regarding the described solution ?
- The solution shows positive deviation.
 - The solution shows negative deviation.
 - The solution is ideal.
 - The solution has volume greater than the sum of individual volumes.

Ans. (2)

Sol. $X \quad Y$

$$n_x = 5 \quad n_y = 10 \\ P_x^0 = 63 \quad P_y^0 = 78$$

$$P_{s(\text{calc.})} = P_x^0 x_x + P_y^0 X_y \\ = \frac{63 \times 5}{15} + 78 \times \frac{10}{15} \\ = 21 + 52 \\ = 73 \\ P_{s(\text{obs.})} = 70 \\ P_{s(\text{obs.})} < P_{s(\text{calc.})}$$

-ve deviation

82. Sugar 'X'

- is found in honey.
- is a keto sugar.
- exists in α and β - anomeric forms.
- is laevorotatory.

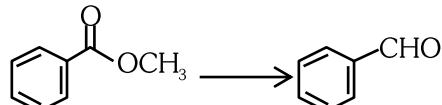
'X' is :

- D-Glucose
- D-Fructose
- Maltose
- Sucrose

Ans. (2)

Sol. D-fructose is a keto sugar exists in α and β anomeric forms. Its is laevorotatory, found in honey.

- 83.** Identify the suitable reagent for the following conversion

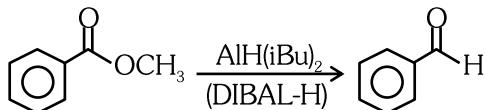
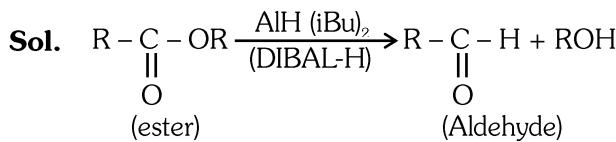


- (i) LiAlH_4 , (ii) $\text{H}^+/\text{H}_2\text{O}$
- (i) $\text{AlH}(\text{iBu})_2$ (ii) H_2O
- (i) NaBH_4 , (ii) $\text{H}^+/\text{H}_2\text{O}$
- $\text{H}_2 / \text{Pd-BaSO}_4$

Ans. (2)



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- 84.** Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : $\text{CH}_2\text{ClCH}_2\text{I}$ undergoes S_N2 reaction faster than $\text{CH}_2\text{ClCH}_2\text{Cl}$:

Reason (R) : Iodine is a better leaving group because of its large size.

In the light of the above statements, choose the **correct** answer from the options given below :

- (1) Both **A** and **R** are true and **R** is the correct explanation of **A**.
 - (2) Both **A** and **R** are true but **R** is not the correct explanation of **A**.
 - (3) **A** is true but **R** is false
 - (4) **A** is false but **R** is true

Ans. (1)

Sol. Rate of S_N2 \propto Leaving tendency of leaving group.
Iodine is better L.G. than chlorine due to its bigger size.

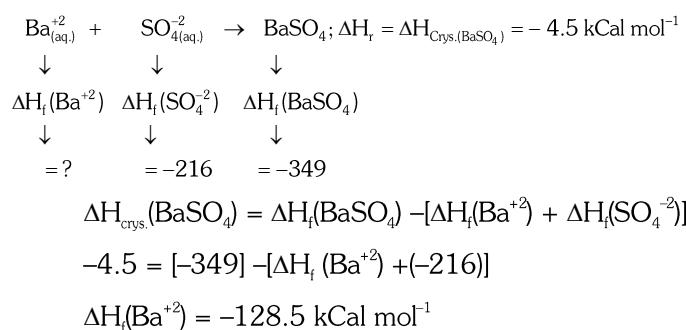
- 85.** The standard heat of formation, in kcal/mol of Ba^{2+} is :

[Given : standard heat of formation of SO_4^{2-} ion (aq)
 $= -216$ kcal/mol,

Standard heat of crystallisation of
 $\text{BaSO}_4(\text{s}) = -4.5 \text{ kcal/mol}$, standard heat of
formation of $\text{BaSO}_4(\text{s}) = -349 \text{ kcal/mol}$

Ans. (1)

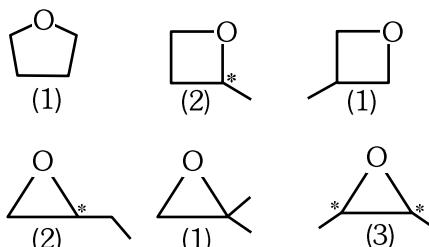
Sol.



- 86.** Total number of possible isomers (both structural as well as stereoisomers) of cyclic ethers of molecular formula C_4H_8O is :

Ans. (3)

Sol. * = Chiral Carbon



Total = 10

- 87.** Identify the correct orders against the property mentioned

(A) $\text{H}_2\text{O} > \text{NH}_3 > \text{CHCl}_3$ – dipole moment

(B) $\text{XeF}_4 > \text{XeO}_3 > \text{XeF}_2$ – number of lone pairs on central atom

(C) $\text{O-H} > \text{C-H} > \text{N-O}$ – bond length

(D) $\text{N}_2 > \text{O}_2 > \text{H}_2$ – bond enthalpy

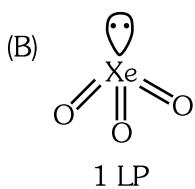
Choose the **correct** answer from the options given below :

Ans. (1)

Sol. (A) $\text{H}_2\text{O} > \text{NH}_3 > \text{CHCl}_3$ – correct



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XeF₄ XeO₃ XeF₂ – Incorrect
 (2 LP) (1 LP) (3 LP)

(C) O–H > C–H > N–O – Incorrect

According to size of element.

(D) N₂ > O₂ > H₂ – correct
 N≡N O=O H–H

88. Higher yield of NO in

N₂(g) + O₂(g) ⇌ 2NO(g) can be obtained at
 [ΔH of the reaction = +180.7 kJ mol⁻¹]

- A. higher temperature
- B. lower temperature
- C. higher concentration of N₂
- D. higher concentration of O₂

Choose the **correct** answer from the options given below :

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

Ans. (4)

Sol. N₂(g) + O_{2(g)} ⇌ 2NO_(g); ΔH = +180.7 kJ mol⁻¹

- (A) as T↑ ⇒ reaction shifts forward
- (B) as T↓ ⇒ reaction shifts backward
- (C) as [N₂] ↑ ⇒ reaction shifts forward
- (D) as [O₂] ↑ ⇒ reaction shifts forward

89. If the rate constant of a reaction is 0.03 s⁻¹, how much time does it take for 7.2 mol L⁻¹ concentration of the reactant to get reduced to 0.9 mol L⁻¹?

(Given : log 2 = 0.301)

- | | |
|------------|------------|
| (1) 69.3 s | (2) 23.1 s |
| (3) 210 s | (4) 21.0 s |

Ans. (1)

Sol. K = 0.03 s⁻¹ (First order reaction)

$$A_0 = 7.2 \text{ mol L}^{-1}$$

$$A_t = 0.9 \text{ mol L}^{-1}$$

$$7.2 \xrightarrow{t_{1/2}} 3.6 \xrightarrow{t_{1/2}} 1.8 \xrightarrow{t_{1/2}} 0.9$$

$$t = 3t_{1/2} = \frac{3 \times 0.693}{0.03} = 69.3 \text{ s}$$

90. Which one of the following reactions does **NOT** belong to "Lassaigne's test" ?

- | |
|---|
| (1) Na + C + N $\xrightarrow{\Delta}$ NaCN |
| (2) 2Na + S $\xrightarrow{\Delta}$ Na ₂ S |
| (3) Na + X $\xrightarrow{\Delta}$ + NaX |
| (4) 2CuO + C $\xrightarrow{\Delta}$ 2Cu + CO ₂ |

Ans. (4)

Sol. 2CuO + C $\xrightarrow{\Delta}$ 2Cu + CO₂

"Lassaigne's test" is used to detect Nitrogen, Halogen, Sulphur, Phosphorus.

4th option is detection of carbon, it is not "Lassaigne's test".



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 8878873188 | 8878873288 | 8788848941



FINAL NEET(UG) 2025 SOLUTION - CODE 45

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- | | |
|---|--|
| <p>91. The complex II of mitochondrial electron transport chain is also known as</p> <ol style="list-style-type: none"> Cytochrome bc_1 Succinate dehydrogenase Cytochrome c oxidase NADH dehydrogenase <p>Ans. (2)</p> <p>92. Polymerase chain reaction (PCR) amplifies DNA following the equation.</p> <ol style="list-style-type: none"> N^2 2^n $2n + 1$ $2N^2$ <p>Ans. (2)</p> <p>93. What are the potential drawbacks in adoption of the IVF method?</p> <ol style="list-style-type: none"> High fatality risk to mother Expensive instruments and reagents Husband/wife necessary for being donors Less adoption of orphans Not available in India Possibility that the early embryo does not survive <p>Choose the correct answer from the options given below :</p> <ol style="list-style-type: none"> B, D, F only A, C, D, F only A, B, C, D only A, B, C, E, F only <p>Ans. (1)</p> <p>94. What is the name of the blood vessel that carries deoxygenated blood from the body to the heart in a frog ?</p> <ol style="list-style-type: none"> Aorta Pulmonary artery Pulmonary vein Vena cava <p>Ans. (4)</p> | <p>95. Which one of the following statements refers to Reductionist Biology?</p> <ol style="list-style-type: none"> Physico-chemical approach to study and understand living organisms. Physiological approach to study and understand living organisms. Chemical approach to study and understand living organisms. Behavioural approach to study and understand living organisms. <p>Ans. (1)</p> <p>96. Given below are two statements :</p> <p>Statement I : In the RNA world, RNA is considered the first genetic material evolved to carry out essential life processes. RNA acts as a genetic material and also as a catalyst for some important biochemical reactions in living systems. Being reactive, RNA is unstable.</p> <p>Statement II : DNA evolved from RNA and is a more stable genetic material. Its double helical strands being complementary, resist changes by evolving repairing mechanism.</p> <p>In the light of the above statements, choose the most appropriate answer from the options given below :</p> <ol style="list-style-type: none"> Both statement I and statement II are correct. Both statement I and statement II are incorrect. Statement I is correct but statement II is incorrect. Statement I is incorrect but statement II is correct. <p>Ans. (1)</p> <p>97. Epiphytes that are growing on a mango branch is an example of which of the following?</p> <ol style="list-style-type: none"> Commensalism Mutualism Predation Amensalism <p>Ans. (1)</p> |
|---|--|



- 98.** From the statements given below choose the **correct** option :

- A. The eukaryotic ribosomes are 80S and prokaryotic ribosomes are 70S.
 - B. Each ribosome has two sub-units.
 - C. The two sub-units of 80S ribosome are 60S and 40S while that of 70S are 50S and 30S.
 - D. The two sub-units of 80S ribosome are 60S and 20S and that of 70S are 50S and 20S.
 - E. The two sub-units of 80S ribosome are 60S and 30S and that of 70S are 50S and 30S.
- (1) A, B, C are true (2) A, B, D are true
 (3) A, B, E are true (4) B, D, E are true

Ans. (1)

- 99.** Which one of the following is an example of ex-situ conservation?

- (1) National park
- (2) Wildlife Sanctuary
- (3) Zoos and botanical gardens
- (4) Protected areas

Ans. (3)

- 100.** Given below are two statements :

Statement I : The primary source of energy in an ecosystem is solar energy.

Statement II : The rate of production of organic matter during photosynthesis in an ecosystem is called net primary productivity (NPP).

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) Both statement I and statement II are correct.
- (2) Both statement I and statement II are incorrect.
- (3) Statement I is correct but statement II is incorrect.
- (4) Statement I is incorrect but statement II is correct.

Ans. (3)

- 101.** Match **List-I** with **List-II**.

List-I	List-II
A. Emphysema	I. Rapid spasms in muscle due to low Ca^{++} in body fluid
B. Angina Pectoris	II. Damaged alveolar walls and decreased respiratory surface
C. Glomerulonephritis	III. Acute chest pain when not enough oxygen is reaching to heart muscle
D. Tetany	IV. Inflammation of glomeruli of kidney

Choose the **correct** answer from the options given below :

- (1) A-III, B-I, C-IV, D-II (2) A-III, B-I, C-II, D-IV
 (3) A-II, B-IV, C-III, D-I (4) A-II, B-III, C-IV, D-I

Ans. (4)

- 102.** Given below are two statements : One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : Both wind and water pollinated flowers are not very colourful and do not produce nectar.

Reason (R) : The flowers produce enormous amount of pollen grains in wind and water pollinated flowers.

In the of the above statements, choose the **correct** answer from the options given below :

- (1) Both **A** and **R** are true and **R** is the correct explanation of **A**.
- (2) Both **A** and **R** are true and **R** is **NOT** the correct explanation of **A**.
- (3) **A** is true but **R** is false.
- (4) **A** is false but **R** is true.

Ans. (2)

- 103.** Which of the following is an example of non-distilled alcoholic beverage produced by yeast?

- (1) Whisky (2) Brandy
- (3) Beer (4) Rum

Ans. (3)



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104. Given below are two statements :

Statement I : In a floral formula \oplus stands for zygomorphic nature of the flower, and \underline{G} stands for inferior ovary.

Statement II : In a floral formula \oplus stands for actinomorphic nature of the flower and \underline{G} stands for superior ovary.

In the light of the above statements, choose the **correct** answer from the options given below :

- (1) Both Statement I and Statement II are correct.
- (2) Both Statement I and Statement II are incorrect.
- (3) Statement I is correct but Statement II is incorrect.
- (4) Statement I is incorrect but Statement II is correct.

Ans. (4)

105. Streptokinase produced by bacterium *Streptococcus* is used for

- (1) Curd production
- (2) Ethanol production
- (3) Liver disease treatment
- (4) Removing clots from blood vessels

Ans. (4)

106. Which chromosome in the human genome has the highest number of genes ?

- (1) Chromosome X (2) Chromosome Y
- (3) Chromosome 1 (4) Chromosome 10

Ans. (3)

107. Which of the following statement is **correct** about location of the male frog copulatory pad ?

- (1) First and Second digit of fore limb
- (2) First digit of hind limb
- (3) Second digit of fore limb
- (4) First digit of the fore limb

Ans. (4)

108. Which one of the following phytohormones promotes nutrient mobilization which helps in the delay of leaf senescence in plants ?

- (1) Ethylene (2) Abscisic acid
- (3) Gibberellin (4) Cytokinin

Ans. (4)

109. While trying to find out the characteristic of a newly found animal, a researcher did the histology of adult animal and observed a cavity with presence of mesodermal tissue towards the body wall but no mesodermal tissue was observed towards the alimentary canal. What could be the possible coelome of that animal ?

- (1) Acoelomate (2) Pseudocoelomate
- (3) Schizocoelomate (4) Spongocoelomate

Ans. (2)

110. Match **List-I** with **List-II**

List-I	List-II
A. Head	I. Enzymes
B. Middle piece	II. Sperm motility
C. Acrosome	III. Energy
D. Tail	IV. Genetic material

Choose the **correct** answer from the options given below :

- (1) A-IV, B-III, C-I, D-II
- (2) A-IV, B-III, C-II, D-I
- (3) A-III, B-IV, C-II, D-I
- (4) A-III, B-II, C-I, D-IV

Ans. (1)

111. Given below are the stages in the life cycle of pteridophytes. Arrange the following stages in the correct sequence.

- A. Prothallus stage
- B. Meiosis in spore mother cells
- C. Fertilisation
- D. Formation of archegonia and antheridia in gametophyte.
- E. Transfer of antherozoids to the archegonia in presence of water.

Choose the **correct** answer from the options given below :

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

Ans. (1)



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112. Cardiac activities of the heart are regulated by :

- A. Nodal tissue
- B. A special neural centre in the medulla oblongata
- C. Adrenal medullary hormones
- D. Adrenal cortical hormones

Choose the **correct** answer from the options given below :

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

Ans. (1)

113. Which of following organisms *cannot* fix nitrogen ?

- A. *Azotobacter*
- B. *Oscillatoria*
- C. *Anabaena*
- D. *Volvox*
- E. *Nostoc*

Choose the **correct** answer from the options given below :

- (1) A only
- (2) D only
- (3) B only
- (4) E only

Ans. (2)

114. Given below are two statements :

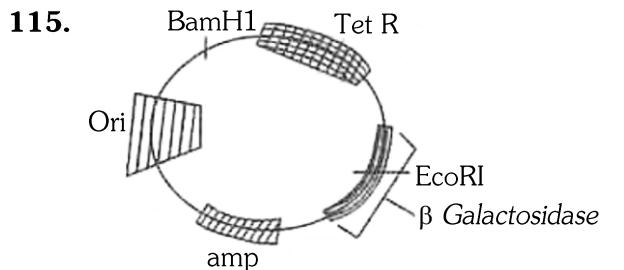
Statement I : Transfer RNAs and ribosomal RNA do not interact with mRNA.

Statement II : RNA interference (RNAi) takes place in all eukaryotic organisms as a method of cellular defence.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) Both Statement I and Statement II are correct
- (2) Both Statement I and Statement II are incorrect
- (3) Statement I is correct but Statement II is incorrect
- (4) Statement I is incorrect but Statement II is correct

Ans. (4)



In the above represented plasmid an alien piece of DNA is inserted at EcoRI site. Which of the following strategies will be chosen to select the recombinant colonies ?

- (1) Using ampicillin & tetracyclin containing medium plate
- (2) Blue color colonies will be selected
- (3) White color colonies will be selected.
- (4) Blue color colonies grown on ampicillin plates can be selected.

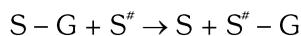
Ans. (3)

116. Which of the following genetically engineered organisms was used by Eli Lilly to prepare human insulin ?

- (1) Bacterium
- (2) Yeast
- (3) Virus
- (4) Phage

Ans. (1)

117. Name the class of enzyme that usually catalyze the following reaction :



Where, G → a group other than hydrogen

S → a substrate

S'' → another substrate

- (1) Hydrolase
- (2) Lyase
- (3) Transferase
- (4) Ligase

Ans. (3)

118. Find the statement that is **NOT** correct with regard to the structure of monocot stem.

- (1) Hypodermis is parenchymatous
- (2) Vascular bundles are scattered.
- (3) Vascular bundles are conjoint and closed.
- (4) Phloem parenchyma is absent.

Ans. (1)



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119. The correct sequence of events in the life cycle of bryophytes is

- A. Fusion of antherozoid with egg.
- B. Attachment of gametophyte to substratum.
- C. Reduction division to produce haploid spores.
- D. Formation of sporophyte.
- E. Release of antherozoids into water.

Choose the **correct** answer from the options given below :

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

Ans. (3)

120. Which are correct :

- A. Computed tomography and magnetic resonance imaging detect cancers of internal organs.
- B. Chemotherapeutics drugs are used to kill non-cancerous cells.
- C. α -interferon activate the cancer patients' immune system and helps in destroying the tumour.
- D. Chemotherapeutic drugs are biological response modifiers.
- E. In the case of leukaemia blood cell counts are decreased.

Choose the **correct** answer from the options given below:

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

Ans. (4)

121. Match **List - I** with **List - II**.

List - I	List - II
A. Centromere	I. Mitochondrion
B. Cilium	II. Cell division
C. Cristae	III. Cell movement
D. Cell membrane	IV. Phospholipid Bilayer

Choose the **correct** answer from the options given below :

- (1) A-I, B-II, C-III, D-IV
(2) A-II, B-I, C-IV, D-III
(3) A-IV, B-II, C-III, D-I
(4) A-II, B-III, C-I, D-IV

Ans. (4)

122. Match **List I** with **List II**.

List I	List II
A. Chlorophyll a	I. Yellow-green
B. Chlorophyll b	II. Yellow
C. Xanthophylls	III. Blue-green
D. Carotenoids	IV. Yellow to Yellow-orange

Choose the option with all **correct** matches.

- (1) A-III, B-IV, C-II, D-I
(2) A-III, B-I, C-II, D-IV
(3) A-I, B-II, C-IV, D-III
(4) A-I, B-IV, C-III, D-II

Ans. (2)

123. Find the **correct** statements :

- A. In human pregnancy, the major organ systems are formed at the end of 12 weeks.
- B. In human pregnancy the major organ systems are formed at the end of 8 weeks.
- C. In human pregnancy heart is formed after one month of gestation.
- D. In human pregnancy, limbs and digits develop by the end of second month.
- E. In human pregnancy the appearance of hair is usually observed in the fifth month.

Choose the **correct** answer from the options given below :

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

Ans. (4)

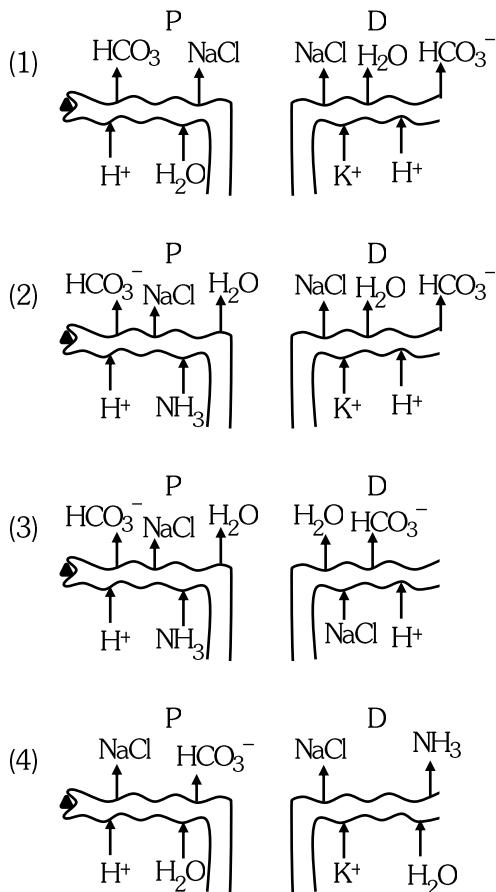
124. In the seeds of cereals, the outer covering of endosperm separates the embryo by a protein-rich layer called :

- (1) Coleoptile
(2) Coleorhiza
(3) Integument
(4) Aleurone Layer

Ans. (4)

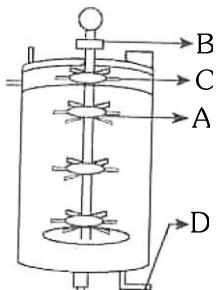


- 125.** Which of the following diagrams is correct with regard to the proximal (P) and distal (D) tubule of the Nephron.



Ans. (2)

- 126.** Identify the part of a bio-reactor which is used as a foam braker from the given figure.



Ans. (4)

- 127.** Given below are two statements : One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : A typical unfertilised, angiosperm embryo sac at maturity is 8 nucleate and 7-celled.

Reason (R) : The egg apparatus has 2 polar nuclei.

In the light of the above statements, choose the **correct** answer from the options given below :

- (1) Both **A** and **R** are true and **R** is the correct explanation of **A**.
 - (2) Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**.
 - (3) **A** is true but **R** is false.
 - (4) **A** is false but **R** is true.

Ans. (3)

- 128.** A specialised membranous structure in a prokaryotic cell which helps in cell wall formation, DNA replication and respiration is :

- (1) Mesosome (2) Chromatophores
(3) Cristae (4) Endoplasmic Reticulum

Ans. (1)

- 129.** Which of the following are the post-transcriptional events in an eukaryotic cell ?

- A. Transport of pre-mRNA to cytoplasm prior to splicing.
 - B. Removal of introns and joining of exons.
 - C. Addition of methyl group 5' end of hnRNA.
 - D. Addition of adenine residues at 3' end of hnRNA.
 - E. Recognition of target sequence by tRNA

E. Base pairing of two complementary RNAs.
Choose the **correct** answer from the options given below :

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

Ans. (2)

- 130.** What is the pattern of inheritance for polygenic trait?
(1) Mendelian

- (1) Mendelian inheritance pattern
 - (2) Non-mendelian inheritance pattern
 - (3) Autosomal dominant pattern
 - (4) X-linked recessive inheritance pattern

Ans. (2)

- 131.** Which one of the following enzymes contains 'Haem' as the prosthetic group ?
(1) RuBisCo
(2) Carbonic anhydrase
(3) Succinate dehydrogenase
(4) Catalase

Ans. (4)

- 132.** Each of the following characteristics represent a Kingdom proposed by Whittaker. Arrange the following in increasing order of complexity of body organization.

- A. Multicellular heterotrophs with cell wall made of chitin.
- B. Heterotrophs with tissue/organ/organ system level of body organization.
- C. Prokaryotes with cell wall made of polysaccharides and amino acids.
- D. Eukaryotic autotrophs with tissue/organ level of body organization.

Choose the **correct** answer from the options given below :

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

Ans. (2)

- 133.** Who is known as the father of Ecology in India ?
(1) S.R. Kashyap
(2) Ramdeo Misra
(3) Ram Udar
(4) Birbal Sahni

Ans. (2)

- 134.** Match **List-I** with **List-II**.

List-I	List-II
A. Alfred Hershey and Martha Chase	I. Streptococcus pneumoniae
B. Euchromatin	II. Densely packed and dark-stained
C. Frederick Griffith	III. Loosely packed and light-stained
D. Heterochromatin	IV. DNA as genetic material confirmation

Choose the **correct** answer from the options given below :

- (1) A-II, B-IV, C-I, D-III
(2) A-IV, B-II, C-I, D-III
(3) A-IV, B-III, C-I, D-II
(4) A-III, B-II, C-IV, D-I

Ans. (3)

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Classroom Student of
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Application No. - 240410416192 | D.O.B. - 06.09.2004



- 135.** Neoplastic characteristics of cells refer to:

 - A. A mass of proliferating cell
 - B. Rapid growth of cells
 - C. Invasion and damage to the surrounding tissue
 - D. Those confined to original location

Choose the **correct** answer from the options given below:

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

Ans. (2)

- 136.** Given below are two statements:

Statement I: The DNA fragments extracted from gel electrophoresis can be used in construction of recombinant DNA.

Statement II: Smaller size DNA fragments are observed near anode while larger fragments are found near the wells in an agarose gel.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

- (1) Both statement I and statement II are correct
 - (2) Both statement I and statement II are incorrect
 - (3) Statement I is correct but statement II is incorrect
 - (4) Statement I is incorrect but statement II is correct

Ans. (1)

- 137.** Match List-I with List-II.

	List-I	List-II
A.	Adenosine	I. Nitrogen base
B.	Adenylic acid	II. Nucleotide
C.	Adenine	III. Nucleoside
D.	Alanine	IV. Amino acid

Choose the option with all **correct** matches :

- (1) A-III, B-IV, C-II, D-I
 (2) A-III, B-II, C-IV, D-I
 (3) A-III, B-II, C-I, D-IV
 (4) A-II, B-III, C-I, D-IV

Ans. (3)

- 138.** Consider the following:

- A. The reductive division for the human female gametogenesis starts earlier than that of the male gametogenesis.
 - B. The gap between the first meiotic division and the second meiotic division is much shorter for males compared to females.
 - C. The first polar body is associated with the formation of the primary oocyte.
 - D. Luteinizing Hormone (LH) surge leads to disintegration of the endometrium and onset of menstrual bleeding.

Choose the **correct** answer from the options given below:

- (1) A and B are true (2) A and C are true
(3) B and D are true (4) B and C are true

Ans. (1)

- 139.** All living members of the class Cyclostomata are:

 - (1) Free living
 - (2) Endoparasite
 - (3) Symbiotic
 - (4) Ectoparasite

Ans. (4)

- 140.** Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A): The primary function of the Golgi apparatus is to package the materials made by the endoplasmic reticulum and deliver it to intracellular targets and outside the cell.

Reason (R): Vesicles containing materials made by the endoplasmic reticulum fuse with the cis face of the Golgi apparatus, and they are modified and released from the trans face of the Golgi apparatus. In the light of the above statements, choose the **correct** answer from the options given below:

- (1) Both **A** and **R** are true and **R** is the correct explanation of **A**
 - (2) Both **A** and **R** are true but **R** is **not** the correct explanation of **A**
 - (3) **A** is true but **R** is false
 - (4) **A** is false but **R** is true

Ans. (1)



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141. Match **List-I** with **List-II**.

List-I	List-II
A. Scutellum	I. Persistent nucellus
B. Non-albuminous seed	II. Cotyledon of Monocot seed
C. Epiblast	III. Groundnut
D. Perisperm	IV. Rudimentary cotyledon

Choose the option with all **correct** matches.

- (1) A-II, B-III, C-IV, D-I
- (2) A-IV, B-III, C-II, D-I
- (3) A-IV, B-III, C-I, D-II
- (4) A-II, B-IV, C-III, D-I

Ans. (1)

142. Given below are two statements: one is labelled as

Assertion (A) and the other is labelled as **Reason (R)**.

Assertion (A): All vertebrates are chordates but all chordates are not vertebrate.

Reason (R): The members of subphylum vertebrata possess notochord during the embryonic period, the notochord is replaced by a cartilaginous or bony vertebral column in adults.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both **A** and **R** are true and **R** is the correct explanation of **A**
- (2) Both **A** and **R** are true but **R** is not the correct explanation of **A**
- (3) **A** is true but **R** is false
- (4) **A** is false but **R** is true

Ans. (1)

143. Identify the statement that is **NOT** correct.

- (1) Each antibody has two light and two heavy chains.
- (2) The heavy and light chains are held together by disulfide bonds.
- (3) Antigen binding site is located at C-terminal region of antibody molecules.
- (4) Constant region of heavy and light chains are located at C-terminus of antibody molecules.

Ans. (3)

144. Silencing of specific mRNA is possible via RNAi because of -

- (1) Complementary dsRNA
- (2) Inhibitory ssRNA
- (3) Complementary tRNA
- (4) Non-complementary ssRNA

Ans. (1)

145. Genes R and Y follow independent assortment. If RRYY produce round yellow seeds and rryy produce wrinkled green seeds, what will be the phenotypic ratio of the F2 generation?

- (1) Phenotypic ratio – 1 : 2 : 1
- (2) Phenotypic ratio – 3 : 1
- (3) Phenotypic ratio – 9 : 3 : 3 : 1
- (4) Phenotypic ratio – 9 : 7

Ans. (3)

146. Histones are enriched with -

- (1) Lysine & Arginine
- (2) Leucine & Lysine
- (3) Phenylalanine & Leucine
- (4) Phenylalanine & Arginine

Ans. (1)

147. The first menstruation is called :

- (1) Menopause
- (2) Menarche
- (3) Diapause
- (4) Ovulation

Ans. (2)



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148. Match **List - I** with **List - II**.

- | List-I | List-II |
|----------------------------|--------------------------------|
| A. Heart | I. Erythropoietin |
| B. Kidney | II. Aldosterone |
| C. Gastro-intestinal tract | III. Atrial natriuretic factor |
| D. Adrenal Cortex | IV. Secretin |

Choose the **correct** answer from the options given below :

- (1) A-II, B-I, C-III, D-IV
- (2) A-IV, B-III, C-II, D-I
- (3) A-I, B-III, C-IV, D-II
- (4) A-III, B-I, C-IV, D-II

Ans. (4)

149. The protein portion of an enzyme is called :

- (1) Cofactor
- (2) Coenzyme
- (3) Apoenzyme
- (4) Prosthetic group

Ans. (3)

150. Which of the following is the unit of productivity of an ecosystem ?

- (1) gm^{-2}
- (2) KCal m^{-2}
- (3) KCal m^{-3}
- (4) $(\text{KCal m}^{-2})\text{yr}^{-1}$

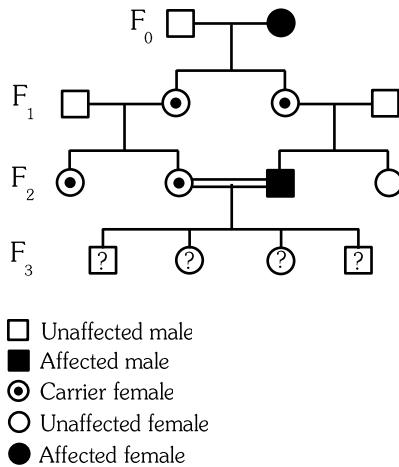
Ans. (4)

151. Sweet potato and potato represent a certain type of evolution. Select the correct combination of terms to explain the evolution.

- (1) Analogy, convergent
- (2) Homology, divergent
- (3) Homology, convergent
- (4) Analogy, divergent

Ans. (1)

152. With the help of given pedigree, find out the probability for the birth of a child having no disease and being a carrier (has the disease mutation in one allele of the gene) in F_3 generation.



- (1) 1/4
- (2) 1/2
- (3) 1/8
- (4) Zero

Ans. (1), (2)

153. Given below are two statements : One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : Cells of the tapetum possess dense cytoplasm and generally have more than one nucleus.

Reason (R) : Presence of more than one nucleus in the tapetum increase the efficiency of nourishing the developing microspore mother cells

In light of the above statements, choose the **most appropriate** answer from the options given below:

- (1) Both **A** and **R** are true and **R** is the correct explanation of **A**.
- (2) Both **A** and **R** are true and **R** is **NOT** the correct explanation of **A**.
- (3) **A** is true but **R** is false.
- (4) **A** is false but **R** is true.

Ans. (1)



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- 154.** How many meiotic and mitotic divisions need to occur for the development of a mature female gametophyte from the megasporangium mother cell in an angiosperm plant ?

(1) 2 Meiosis and 3 Mitosis
(2) 1 Meiosis and 2 Mitosis
(3) 1 Meiosis and 3 Mitosis
(4) No Meiosis and 3 Mitosis

Ans. (3)

Ans. (3)

- 156.** After maturation, in primary lymphoid organs, the lymphocytes migrate for interaction with antigens to secondary lymphoid organ(s) / tissue(s) like:

 - A. thymus
 - B. bone marrow
 - C. spleen
 - D. lymph nodes
 - E. Peyer's patches

Choose the **correct** answer from the options given below:

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

Ans. (4)

- 157.** Given below are two statements :

Statement I: Fig fruit is a non-vegetarian fruit as it has enclosed fig wasps in it.

Statement II: Fig wasp and fig tree exhibit mutual relationship as fig wasp completes its life cycle in fig fruit and fig fruit gets pollinated by fig wasp.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

- (1) Both statement I and statement II are correct
 - (2) Both statement I and statement II are incorrect
 - (3) Statement I is correct but statement II is incorrect
 - (4) Statement I is incorrect but statement II is correct

Ans. (2)

- 158** What is the main function of the spindle fibers during mitosis?

 - (1) To separate the chromosomes
 - (2) To synthesize new DNA
 - (3) To repair damaged DNA
 - (4) To regulate cell growth

Ans. (1)

- 159.** Which one of the following is the characteristic feature of gymnosperms?

 - (1) Seeds are enclosed in fruits.
 - (2) Seeds are naked.
 - (3) Seeds are absent.
 - (4) Gymnosperms have flowers for reproduction.

Ans. (2)

- 160.** Consider the following statements regarding function of adrenal medullary hormones :

 - A. It causes pupillary constriction
 - B. It is a hyperglycemic hormone
 - C. It causes piloerection
 - D. It increases strength of heart contraction

Choose the **correct** answer from the options given below:

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

Ans. (2)

- 161.** Why can't insulin be given orally to diabetic patients ?

 - (1) Human body will elicit strong immune response
 - (2) It will be digested in Gastro-Intestinal (GI) tract
 - (3) Because of structural variation
 - (4) Its bioavailability will be increased

Ans. (2)

- 162.** Match **List-I** with **List-II**

List-I	List-II
A. Pteridophyte	I. <i>Salvia</i>
B. Bryophyte	II. <i>Ginkgo</i>
C. Angiosperm	III. <i>Polytrichum</i>
D. Gymnosperm	IV. <i>Salvinia</i>

Choose the option with all **correct** matches :

- (1) A-III, B-IV, C-II, D-I
 - (2) A-IV, B-III, C-I, D-II
 - (3) A-III, B-IV, C-I, D-II
 - (4) A-IV, B-III, C-II, D-I

Ans. (2)



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- 163.** Who proposed that the genetic code for amino acids should be made up of three nucleotides ?
 (1) George Gamow (2) Francis Crick
 (3) Jacque Monod (4) Franklin Stahl

Ans. (1)

- 164.** Match **List-I** with **List-II** :

List-I	List-II
A. The Evil Quartet	I. Cryopreservation
B. Ex situ conservation	II. Alien species invasion
C. <i>Lantana camara</i>	III. Causes of biodiversity losses
D. Dodo	IV. Extinction

Choose the option with all correct matches :

- (1) A-III, B-II, C-I, D-IV
- (2) A-III, B-I, C-II, D-IV
- (3) A-III, B-IV, C-II, D-I
- (4) A-III, B-II, C-IV, D-I

Ans. (2)

- 165.** Which of the following hormones released from the pituitary is actually synthesized in the hypothalamus?
 (1) Luteinizing hormone (LH)
 (2) Anti-diuretic hormone (ADH)
 (3) Follicle-stimulating hormone (FSH)
 (4) Adenocorticotrophic hormone (ACTH)

Ans. (2)

- 166.** Role of the water vascular system in Echinoderms is :

- A. Respiration and Locomotion
- B. Excretion and Locomotion
- C. Capture and transport of food
- D. Digestion and Respiration
- E. Digestion and Excretion

Choose the **correct** answer from the options given below :

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

Ans. (2)

- 167.** Which of the following type of immunity is present at the time of birth and is a non-specific type of defence in the human body ?
 (1) Acquired Immunity
 (2) Innate Immunity
 (3) Cell-mediated Immunity
 (4) Humoral Immunity

Ans. (2)

- 168.** In bryophytes, the gemmae help in which one of the following ?
 (1) Sexual reproduction (2) Asexual reproduction
 (3) Nutrient absorption (4) Gaseous exchange

Ans. (2)

- 169.** In frog, the Renal portal system is a special venous connection that acts to link :
 (1) Liver and intestine
 (2) Liver and kidney
 (3) Kidney and intestine
 (4) Kidney and lower part of body

Ans. (4)

- 170.** Given below are two statements :

Statement I : In ecosystem, there is unidirectional flow of energy of sun from producers of consumers.

Statement II : Ecosystems are exempted from 2nd law of thermodynamics.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) Both statement-I and statement II are correct
- (2) Both statement-I and statement II are incorrect
- (3) Statement-I is correct but statement II is incorrect
- (4) Statement-I is incorrect but statement II is correct

Ans. (3)

- 171.** Which of the following statements about RuBisCO is true ?
 (1) It is active only in the dark.
 (2) It has higher affinity of oxygen than carbon dioxide.
 (3) It is an enzyme involved in the photolysis of water.
 (4) It catalyzes the carboxylation of RuBP

Ans. (4)



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172. Which of the following enzyme(s) are **NOT** essential for gene cloning ?

- A. Restriction enzymes
- B. DNA ligase
- C. DNA mutase
- D. DNA recombinase
- E. DNA polymerase

Choose the **correct** answer from the options given below :

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

Ans. (1)

173. Read the following statements on plant growth and development.

- A. Parthenocarpy can be induced by auxins.
- B. Plant growth regulators can be involved in promotion as well as inhibition of growth.
- C. Dedifferentiation is a pre-requisite for re-differentiation.
- D. Abscisic acid is a plant growth promoter.
- E. Apical dominance promotes the growth of lateral buds.

Choose the option with all correct statements.

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

Ans. (1)

174. Which factor is important for termination of transcription ?

- (1) α (alpha)
- (2) σ (sigma)
- (3) ρ (rho)
- (4) γ (gamma)

Ans. (3)

175. Frogs respire in water by skin and buccal cavity and on land by skin, buccal cavity and lungs. Choose the **correct** answer from the following :

- (1) The statement is true for water but false for land
- (2) The statement is true for both the environment
- (3) The statement is false for water but true for land
- (4) The statement is false for both the environment

Ans. (3)

176. Twins are born to a family that lives next door to you. The twins are a boy and a girl. Which of the following must be true?

- (1) They are monozygotic twins.
- (2) They are fraternal twins
- (3) They were conceived through in vitro fertilization.
- (4) They have 75% identical genetic content.

Ans. (2)

177. Which of the following microbes is **NOT** involved in the preparation of household products?

- A. *Aspergillus niger*
- B. *Lactobacillus*
- C. *Trichoderma pulysporum*
- D. *Saccharomyces cerevisiae*
- E. *Propionibacterium sharmani*

Choose the **correct** answer from the options given below :

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

Ans. (2)

178. Match **List-I** with **List-II**

List-I	List-II
A. Progesterone	I. Pars intermedia
B. Relaxin	II. Ovary
C. Melanocyte stimulating hormone	III. Adrenal Medulla
D. Catecholamines	IV. Corpus luteum

Choose the **correct** answer from the options given below :

- (1) A-IV, B-II, C-I, D-III
- (2) A-IV, B-II, C-III, D-I
- (3) A-II, B-IV, C-I, D-III
- (4) A-III, B-II, C-IV, D-I

Ans. (1)



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179. The blue and white selectable markers have been developed which differentiate recombinant colonies from non-recombinant colonies on the basis of their ability to produce colour in the presence of a chromogenic substrate.

Given below are two statements about this method :

Statement-I : The blue coloured colonies have DNA insert in the plasmid and they are identified as recombinant colonies.

Statement-II : The colonies without blue colour have DNA insert in the plasmid and are identified as recombinant colonies.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) Both Statement I and Statement II are correct
- (2) Both Statement I and Statement II is incorrect
- (3) Statement I is correct but Statement II is incorrect
- (4) Statement I is incorrect but Statement II is correct

Ans. (4)

180. Which one of the following equations represents the Verhulst-Pearl Logistic Growth of population?

$$(1) \frac{dN}{dt} = r \left(\frac{K - N}{K} \right)$$

$$(2) \frac{dN}{dt} = rN \left(\frac{K - N}{K} \right)$$

$$(3) \frac{dN}{dt} = rN \left(\frac{N - K}{N} \right)$$

$$(4) \frac{dN}{dt} = N \left(\frac{r - K}{K} \right)$$

Ans. (2)



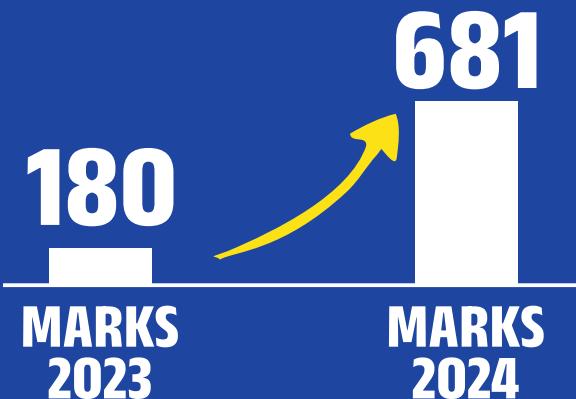
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