NEET(UG)-2023

QUESTIONS WITH SOLUTION FOR NEET-2023 HELD ON 07 MAY 2023

PART-I : PHYSICS

Physics : Section-A (Q. No. 001 to 035)

1. In a series LCR circuit, the inductance L is 10 mH, capacitance C is 1μF and resistance R is 100 Ω. The frequency at which resonance occurs is :-

(1) 15.9 kHz (2) 1.59 rad/s

(3) 1. 59 kHz (4) 15.9 rad/s

Ans. (3)

Sol. $L = 10 \times 10^{-3} H$

$C = 1 \times 10^{-6} F$

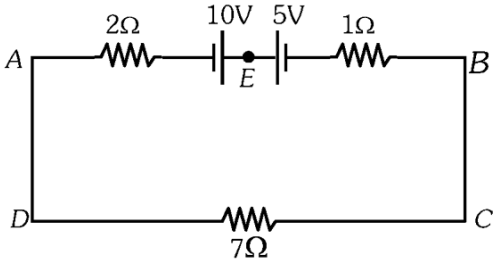
$R = 100\ \Omega$

At resonance $X_L = X_C$

$$\omega L = \frac{1}{\omega C}$$

$$f = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{2\pi\sqrt{10 \times 10^{-3} \times 10^{-6}}} = 1.59\ KHz$$

2. The magnitude and direction of the current in the following circuit is :-



(1) 0.5 A from A to B through E

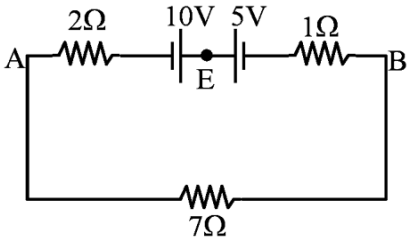
(2) $\frac{5}{9}$A from A to B through E

(3) 1.5 A from B to A through E

(4) 0.2 A from B to A through E

Ans. (1)

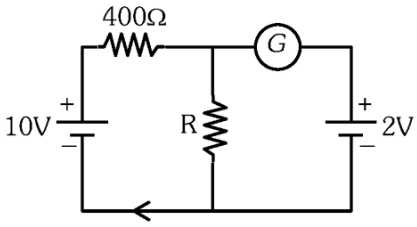
Sol. $i = \frac{10-5}{10} = \frac{5}{10} A$



= 0.5 A

from A to B through E.

3. If the galvanometer G does not show any deflection in the circuit shown, the value of R is given by :

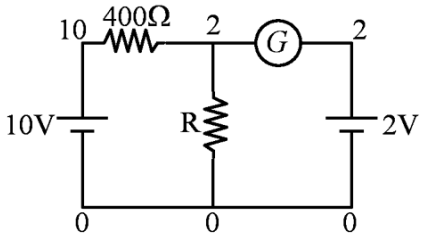


(1) 50 Ω (2) 100Ω

(3) 400 Ω (4) 200 Ω

Ans. (2)

Sol. For no reading galvanometer. Potential across it is same.



$$i_{400\Omega} \Rightarrow \frac{10-2}{400} = \frac{8}{400} = \frac{1}{50} = i_R$$

$$i_R \Rightarrow \frac{V_R}{R} \Rightarrow \frac{2}{R} = \frac{1}{50} \Rightarrow R = 100\Omega$$

4. The temperature of a gas is –50°C. To what temperature the gas should be heated so that the rms speed is increased by 3 times ?

(1) 3295°C (2) 3097 K

(3) 223 K (4) 669°C

Ans. (1)

Sol. $v_{rms} \propto \sqrt{T}$

$$\frac{v_1}{v_2} = \sqrt{\frac{T_1}{T_2}}$$

= let initial speed is v

As speed is increased by 3 times so final speed become 4v

$$\Rightarrow \frac{v}{4v} = \sqrt{\frac{223}{T}}$$

T = 3568 K

So temp. in °C = 3568 – 273 = 3295°C

5. The ratio of radius of gyration of a solid sphere of mass M and radius R about its own axis to the radius of gyration of the thin hollow sphere of same mass and radius about its axis is :-

(1) 5 : 3 (2) 2 : 5 (3) 5 : 2 (4) 3 : 5

Ans. **(4/BONUS)**

Sol. Radius of gyration : $K = \sqrt{\frac{I}{m}}$

$$\frac{k_{\text{solid sphere}}}{k_{\text{hollow sphere}}} = \sqrt{\frac{2mR^2/5m}{2mR^2/3m}} = \sqrt{3} : \sqrt{5}$$

6. A Carnot engine has an efficiency of 50% when its source is at a temperature 327° C. The temperature of the sink is :-

(1) 15°C (2) 100°C
(3) 200°C (4) 27°C

Ans. **(4)**

Sol. Efficiency of carnot engine

$$\%\eta = \left(1 - \frac{T_{sink}}{T_{source}}\right) \times 100$$

T_{source} = 327°C = 600 K

$$50 = \left(1 - \frac{T_{sink}}{600}\right) \times 100$$

$$\frac{1}{2} = 1 - \frac{T_{sink}}{600}$$

$T_{Sink} = 300K$

So temp. of sink is °C = 300 – 2763 = 27°C

7. A bullet is fired from a gun at the speed of 280 ms^{-1} in the direction 30° above the horizontal. The maximum height attained by the bullet is $\left(g = 9.8ms^{-2}, \sin 30° = 0.5\right)$:-

(1) 2000 m (2) 1000 m
(3) 3000 m (4) 2800 m

Ans. **(2)**

Sol. $H_{max} = \frac{u^2 \sin^2\theta}{2g}$

$$= \frac{(280)^2(\sin 30°)^2}{2(9.8)}$$

= 1000 m

8. An electric dipole is placed at an angle of 30° with an electric field of intensity 2 × 10^5 NC^{-1}. It experiences a torque equal to 4 N m. Calculate the magnitude of charge on the dipole, if the dipole length is 2 cm.

(1) 6 mC (2) 4 mC (3) 2 mC (4) 8 mC

Ans. **(3)**

Sol. τ on a dipole = $\vec{p} \times \vec{E}$

τ = pEsin θ

$4 = q \times \ell \times E \times \sin 30°$

$$4 = q \times 2 \times 10^{-2} \times 2 \times 10^5 \times \frac{1}{2}$$

$q = 2 \times 10^{-3}$

q = 2 mC

9. Given below are two statements:

Statement I : Photovoltaic devices can convert optical radiation into electricity.

Statement II : Zener diode is designed to operate under reverse bias in breakdown region.

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

Ans. **(4)**

Sol. Statement I : Photocell/solar cell convert light energy into electric energy/current.

Statement II : We use zener diode in reverse biased condition, when reverse biased voltage more than break down voltage than it act as stablizer.

10. The errors in the measurement which arise due to unpredictable fluctuations in temperature and voltage supply are :

(1) Personal errors
(2) Least count errors
(3) Random errors
(4) Instrumental errors

Ans. **(3)**

Sol. Error arise due to unpredictable fluctuation in temperature and voltage supply are → random errors.

11. The ratio of frequencies of fundamental harmonic produced by an open pipe to that of closed pipe having the same length is :

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

Ans. **(1)**

Sol. $$\frac{n_{oop}}{n_{cop}} = \frac{\frac{V}{2L}}{\frac{V}{4L}}$$

$$\Rightarrow \frac{n_{oop}}{n_{cop}} = \frac{2}{1}$$

12. The net magnetic flux through any closed surface is :

(1) Positive

(2) Infinity

(3) Negative

(4) Zero

Ans. (4)

Sol. Magnetic field exist in

Closed Loops (Monopoles do not exist)

$\boxed{\phi\vec{B}.d\vec{A} = 0}$

(Gauss law for magnetism)

13. The work functions of Caesium (Cs), potassium (K) and Sodium (Na) are 2.14 eV, 2.30 eV and 2.75 eV respectively. If incident electromagnetic radiation has an incident energy of 2.20 eV, which of these photosensitive surfaces may emit photoelectrons ?

(1) Both Na and K

(2) K only

(3) Na only

(4) Cs only

Ans. (4)

Sol. Given energy of photon E = 2.20 eV

Work function of Cs ϕ_0 = 2.14 eV, K ϕ_0 = 2.30 eV

, Na ϕ_0 = 2.75 eV

We know that e^- emitts when $h\nu > \phi_0$

here it is clear that energy of photon is more than the work function of Cs [Caesium] only so Ans. only (Cs).

14. The minimum wavelength of *X*-rays produced by an electron accelerated through a potential difference of *V* volts is proportional to :

(1) $\frac{1}{V}$ (2) $\frac{1}{\sqrt{V}}$

(3) V^2 (4) $\sqrt{V}$

Ans. (1)

Sol. Minimum wavelength of X-Rays is

$\lambda_{min} = \frac{hC}{eV}$

hence $\lambda_{min} \propto \frac{1}{V}$

So Ans. $\left(\frac{1}{V}\right)$

15. A 12 V, 60 W lamp is connected to the secondary of a step down transformer, whose primary is connected to ac mains of 220 V. Assuming the transformer to be ideal, what is the current in the primary winding ?

(1) 2.7 A (2) 3.7 A

(3) 0.37 A (4) 0.27 A

Ans. (4)

Sol. $V_SI_S = V_PI_P$ (ideal Transformer)

$\Rightarrow P_{out} = P_{in}$

$\Rightarrow 60 = 220 \times I_P$

$I_P = \frac{60}{220} = 0.27A$

16. Light travels a distance *x* in time t_1 in air and 10x in time t_2 in another denser medium. What is the critical angle for this medium ?

(1) $\sin^{-1}\left(\frac{10t_2}{t_1}\right)$ (2) $\sin^{-1}\left(\frac{t_1}{10t_2}\right)$

(3) $\sin^{-1}\left(\frac{10t_1}{t_2}\right)$ (4) $\sin^{-1}\left(\frac{t_2}{t_1}\right)$

Ans. (3)

Sol. Speed of light is air $V_1 = \frac{x}{t_1}$

speed of light is a medium $V_2 = \frac{10x}{t_2}$

$\sin\theta_c = \frac{V_2}{V_1} = \frac{10x}{t_2}\frac{t_1}{x}$

$\theta_c = \sin^{-1}\left(\frac{10t_1}{t_2}\right)$

17. A metal wire has mass (0.4 ± 0.002) g, radius (0.3 ± 0.001) mm and length (5 ± 0.02) cm. The maximum possible percentage error in the measurement of density will nearly be :

(1) 1.3% (2) 1.6% (3) 1.4% (4) 1.2%

Ans. (2)

Sol. $\rho = \frac{M}{V}$

$\rho = \frac{M}{\pi r^2 \ell}$

$\frac{\Delta\rho}{\rho} = \frac{\Delta M}{M} + \frac{2\Delta r}{r} + \frac{\Delta\ell}{\ell}$

$\frac{\Delta\rho}{\rho}\% = \left[\frac{0.002}{0.4} + \frac{2(0.001)}{(0.3)} + \frac{0.02}{5}\right] \times 100\%$

$= \frac{1}{2}\% + \frac{2}{3}\% + \frac{2}{5}\%$

$= 1.6\%$

18. For Young's double slit experiment, two statements are given below :

Statement I : If screen is moved away from the plane of slits, angular separation of the fringes remains constant.

Statement II : If the monochromatic source is replaced by another monochromatic source of larger wavelength, the angular separation of fringes decreases.

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

(1) Both **Statement I** and **Statement II** are false

(2) **Statement I** is true but **Statement II** is false

(3) **Statement I** is false but **Statement II** is true

(4) Both **Statement I** and **Statement II** are true

Ans. (2)

Sol. Angular width, $\theta_w = \frac{\lambda}{d}$

θ_w independent of D but depends on λ

19. The half life of a radioactive substance is 20 minutes. In how much time, the activity of substance drops to $\left(\frac{1}{16}\right)^{th}$ of its initial value ?

(1) 40 minutes

(2) 60 minutes

(3) 80 minutes

(4) 20 minutes

Ans. (3)

Sol. Half life T = 20 min

Left fraction of activity $\frac{1}{16}$

$\because \frac{R}{R_0} = \left(\frac{1}{2}\right)^{t/T}$

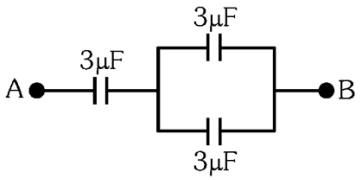
$\frac{1}{16} = \left(\frac{1}{2}\right)^{t/20}$

$\left(\frac{1}{2}\right)^4 = \left(\frac{1}{2}\right)^{t/20}$

$4 = \frac{t}{20}$

t = 80 min

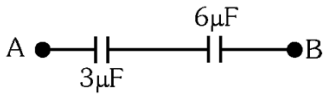
20. The equivalent capacitance of the system shown in the following circuit is :



(1) 3μF (2) 6μF (3) 9μF (4) 2μF

Ans. (4)

Sol. $C_{AB} = \frac{3\times6}{3+6} = 2\mu F$



21. Resistance of a carbon resistor determined from colour codes is (22000 ± 5%) Ω. The colour of third band must be :

(1) Green (2) Orange (3) Yellow (4) Red

Ans. (2)

Sol. $R = [22\times10^3 \pm 5\%]\Omega$

Acc. to color code

Third Band → Orange

(color code for digit 3 is orange)

22. An ac source is connected to a capacitor C. Due to decrease in its operating frequency :

(1) displacement current increases.

(2) displacement current decreases.

(3) capacitive reactance remains constant.

(4) capacitive reactance decreases.

Ans. (2)

Sol. $i_C = i_D = \frac{V_O}{X_C}\sin\omega t$

$i_C = i_D = (V_O\omega C)\sin\omega t$

On decreasing frequency $i_C \downarrow$

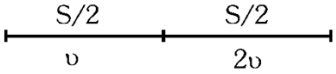
23. A vehicle travels half the distance with speed υ and the remaining distance with speed 2υ. Its average speed is :

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

(3) $\frac{3\upsilon}{4}$ (4) $\frac{\upsilon}{3}$

Ans. (2)

Sol.



$V_{avg} = \frac{2\upsilon_1\upsilon_2}{\upsilon_1+\upsilon_2} = \frac{2(\upsilon)(2\upsilon)}{\upsilon+2\upsilon} = \frac{4\upsilon^2}{3\upsilon} = \frac{4\upsilon}{3}$

24. The amount of energy required to form a soap bubble of radius 2 cm from a soap solution is nearly: (surface tension of soap solution = 0.03 N m^{-1})

(1) 5.06×10^{-4} J (2) 3.01×10^{-4} J
(3) 50.1×10^{-4} J (4) 30.16×10^{-4} J

Ans. (2)

Sol. $E = 2T(4\pi R^2)$

$= 2\,(0.03)\,(4)\,(3.14)\,(2 \times 10^{-2})^2$

$= 3.01 \times 10^{-4}$J

25. The venturi-meter works on :

(1) Bernoulli's principle
(2) The principle of parallel axes
(3) The principle of perpendicular axes
(4) Huygen's principle

Ans. (1)

Sol. Venturimeter works an Bernoulli's principle

26. In hydrogen spectrum, the shortest wavelength in the Balmer series is λ. The shortest wavelength in the Bracket series is :

(1) 4 λ (2) 9 λ (3) 16 λ (4) 2 λ

Ans. (1)

Sol. Shortest wavelength in Balmer series when transition of e^- from ∞ to n = 2

$$\because \frac{1}{\lambda} = Rz^2\left[\frac{1}{2^2} - \frac{1}{\infty^2}\right]$$

$$\frac{1}{\lambda} = \frac{R}{4} \quad ..(1)$$

Shortest wavelength is Bracket series when transition of e^- from ∞ to n = 4

$$\frac{1}{\lambda'} = R(1)^2\left[\frac{1}{4^2} - \frac{1}{\infty^2}\right] \Rightarrow \frac{1}{\lambda'} = \frac{R}{16} \quad ..(2)$$

Eq. (1)/Eq. (2)

$$\frac{\lambda'}{\lambda} = \frac{R}{4} \times \frac{16}{R} \Rightarrow \lambda' = 4\lambda$$

27. The potential energy of a long spring when stretched by 2 cm is U. If the spring is stretched by 8 cm, potential energy stored in it will be :

(1) 4U (2) 8U (3) 16U (4) 2U

Ans. (3)

Sol. $U = \frac{1}{2}kx^2$

for x = 2

$$U = \frac{1}{2}k(2)^2 \quad .(1)$$

$$U' = \frac{1}{2}k(8)^2 \quad .(2)$$

Eq. (2)/eq. (1)

$$\Rightarrow \frac{U'}{U} = \left(\frac{8}{2}\right)^2$$

$$\Rightarrow \boxed{U' = 16U}$$

28. A full wave rectifier circuit consists of two p-n junction diodes, a centre-tapped transformer, capacitor and a load resistance. Which of these components remove the ac ripple from the rectified output ?

(1) p-n junction diodes
(2) Capacitor
(3) Load resistance
(4) A centre-tapped transformer

Ans. (2)

Sol. Capacitor used to remove AC ripples from Rectifier output.

29. The magnetic energy stored in an inductor of inductance 4 μH carrying a current of 2 A is :

(1) 4 mJ (2) 8 mJ (3) 8 μJ (4) 4 μJ

Ans. (3)

Sol. Energy = $\frac{1}{2}Li^2$

$$= \frac{1}{2}4 \times 10^{-6} \times 2^2$$

$= 8 \times 10^{-6}$ J

energy = 8 μJ

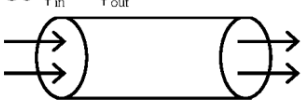
30. If $\oint_s \vec{E}.\overrightarrow{dS} = 0$ over a surface, then:

(1) the magnitude of electric field on the surface is constant.
(2) all the charges must necessarily be inside the surface.
(3) the electric field inside the surface is necessarily uniform.
(4) the number of flux lines entering the surface must be equal to the number of flux lines leaving it.

Ans. (4)

Sol. $\phi_{closed} = 0$

So $\phi_{in} = \phi_{out}$



Number of field lines entering is equal number of field lines leaving.

31. A football player is moving southward and suddenly turns eastward with the same speed to avoid an opponent. The force that acts on the player while turning is :

(1) along northward

(2) along north-east

(3) along south-west

(4) along eastward

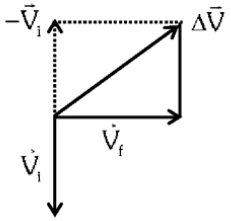
Ans. (2)

Sol. $\vec{V}_i = (V)$ southward

$\vec{V}_F = (V)$ Eastward

$\overrightarrow{\Delta V} = \vec{V}_F - \vec{V}_i$

= Along North – East



32. Let a wire be suspended from the ceiling (rigid support) and stretched by a weight W attached at its free end. The longitudinal stress at any point of cross-sectional area A of the wire is :

(1) W/A (2) $W/2A$

(3) Zero (4) $2W/A$

Ans. (1)

Sol. Stress = $\frac{IRF}{A}$

Stress = $\frac{W}{A}$

(Here A Cross-sectional Area)

33. The angular acceleration of a body, moving along the circumference of a circle, is :

(1) along the radius towards the centre

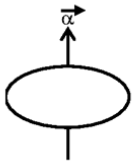
(2) along the tangent to its position

(3) along the axis of rotation

(4) along the radius, away from centre

Ans. (3)

Sol.



Along the axis of rotation

34. In a plane electromagnetic wave travelling in free space, the electric field component oscillates sinusoidally at a frequency of 2.0×10^{10} Hz and amplitude 48 Vm^{-1}. Then the amplitude of oscillating magnetic field is : (Speed of light in free space = 3×10^8 m s^{-1})

(1) 1.6×10^{-8} T (2) 1.6×10^{-7} T

(3) 1.6×10^{-6} T (4) 1.6×10^{-9} T

Ans. (2)

Sol. $C = \frac{E_0}{B_0}$

$B_0 = \frac{E_0}{C}$

$= \frac{48}{3\times10^8}$

$= 1.6 \times 10^{-7}$ T

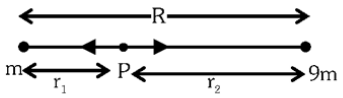
35. Two bodies of mass m and $9m$ are placed at a distance R. The gravitational potential on the line joining the bodies where the gravitational field equals zero, will be (G = gravitational constant) :

(1) $-\frac{12Gm}{R}$ (2) $-\frac{16Gm}{R}$

(3) $-\frac{20Gm}{R}$ (4) $-\frac{8Gm}{R}$

Ans. (2)

Sol.



Position of Neutral point (Zero Gravitational Field)

$r_1 = \frac{\sqrt{m_1}R}{\sqrt{m_1}+\sqrt{m_2}} = \frac{\sqrt{m}R}{\sqrt{m}+\sqrt{9m}} = \frac{R}{4}$

$r_2 = R - R/4 = 3R/4$

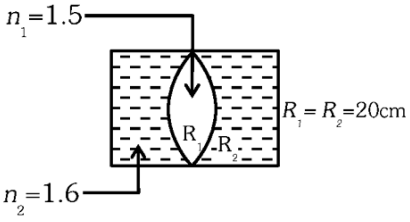
Now Gravitational potential at point P

$V_P = -\frac{GM}{R/4} - \frac{9(GM)}{3R/4}$

$= \frac{-16GM}{R}$

Physics : Section-B (Q. No. 036 to 050)

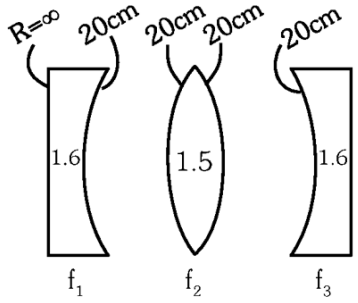
36. In the figure shown here, what is the equivalent focal length of the combination of lenses (Assume that all layers are thin) ?



(1) – 40 cm (2) –100 cm
(3) –50 cm (4) 40 cm

Ans. (2)

Sol.



Use $\frac{1}{f}=[\mu-1]\left[\frac{1}{R_1}-\frac{1}{R_2}\right]$

$$\frac{1}{f_1}=[1.6-1]\left[\frac{1}{\infty}-\frac{1}{20}\right]=\frac{-3}{100}$$

$$\frac{1}{f_2}=[1.5-1]\left[\frac{1}{20}+\frac{1}{20}\right]=\frac{1}{20}$$

$$\frac{1}{f_3}=\frac{-3}{100}$$

$$\frac{1}{f_{eq}}=\frac{1}{f_1}+\frac{1}{f_2}+\frac{1}{f_3}$$

$$\frac{1}{f_{eq}}=-\frac{3}{100}+\frac{1}{20}-\frac{3}{100}=\frac{-1}{100}$$

37. Calculate the maximum acceleration of a moving car so that a body lying on the floor of the car remains stationary. The coefficient of static friction between the body and the floor is 0.15
($g = 10\ m\ s^{-2}$).
(1) $150\ m\ s^{-2}$
(2) $1.5\ m\ s^{-2}$
(3) $50\ m\ s^{-2}$
(4) $1.2\ m\ s^{-2}$

Ans. (2)

Sol. $F_s = ma$

$f_L = ma_{max}$

$\mu mg = ma_{max}$

$a_{max} = \mu g$

$= 0.15(10)$

$= 1.5\ m/s^2$

38. A satellite is orbiting just above the surface of the earth with period T. If d is the density of the earth and G is the universal constant of gravitation, the quantity $\frac{3\pi}{Gd}$ represents :

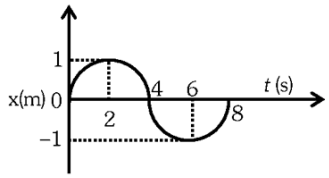
(1) T^2 (2) T^3 (3) $\sqrt{T}$ (4) T

Ans. (1)

Sol. $T=\frac{2\pi}{\sqrt{GM}}r^{3/2}\Rightarrow T^2=\frac{4\pi^2R^3}{G\left(\frac{4}{3}\pi R^3 d\right)}$ $(r = R)$

$$T^2=\frac{3\pi}{Gd}$$

39. The x - t graph of a particle performing simple harmonic motion is shown in the figure. The acceleration of the particle at $t = 2$ s is :



(1) $-\frac{\pi^2}{8}m\,s^{-2}$ (2) $\frac{\pi^2}{16}m\,s^{-2}$
(3) $-\frac{\pi^2}{16}m\,s^{-2}$ (4) $\frac{\pi^2}{8}m\,s^{-2}$

Ans. (3)

Sol.

$x = A\sin(\omega t)$

$$\frac{dx}{dt}=v=A\omega\cos(\omega t)$$

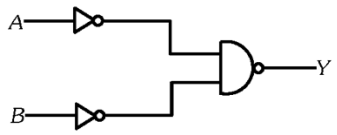
$$\frac{dv}{dt}=a=-\omega^2 A\sin(\omega t)$$

$$a=-\left(\frac{2\pi}{8}\right)^2\times 1\sin\left(\frac{2\pi}{8}\times 2\right)$$

$$\Rightarrow a=-\frac{\pi^2}{16}\times\sin\left(\frac{\pi}{2}\right)$$

$$\therefore \boxed{a=\frac{-\pi^2}{16}m/s^2}$$

40. For the following logic circuit, the truth table is :



(1)

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

(2)

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

(3)

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

(4)

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

Ans. (1)

Sol. $y = \overline{\overline{A}.\overline{B}} = \overline{\overline{A}} + \overline{\overline{B}}$

= (A + B) OR Gate

A	B	y
0	0	0
0	1	1
1	0	1
1	1	1

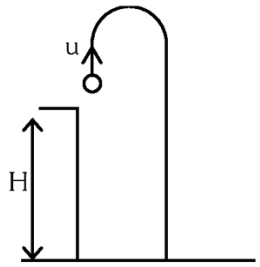
41. A horizontal bridge is built across a river. A student standing on the bridge throws a small ball vertically upwards with a velocity 4 m s^{-1}. The ball strikes the water surface after 4 s . The height of bridge above water surface is (Take g = 10 m s^{-2})

(1) 60 m (2) 64 m

(3) 68 m (4) 56 m

Ans. (2)

Sol. $S = ut + \frac{1}{2}at^2$



$-H = 4\times4 - \frac{1}{2}\times10\times4^2$

$-H = 16 - 80$

$-H = -64$

$H = 64$ m

42. Two thin lenses are of same focal lengths (*f*), but one is convex and the other one is concave. When they are placed in contact with each other, the equivalent focal length of the combination will be :

(1) *f*/4 (2) *f*/2

(3) Infinite (4) Zero

Ans. (3)

Sol. $\frac{1}{f_{eq}} = \frac{1}{f_1} + \frac{1}{f_2}$

$\frac{1}{f_{eq}} = \frac{1}{f} - \frac{1}{f}$

$f_{eq} = \infty$

43. A wire carrying a current *I* along the positive x-axis has length *L*. It is kept in a magnetic field $\vec{B} = (2\hat{i} + 3\hat{j} - 4\hat{k})T$. The magnitude of the magnetic force acting on the wire is :

(1) $\sqrt{5}$ *IL* (2) 5 *IL*

(3) $\sqrt{3}$ *IL* (4) 3 *IL*

Ans. (2)

Sol. $\vec{F} = I(\vec{\ell}\times\vec{B})$

$= I\left[(L\hat{i})\times(2\hat{i} + 3\hat{j} - 4\hat{k})\right]$

$= I(4L\hat{j} + 3L\hat{k})$

$|\vec{F}| = 5$ IL

44. A bullet from a gun is fired on a rectangular wooden block with velocity *u*. When bullet travels 24 cm through the block along its length horizontally, velocity of bullet becomes $\frac{u}{3}$. Then it further penetrates into the block in the same direction before coming to rest exactly at the other end of the block. The total length of the block is :

(1) 24 cm (2) 28 cm (3) 30 cm (4) 27 cm

Ans. (4)

Sol. By $v^2 = u^2 + 2as$

$$\left(\frac{u}{3}\right)^2 = u^2 - 2ax$$

$$2ax = u^2 - \frac{u^2}{9}$$

$$\boxed{2ax = \frac{8u^2}{9}} \quad \ldots(1)$$

Similarly from starting

$v^2 = u^2 + 2ax$

$0 = u^2 - 2ax_2$

$$\boxed{2ax_2 = u^2} \quad \ldots(2)$$

By (1) / (2)

$$\frac{x}{x_2} = \frac{8}{9}$$

$$\frac{24}{x_2} = \frac{8}{9}$$

$x_2 = 27$ cm

45. The resistance of platinum wire at 0°C is 2Ω and 6.8 Ω at 80°C. The temperature coefficient of resistance of the wire is :

(1) $3 \times 10^{-3}\,°C^{-1}$
(2) $3 \times 10^{-2}\,°C^{-1}$
(3) $3 \times 10^{-1}\,°C^{-1}$
(4) $3 \times 10^{-4}\,°C^{-1}$

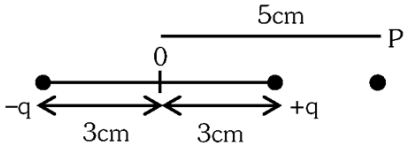
Ans. (2)

Sol. $R_T = R_0[1+\alpha(T-T_0)]$

$6.8 = 2[1+\alpha(80-\alpha)]$

$$\alpha = \frac{2.4}{80} = 0.03/°C = 3 \times 10^{-2}/°C$$

46. An electric dipole is placed as shown in the figure.



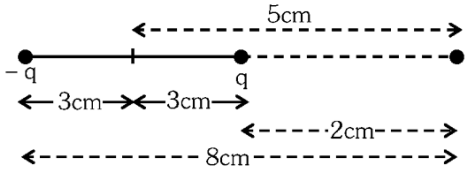
The electric potential (in 10^2 V) at point P due to the dipole is (ϵ_0 = permittivity of free space and $\frac{1}{4\pi\epsilon_0} = K$):

(1) $\left(\frac{5}{8}\right)qK$ (2) $\left(\frac{8}{5}\right)qK$

(3) $\left(\frac{8}{3}\right)qK$ (4) $\left(\frac{3}{8}\right)qK$

Ans. (4)

Sol.



$$v = \frac{Kq}{2\times10^{-2}} - \frac{Kq}{8\times10^{-2}}$$

$$= Kq\left[\frac{3}{8}\right]\times10^2$$

47. 10 resistors, each of resistance R are connected in series to a battery of emf *E* and negligible internal resistance. Then those are connected in parallel to the same battery, the current is increased *n* times. The value of *n* is :

(1) 100 (2) 1 (3) 1000 (4) 10

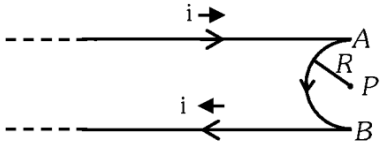
Ans. (1)

Sol. $$I_S = \frac{E}{10R} \quad \ldots(1)$$

$$I_P = \frac{E}{R/10} = \frac{10E}{R} \quad \ldots(2)$$

$$n = \frac{I_P}{I_S} = 100 \Rightarrow n = 100$$

48. A very long conducting wire is bent in a semi-circular shape from *A* to *B* as shown in figure. The magnetic field at point *P* for steady current configuration is given by :



(1) $\frac{\mu_0 i}{4R}$ pointed away from the page

(2) $\frac{\mu_0 i}{4R}\left[1-\frac{2}{\pi}\right]$ pointed away from page

(3) $\frac{\mu_0 i}{4R}\left[1-\frac{2}{\pi}\right]$ pointed into the page

(4) $\frac{\mu_0 i}{4R}$ pointed into the page

Ans. (2)

Sol. $$B = \frac{\mu_0}{4\pi}\frac{I}{R}(\pi) - \frac{\mu_0}{4\pi}\frac{2I}{R}$$

$$= \frac{\mu_0 I}{4R}\left[1-\frac{2}{\pi}\right]$$ outward i.e away from page.

49. The radius of inner most orbit of hydrogen atom is 5.3×10^{-11} m. What is the radius of third allowed orbit of hydrogen atom ?

(1) 1.06 Å (2) 1.59 Å
(3) 4.77 Å (4) 0.53 Å

Ans. (3)

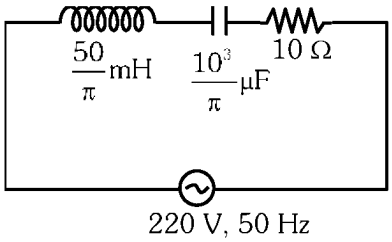
Sol. Radius of n^{th} orbit in Hydrogen Atom

$$r_n = 0.53 \times \frac{n^2}{Z}\text{Å}$$

So, radius of third orbit

$$r_3 = 0.53 \times \frac{(3)^2}{(1)}\text{Å} = 4.77\text{Å}$$

50. The net impedance of circuit (as shown in figure) will be :



(1) 15 Ω
(2) $5\sqrt{5}\,\Omega$
(3) 25 Ω
(4) $10\sqrt{2}\,\Omega$

Ans. (2)

Sol. $X_L = \frac{50}{L} \times 10^{-3} \times 2\pi \times 50 = 5\Omega$

$$X_C = \frac{1}{2\pi \times 50 \times \frac{10^3}{\pi} \times 10^{-6}} = 10\Omega$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$= \sqrt{(10)^2 + (5)^2}$$

$$= 5\sqrt{5}\,\Omega$$

PART-II: CHEMISTRY

Chemistry : Section-A (Q. No. 051 to 085)

51. Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R** :

Assertion A : Metallic sodium dissolves in liquid ammonia giving a deep blue solution, which is paramagnetic.

Reason R : The deep blue solution is due to the formation of amide.

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

(1) Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**.

(2) **A** is true but **R** is false

(3) **A** is false but **R** is true

(4) Both **A** and **R** are true and **R** is the correct explanation of **A**.

Ans. (2)

Sol. Assertion is correct because all Alkali metals gives deep blue solution by giving electrons.

Reason : is incorrect because deep blue solution appears due to the presence of ammoniated electron or solvated electrons.

52. The conductivity of centimolar solution of KCl at 25°C is 0.0210 ohm^{-1} cm^{-1} and the resistance of the cell containing the solution at 25°C is 60 ohm. The value of cell constant is -

(1) 3.28 cm^{-1} (2) 1.26 cm^{-1}

(3) 3.34 cm^{-1} (4) 1.34 cm^{-1}

Ans. (2)

Sol. Centimolar solution = $\frac{1}{100}M = 0.01M$

Conductivity (k) = 0.0210 ohm^{-1} cm^{-1}

Resistance (R) = 60 ohm

$$k = \frac{1}{R}\left(\frac{\ell}{A}\right)$$

$$\Rightarrow 0.0210 = \frac{1}{60}\left(\frac{\ell}{A}\right) \Rightarrow \frac{\ell}{A} = 1.26 cm^{-1}$$

53. For a certain reaction, the rate = k $[A]^2$ [B], when the initial concentration of A is tripled keeping concentration of B constant, the initial rate would

(1) increase by a factor of six

(2) increase by a factor of nine

(3) increase by a factor of three

(4) decrease by a factor of nine

Ans. (2)

Sol. Rate = k $[A]^2$ [B]

If [A] is tripled and [B] is kept constant.

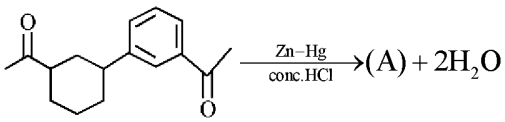
$r^1 = k [3A]^2 [B]$

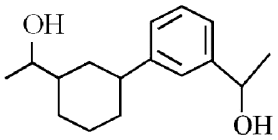
$r^1 = 9k [A]^2 [B]$

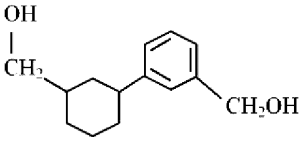
$r^1 = 9r$

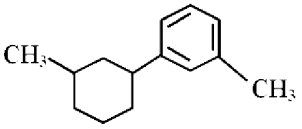
Increased by a factor of nine

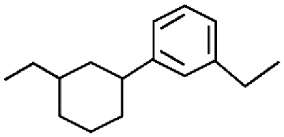
54. Identify product (A) is the following reaction :



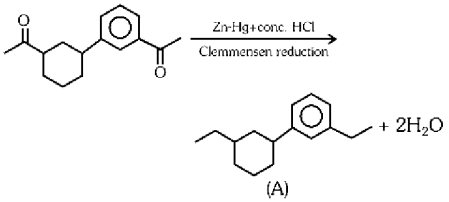
(1) 

(2) 

(3) 

(4) 

Ans. (4)

Sol. 

55. Which one is an example of heterogenous catalysis ?
(1) Hydrolysis of sugar catalysed by H^+ ions.
(2) Decomposition of ozone is presence of nitrogen monoxide.
(3) Combination between dinitrogen and dihydrogen to form ammonia in the presence of finely divided iron.
(4) Oxidation of sulphur dioxide into sulphur trioxide in the presence of oxides of nitrogen.

Ans. (3)

Sol.

(1) $C_{12}H_{22}O_{11(aq)} + H_2O \xrightarrow{H^+} C_6H_{12}O_{6(aq)} + C_6H_{12}O_{6(aq)}$
(Homogeneous reaction)

(2) $2O_{3(g)} \xrightarrow{NO\ (g)} 3O_{2(g)}$ (Homogeneous reaction)

(3) $N_{2(g)} + 3H_{2(g)} \xrightarrow{Fe\ (s)} 2NH_{3(g)}$
(Reactants and catalyst are in different phase)
It is heterogeneous reaction

(4) $SO_{2(g)} + \frac{1}{2}O_{2(g)} \xrightarrow{NO\ (g)} SO_{3(g)}$

56. Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**.
Assertion A : Helium is used to dilute oxygen in diving apparatus.
Reasons R : Helium has high solubility in O_2.
In the light of the above statements, choose the **correct** answer from the options given below :
(1) Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**.
(2) **A** is true but **R** is false
(3) **A** is false but **R** is true
(4) Both **A** and **R** are true and **R** is the correct explanation of **A**.

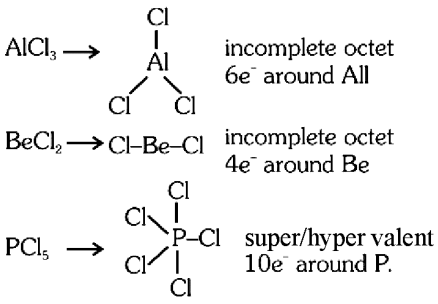
Ans. (2)

Sol. Assertion is true because He has low solubility in blood. (NCERT)

57. Amongst the following, the total number of species NOT having eight electrons around central atom in its outer most shell, is
NH_3, $AlCl_3$, $BeCl_2$, CCl_4, PCl_5 :
(1) 2 (2) 4
(3) 1 (4) 3

Ans. (4)

Sol. Total number of species = 3



58. The **correct** order of energies of molecular orbitals of N_2 molecule, is

(1) $\sigma ls < \sigma^* ls < \sigma 2s < \sigma^* 2s < \sigma 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$

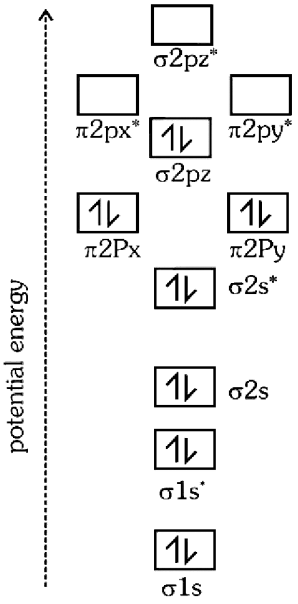
(2) $\sigma ls < \sigma^* ls < \sigma 2s < \sigma^* 2s < \sigma 2p_z < \sigma^* 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y)$

(3) $\sigma ls < \sigma^* ls < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma 2p_z < \sigma^* 2p_z$

(4) $\sigma ls < \sigma^* ls < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < \sigma 2p_z < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$

Ans. (4)

Sol. Molecular orbital (energy) diagram / sequence of N_2



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

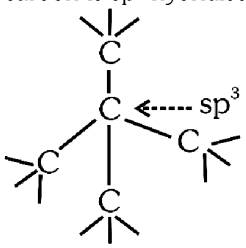
List-I	**List-II**
A. Coke	I. Carbon atoms are sp^3 hybridised
B. Diamond	II. Used as a dry lubricant
C. Fullerene	III. Used as a reducing agent
D. Graphite	IV. Cage like molecules

Choose the **correct** answer from the options given below:
(1) A-IV, B-I, C-II, D-III
(2) A-III, B-I, C-IV, D-II
(3) A-III, B-IV, C-I, D-II
(4) A-II, B-IV, C-I, D-III

Ans. (2)

Sol. **Coke** : It is used as reducing agent in carbon reduction methods. (in metallurgical process)

Diamond : It is a allotrope of carbon in which each carbon is sp^3 hybridised.



Fullerene **:** It contains pentagonal & hexagonal rings (cage like structure)

Graphite : It is soft solid because graphite layers are bonded with weak Vander Wall attractions.

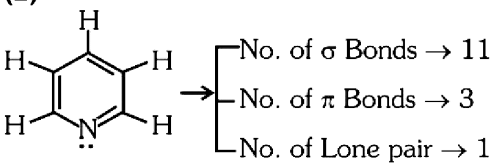
60. The number of σ bonds, π bonds and lone pair of electrons in pyridine, respectively are :

(1) 12, 3, 0 (2) 11, 3, 1

(3) 12, 2, 1 (4) 11, 2, 0

Ans. **(2)**

Sol.



61. The element expected to form largest ion to achieve the nearest noble gas configuration is

(1) F (2) N

(3) Na (4) O

Ans. **(2)**

Sol. F^{-1}, N^{-3}, Na^{+} & O^{-2}

all ions are isoelectronic containing 10 e^-

$Z_{eff} \rightarrow Na^+ > F^- > O^{-2} > N^{-3}$

order of radius $\rightarrow N^{-3} > O^{-2} > F^- > Na^+$

$\rightarrow$ Nitrogen to achieve Noble gas configuration it gain 3 e^- , & form N^{-3}

62. Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A : A reaction can have zero activation energy.

Reasons R : The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activation energy.

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

(1) Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**.

(2) **A** is true but **R** is false

(3) **A** is false but **R** is true

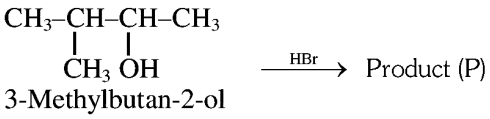
(4) Both **A** and **R** are true and **R** is the correct explanation of **A**.

Ans. **(3)**

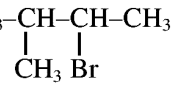
Sol. A reaction cannot have zero activation energy.

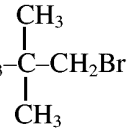
E_a is minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value.

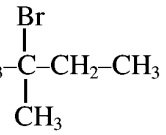
63. Consider the following reaction and identify the product (P).



(1) $CH_3CH=CH-CH_3$

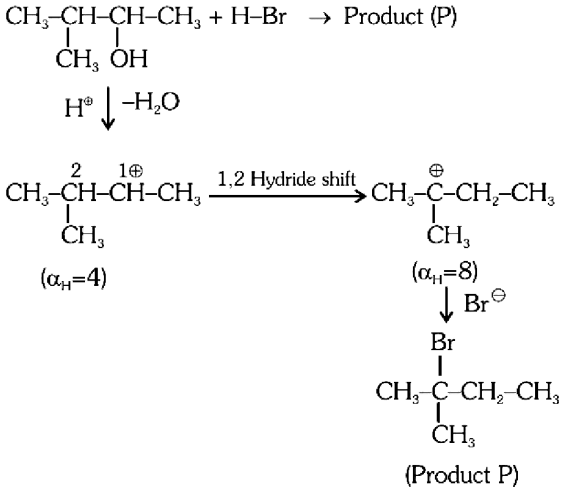
(2) 

(3) 

(4) 

Ans. **(4)**

Sol.



64. Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R :**

Assertion A : In equation $\Delta_r G = -nFE_{cell}$, value of $\Delta_r G$ depends on n.

Reasons R : E_{cell} is an intensive property and $\Delta_r G$ is an extensive property.

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 **NOT** the correct explanation of **A**.

(2) **A** is true but **R** is false

(3) **A** is false but R is true

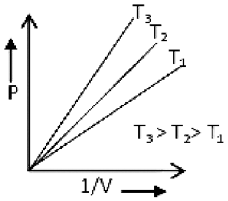
(4) Both **A** and **R** are true and **R** is the correct explanation of **A.**

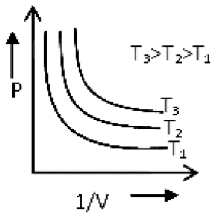
Ans. (4)

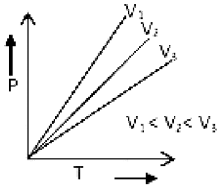
Sol. $\Delta_r G = -nFE_{cell}$

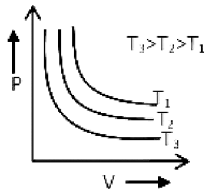
E_{cell} is an intensive property and $\Delta_r G$ is an extensive property as it depends on number of $e^{\ominus}$ transferred in cell reaction

65. Which amongst the following options is correct graphical representation of Boyle's Law?

(1) 

(2) 

(3) 

(4) 

Ans. (1)

Sol. Boyle's law is defined at constant temperature for an ideal gas.

$$P \propto \frac{1}{V}$$

$$P = (nRT)\left(\frac{1}{V}\right) \text{ [straight line equation]}$$

slope of P versus $\frac{1}{V}$ curve is nRT

$\Rightarrow$ Slope $\uparrow \Rightarrow T \uparrow \therefore T_3 > T_2 > T_1$

66. In Lassaigne's extract of an organic compound, both nitrogen and sulphur are present, which gives blood red colour with Fe^{3+} due to the formation of-

(1) NaSCN (2) $\left[Fe(CN)_5 NOS\right]^{4-}$

(3) $\left[Fe(SCN)\right]^{2+}$ (4) $Fe_4\left[Fe(CN_6)\right]_3.xH_2O$

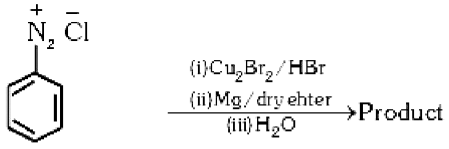
Ans. (3)

Sol. In case nitrogen and sulphur both are present in an organic compound, sodium thiocyanate is formed, it give blood red colour and no prussian blue since there are no free cyanide Ions

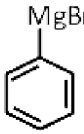
$Na + C + N + S \rightarrow NaSCN$

$$Fe^{+3} + SCN^{\ominus} \longrightarrow \underset{\text{Blood red}}{\left[Fe(SCN)\right]^{2+}}$$

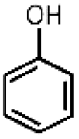
67. Identify the product in the following reaction :



(1) 

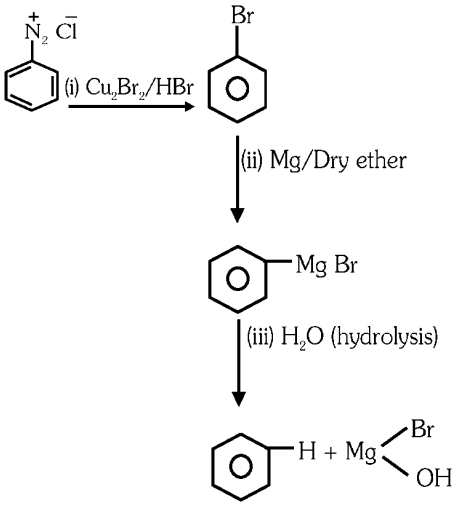
(2) 

(3) 

(4) 

Ans. (1)

Sol.



68. Select the **correct** Statements from the following :

A. Atoms of all elements are composed of two fundamental particles.

B. The mass of the electron is 9.10939×10^{-31} kg.

C. All the isotopes of a given elements show same chemical properties.

D. Protons and electrons are collectively known as nucleons.

E. Dalton's atomic theory, regarded the atom as an ultimate particle of matter.

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

(1) C,D and E only (2) A and E only

(3) B,C and E only (4) A,B and C only

Ans. (3)

Sol. It is statement based question.

Statements B, C & E are correct.

(B) Mass of the electron is 9.10939×10^{-31} kg

(C) All the isotopes of given elements show same chemical properties.

(E) Dalton's atomic theory, regarded the atom as an ultimate particle of matter.

69. A compound is formed by two elements A and B. The elements B forms cubic close packed structure and atoms of A occupy 1/3 of tetrahedral voids. If the formula of the compound is A_xB_y, then the value of x + y is in option

(1) 4 (2) 3

(3) 2 (4) 5

Ans. (4)

Sol.

A	**B**
$\frac{1}{3}$THV	CCP
$\Rightarrow Z_A = \frac{1}{3}\times 8 = \frac{8}{3}$	$Z_B = 4$
$\Rightarrow = \frac{8}{3} : 4$	
$\Rightarrow \frac{2}{3} : 1$	
2 : 3	

simplest formula $\overset{A_2}{\underset{x}{\downarrow}}\ \overset{B_3}{\underset{y}{\downarrow}}$

x + y = 5

70. Given below are two statements:

Statement I : A unit formed by the attachment of a base to l' position of sugar is known as nucleoside

Statement II : When nucleoside is linked to phosphorous acid at 5'-position of sugar moiety, we get nucleotide.

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

(1) Both Statement **I** and Statement **II** are false

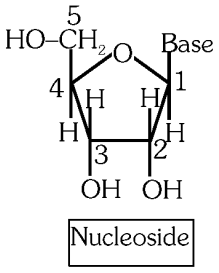
(2) Statement **I** is true but Statement **II** is false

(3) Statement **I** is false but Statement **II** is true

(4) Both Statement **I** and Statement **II** are true

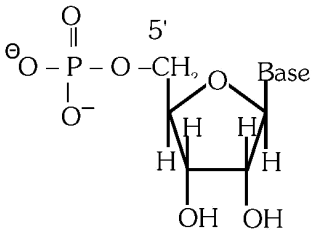
Ans. (2)

Sol.



Nucleoside

Base link with 1' position of sugar in nucleoside so statement I is correct



Nucleotide

→ When nucleoside is linked to **phosphoric acid** at 5' position of sugar moiety we get a Nucleotide

⇓

Statement II is Incorrect because not link with **phosphorous acid**.

71. Which amongst the following molecules on polymerization produces neoprene?

(1) $H_2C = \underset{\displaystyle Cl}{\underset{|}{C}} - CH = CH_2$

(2) $H_2C = CH - C \equiv CH$

(3) $H_2C = \underset{\displaystyle CH_3}{\underset{|}{C}} - CH = CH_2$

(4) $H_2C = CH - CH = CH_2$

Ans. (1)

Sol. $CH_2 = \underset{\displaystyle Cl}{\underset{|}{C}} - CH = CH_2 \xrightarrow{\text{Temp \& Pressure}}$

Chloroprene

$$\left\{CH_2 - \underset{\displaystyle Cl}{\underset{|}{C}} = CH - CH_2\right\}_n$$

Neoprene

72. Taking stability as the factor, which one of the following represents **correct** relationship?

(1) $InI_3 > InI$ (2) $AlCl > AlCl_3$

(3) $TlI > TlI_3$ (4) $TlCl_3 > TlCl$

Ans. (3)

Sol. $T\ell^{+}$ & $I^{-} > T\ell^{+3}$ & $3I^{-}$

due to inert pair effect $T\ell^{+}$ is more stable than $T\ell^{+3}$.

73. Some tranquilizers are listed below. Which one from the following belongs to barbiturates?

(1) Meprobamate (2) Valium

(3) Veronal (4) Chlordiazepoxide

Ans. (3)

Sol. Veronal is an example of barbiturates.

74. Which of the following statements are **NOT** correct?

A. Hydrogen is used to reduce heavy metal oxides to metals.

B. Heavy water is used to study reaction mechanism.

C. Hydrogen is used to make saturated fats from oils

D. The H-H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any element.

E. Hydrogen reduces oxides of metals that are more active than iron.

Choose the **most appropriate** answer from the options given below:

(1) B,D only (2) D,E only

(3) A,B,C only (4) B,C,D,E only

Ans. (2)

Sol. (D, E) explanation

(D) H–H bond strength/ bond dissociation energy/bond energy of H_2 can not be lowest because bond formed between hydrogen atoms is due to overlapping of 1s-1s.

(E) Hydrogen can not reduces oxides of highly reactive metal.

75. Intermolecular forces are forces of attraction and repulsion between interacting particles that will include:

A. dipole - dipole forces.

B. dipole - induced dipole forces

C. hydrogen bonding

D. covalent bonding

E. dispersion forces

Choose the **most appropriate** answer from the options given below :

(1) A,B,C,D are correct (2) A,B,C,E are correct

(3) A,C,D,E are correct (4) B,C,D,E are correct

Ans. (2)

Sol. Intermolecular forces means force of attraction between two or more molecules

dipole-dipole (attraction between two or more polar molecules).

Dipole induced dipole (attraction between polar and non polar molecules)

Hydrogen bonding (it is a special type of dipole-dipole and ion-dipole attraction)

Dispersion forces (mainly acts between non polar molecules).

Covalent bonding (acts between atom not between molecules)

76. Amongst the given options which of the following molecules/ion acts as a Lewis acid?

(1) H_2O (2) BF_3

(3) OH^- (4) NH_3

Ans. (2)

Sol. $\left.\begin{matrix} H_2O \\ OH^- \\ NH_3 \end{matrix}\right\}$ can not act as lewis acid because they does not contain vacant orbital

$BF_3 \rightarrow$ Contains vacant orbital on central atom (Boron).

77. The **right** option for the mass of CO_2 produced by heating 20 g of 20% pure limestone is

(Atomic mass of Ca = 40)

$[CaCO_3 \xrightarrow{1200K} CaO + CO_2]$

(1) 1.76 g (2) 2.64 g (3) 1.32 g (4) 1.12 g

Ans. (1)

Sol. Weight of impure limestone = 20 g

Weight of pure limestone ($CaCO_3$) = 20% of 20 g

$= \frac{20}{100} \times 20$

$= 4g$

$n_{CaCO_3} = \frac{4}{100} = 0.04$

$CaCO_3 \rightarrow CaO + CO_2$

n=0.04 n=0.04

$n_{CO_2} = 0.04$

$W_{CO_2} = 0.04 \times 44$

$= 1.76$ g

78. The relation between n_m, (n_m = the number of permissible values of magnetic quantum number (m)) for a given value of azimuthal quantum number (l), is

(1) $l = 2n_m + 1$ (2) $n_m = 2l^2 + 1$

(3) $n_m = l + 2$ (4) $l = \frac{n_m - 1}{2}$

Ans. (4)

Sol. Number of permissible values of magnetic quantum number for a given value of azimuthal quantum (ℓ)

$\Rightarrow n_m = 2\ell + 1$

$\Rightarrow \ell = \frac{n_m - 1}{2}$

79. The stability of Cu^{2+} is more than Cu^{+} salts in aqueous solution due to -

(1) enthalpy of atomization.

(2) hydration energy.

(3) second ionisation enthalpy.

(4) first ionisation enthalpy.

Ans. **(2)**

Sol. $Cu(s) \rightarrow Cu(g) \rightarrow Cu^{+}_{(g)} \rightarrow Cu^{+2}_{(g)} \rightarrow Cu^{+2}_{(aq)}$

$\Delta H_{atomisation}$ IE_1 IE_2 Hydration energy

Cu^{+2} is more stable than Cu^{+1} because released hydration energy is more in case of Cu^{+2} than Cu^{+1}.

80. Which one of the following statements is **correct**?

(1) All enzymes that utilise ATP in phosphate transfer require Ca as the cofactor.

(2) The bone in human body is an inert and unchanging substance.

(3) Mg plays roles in neuromuscular function and interneuronal transmission.

(4) The daily requirement of Mg and Ca in the human body is estimated to be 0.2 - 0.3 g.

Ans. **(4)**

Sol. The daily requirement in the human body has been estimated to be 200-300 mg (NCERT : s-block) Biological importance of magnesium and calcium.

81. Which of the following reactions will NOT give primary amine as the product?

(1) $CH_3CN \xrightarrow[(ii)\,H_3O^{\oplus}]{(i)\,LiAlH_4}$ Product

(2) $CH_3NC \xrightarrow[(ii)\,H_3O^{\oplus}]{(i)\,LiAlH_4}$ Product

(3) $CH_3CONH_2 \xrightarrow[(ii)\,H_3O^{\oplus}]{(i)\,LiAlH_4}$ Product

(4) $CH_3CONH_2 \xrightarrow{Br_2/KOH}$ Product

Ans. **(2)**

Sol.

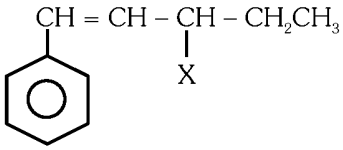
(1) $CH_3-CN \xrightarrow[(ii)\,H_3O^{\oplus}]{(i)\,LiAlH_4} CH_3-CH_2-NH_2$ 1º Amine

(2) $CH_3NC \xrightarrow[(ii)\,H_3O^{\oplus}]{(i)\,LiAlH_4} CH_3-NH-CH_3$ 2º Amine

(3) $CH_3-\overset{O}{\overset{\|}{C}}-NH_2 \xrightarrow[(ii)\,H_3O^{\oplus}]{(i)\,LiAlH_4} CH_3-CH_2-NH_2$ 1º Amine

(4) $CH_3-\overset{O}{\overset{\|}{C}}-NH_2 \xrightarrow{Br_2+OH^-} CH_3-NH_2$ 1º Amine

82. The given compound



is an example of _____.

(1) aryl halide

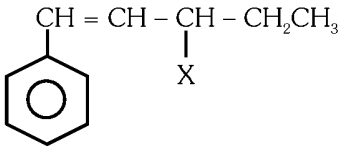
(2) allylic halide

(3) vinylic halide

(4) benzylic halide

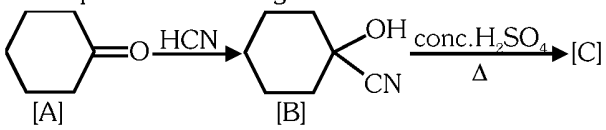
Ans. **(2)**

Sol.

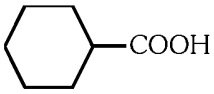


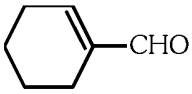
Allylic halide

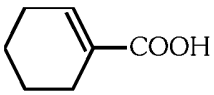
83. Complete the following reaction :

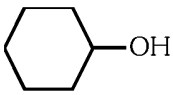


[C] is _____.

(1) 

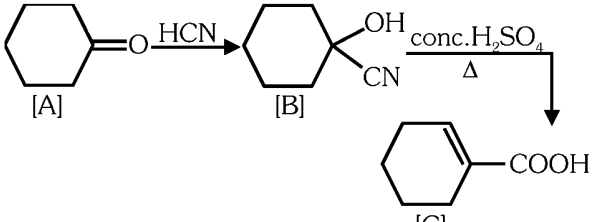
(2) 

(3) 

(4) 

Ans. **(3)**

Sol.



(Hydrolysis of Cyanide)
& (dehydration of alcohol)

84. Homoleptic complex from the following complexes is :
(1) Diamminechloridonitrito-N-platinum (II)
(2) Pentaamminecarbonatocobalt (III) chloride
(3) Triamminetriaquachromium (III) chloride
(4) Potassium trioxalatoaluminate (III)

Ans. (4)

Sol. (1) $[Pt(NH_3)_2Cl(NO_2)]$
(2) $[Co(NH_3)_5(CO_3)]Cl$
(3) $[Cr(NH_3)_3(H_2O)_3]Cl_3$
(4) $K_3[Al(C_2O_4)_3]$
Option 4 contain all ligands are of same type i.e. why complex will be homoleptic.

85. Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is :
(1) 32 (2) 30
(3) 18 (4) 16

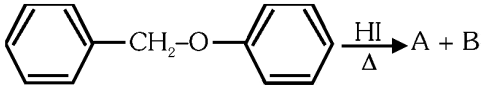
Ans. (1)

Sol. $2CH_3-\overset{O}{\overset{\|}{C}}-O^-Na^+ \xrightarrow[\Delta]{NaOH + CaO} 2\,CH_4$
Sodium ethanoate

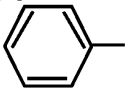
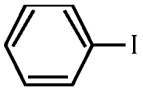
Weight = $2 \times 16 = 32$ g

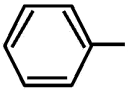
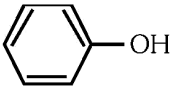
Chemistry : Section-B (Q. No. 086 to 100)

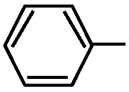
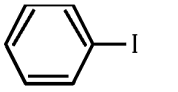
86. Consider the following reaction

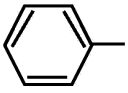
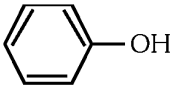


Identify products A and B :-

(1) A=  and B = 

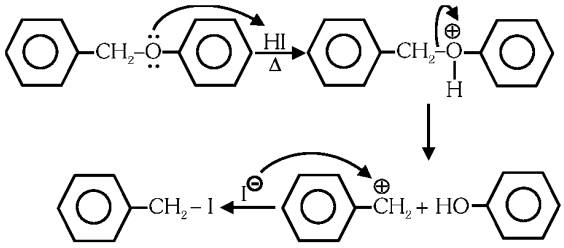
(2) A=  and B = 

(3) A=  and B = 

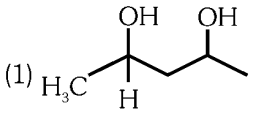
(4) A=  and B = 

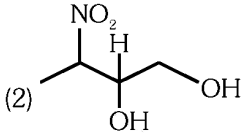
Ans. (2)

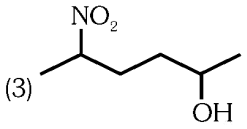
Sol.

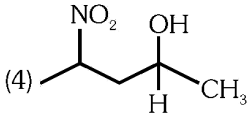


87. Which amongst the following will be most readily dehydrated under acidic conditions ?

(1) 

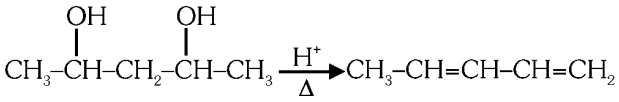
(2) 

(3) 

(4) 

Ans. (1)

Sol. Due to presence of conjugation in product.



88. The equilibrium concentrations of the species in the reaction $A + B \rightleftharpoons C + D$ are 2, 3, 10 and 6 mol L^{-1}, respectively at 300 K. ΔG^0 for the reaction is (R = 2 cal/mol K)
(1) –137.26 cal (2) –1381.80 cal
(3) –13.73 cal (4) 1372.60 cal

Ans. (2)

Sol. $A + B \rightleftharpoons C + D$

$[A] = 2$ mol L^{-1}
$[B] = 3$ mol L^{-1}
$[C] = 10$ mol L^{-1}
$[D] = 6$ mol L^{-1}

$\Delta G^0 = -2.303\,RT \log K_{eq}$

$= -2.303RT \log \frac{[C][D]}{[A][B]}$

$= -2.303 \times 2 \times 300 \times \log \frac{10 \times 6}{2 \times 3}$

$= -2.303 \times 2 \times 300 \times \log 10$

$= -1381.8$ cal

89. Given below are two statements :
Statement I : The nutrient deficient water bodies lead to eutrophication.
Statement II : Eutrophication leads to decrease in the level of oxygen in the water bodies.
In the light of the above statements, choose the **correct** answer from the options given below :
(1) Both **Statement I** and **Statement II** are false
(2) **Statement I** is correct but **Statement II** is false.
(3) **Statement I** is incorrect but **Statement II** is true.
(4) Both **Statement I** and **Statement II** are true.

Ans. (3)

Sol. Nutrient enriched water bodies lead to eutrophication.

90. Which amongst the following options is the **correct** relation between change in enthalpy and change in internal energy?

(1) $\Delta H = \Delta U + \Delta n_g RT$ (2) $\Delta H - \Delta U = -\Delta nRT$

(3) $\Delta H + \Delta U = \Delta nR$ (4) $\Delta H = \Delta U - \Delta n_g RT$

Ans. (1)

Sol. $\Delta H = \Delta U + \Delta n_g RT$

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

List-I (Oxoacids of Sulphur)	**List-II (Bonds)**
A. Peroxodisulphuric acid	I. Two S-OH, Four S=O, One S-O-S
B. Sulphuric acid	II. Two S-OH, One S=O
C. Pyrosulphuric acid	III. Two S-OH, Four S=O, One S-O-O-S
D. Sulphurous acid	IV. Two S-OH, Two S=O

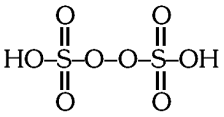
Choose the **correct** answer from the options given below:

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

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

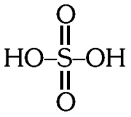
Ans. (1)

Sol. A → Peroxodisulphuric acid

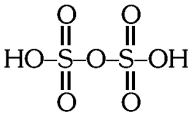


B → Sulphuric acid

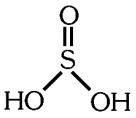
H_2SO_4



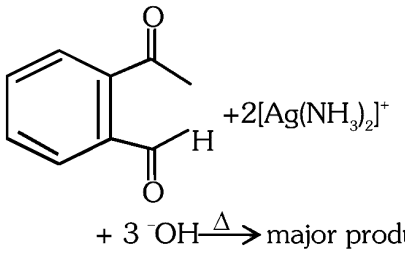
C → Pyrosulphuric acid $H_2S_2O_7$

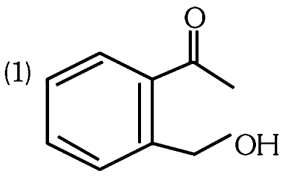


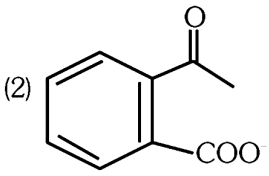
D → Sulphurous acid H_2SO_3

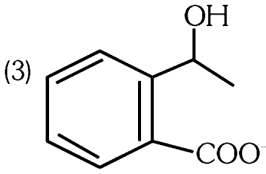


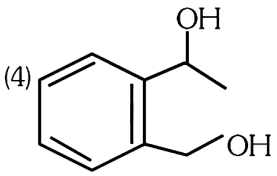
92. Identify the major product obtained in the following reaction:



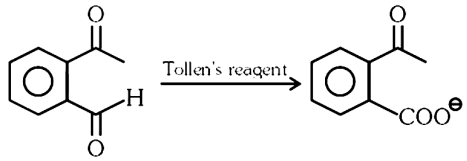
(1) 

(2) 

(3) 

(4) 

Ans. (2)

Sol. 

93. Pumice stone is an example of -

(1) gel (2) solid sol

(3) foam (4) sol

Ans. (2)

Sol. Pumice stone is an example of solid state

94. The reaction that does **NOT** take place in blast furnace between 900 K to 1500 K temperature range during extraction of iron is :

(1) $FeO + CO \rightarrow Fe + CO_2$

(2) $C + CO_2 \rightarrow 2CO$

(3) $CaO + SiO_2 \rightarrow CaSiO_3$

(4) $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$

Ans. (4)

Sol. Reaction

$Fe_2O_3 + CO \rightarrow 2FeO + CO_2$

This reaction takes place at temperature (500 K – 800 K) not at (900 K to 1500 K)

95. Which of the following statements are **INCORRECT** ?

A. All the transition metals except scandium form MO oxides which are ionic.

B. The highest oxidation number corresponding to the group number in transition metal oxides is attained in Sc_2O_3 to Mn_2O_7.

C. Basic character increases from V_2O_3 to V_2O_4 to V_2O_5.

D. V_2O_4 dissolves in acids to give VO_4^{3-} salts.

E. CrO is basic but Cr_2O_3 is amphoteric.

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

(1) B and D only (2) C and D only

(3) B and C only (4) A and E only

Ans. (2)

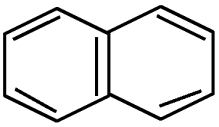
Sol. $C \rightarrow \overset{+3}{V_2}O_3 \rightarrow \overset{+4}{V_2}O_4 \rightarrow \overset{+5}{V_2}O_5$

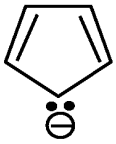
Acidic Nature ↑

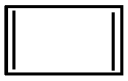
D → V_2O_5 dissolve in acid to give VO_4^{-3} salts

This doesn't shown by V_2O_4

96. Consider the following compounds/species:

(i) 

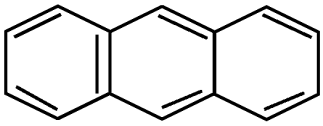
(ii) 

(ii) 

(iv) 

(v) 

(vi) 

(vii) 

The number of compounds/species which obey Huckel's rule is _____.

(1) 6 (2) 2 (3) 5 (4) 4

Ans. (4)

Sol. Huckle's rule = $(4n + 2)\pi$ electrons

Comp (i), (ii), (v), (vii) obey Huckle's rule

97. What fraction of one edge centred octahedral void lies in one unit cell of fcc?

(1) $\frac{1}{3}$ (2) $\frac{1}{4}$ (3) $\frac{1}{12}$ (4) $\frac{1}{2}$

Ans. (2)

Sol. → Edge centered octahedral void is shared between four unit cells

→ Per unit cell contribution is 1/4

98. Which complex compound is most stable?

(1) $\left[Co\left(NH_3\right)_3\left(NO_3\right)_3\right]$

(2) $\left[CoCl_2(en)_2\right]NO_3$

(3) $\left[Co\left(NH_3\right)_6\right]_2\left(SO_4\right)_3$

(4) $\left[Co\left(NH_3\right)_4\left(H_2O\right)Br\right]\left(NO_3\right)_2$

Ans. (2)

Sol. due to Chelation effect of (en).

99. On balancing the given redox reaction,

$$aCr_2O_7^{2-} + bSO_3^{2-}(aq) + cH^+(aq) \rightarrow$$

$$2aCr^{3+}(aq) + bSO_4^{2-}(aq) + \frac{c}{2}H_2O(\ell)$$

the coefficients a, b and c are found to be, respectively -

(1) 3, 8, 1 (2) 1, 8, 3

(3) 8, 1, 3 (4) 1, 3, 8

Ans. (4)

Sol. Reaction has to be balanced in acidic medium

'O' atoms are balanced by adding H_2O and then H-atom is balanced by adding H^+ ions and charge is balanced by $e^{\ominus}$.

Oxidation: $SO_3^{2-} + H_2O \rightarrow SO_4^{2-} + 2H^+ + 2e^{\ominus}]\times 3$

Reduction: $Cr_2O_7^{2-} + 14H^+ + 6e^{\ominus} \rightarrow 2Cr^{3+} + 7H_2O$

$Cr_2O_7^{2-} + 3SO_3^{2-} + 8H^{\oplus} \rightarrow 2Cr^{3+} + 3SO_4^{2-} + 4H_2O$

a = 1

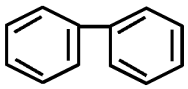
b = 3

c = 8

100. Identify the final product [D] obtained in the following sequence of reactions.

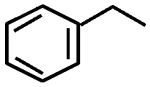
$CH_3CHO \xrightarrow[ii)\ H_3O^+]{i)\ LiAlH_4} [A] \xrightarrow[\Delta]{H_2SO_4} [B]$

$\xrightarrow{HBr} [C] \xrightarrow[Na/dry\ ether]{} [D]$ (with Br)

(1) 

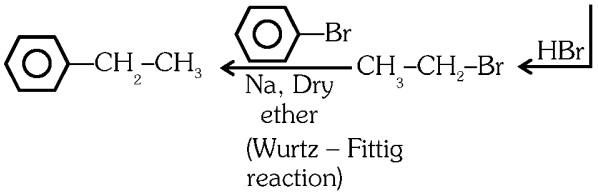
(2) C_4H_{10}

(3) $HC \equiv C^{\ominus}\ Na^+$

(4) 

Ans. (4)

Sol. $CH_3-CH=O \xrightarrow[H_3O^+]{LiAlH_4} CH_3-CH_2-OH \xrightarrow[\Delta]{H^+} CH_2=CH_2$



PART-III : BIOLOGY

Botany : Section-A (Q. No. 101 to 135)

101. Movement and accumulation of ions across a membrane against their concentration gradient can be explained by

(1) Facilitated Diffusion (2) Passive Transport

(3) Active Transport (4) Osmosis

Ans. (3)

Hint NCERT XI Pg # 132

102. Among 'The Evil Quartet', which one is considered the most important cause driving extinction of species ?

(1) Over exploitation for economic gain

(2) Alien species invasions

(3) Co-extinctions

(4) Habitat loss and fragmentation

Ans. (4)

Hint NCERT XII Pg # 264

103. Identify the pair of heterosporous pteridophytes among the following :

(1) *Selaginella* and *Salvinia*

(2) *Psilotum* and *Salvinia*

(3) *Equisetum* and *Salvinia*

(4) *Lycopodium* and *Selaginella*

Ans. (1)

Hint NCERT XI Pg # 38

104. Frequency of recombination between gene pairs on same chromosome as a measure of the distance between genes to map their position on chromosome, was used for the first time by

(1) Sutton and Boveri (2) Alfred Sturtevant

(3) Henking (4) Thomas Hunt Morgan

Ans. (2)

Hint NCERT XII Pg # 83

105. What is the function of tassels in the corn cob ?

(1) To trap pollen grains

(2) To disperse pollen grains

(3) To protect seeds

(4) To attract insects

Ans. (1)

Hint NCERT XII Pg # 29

106. Identify the **correct** statements :

A. Detrivores perform fragmentation.

B. The humus is further degraded by some microbes during mineralization.

C. Water soluble inorganic nutrients go down into the soil and get precipitated by a process called leaching.

D. The detritus food chain begins with living organisms.

E. Earthworms break down detritus into smaller particles by a process called catabolism.

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

(1) B, C, D only (2) C, D, E only

(3) D, E, A only (4) A, B, C only

Ans. (4)

Hint NCERT XII Pg # 243

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

Assertion A : Late wood has fewer xylary elements with narrow vessels.

Reason R : Cambium is less active in winters.

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

(1) Both **A** and **R** are true but **R** is NOT the correct explanation of **A**.

(2) **A** is true but **R** is false.

(3) **A** is false but **R** is true.

(4) Both **A** and **R** are true and **R** is the correct explanation of **A**.

Ans. (4)

Hint NCERT XI Pg # 196

108. The process of appearance of recombination nodules occurs at which sub stage of prophase I in meiosis ?
(1) Pachytene (2) Diplotene
(3) Diakinesis (4) Zygotene
Ans. (1)
Hint NCERT XI Pg # 168

109. Which of the following stages of meiosis involves division of centromere ?
(1) Metaphase II (2) Anaphase II
(3) Telophase (4) Metaphase I
Ans. (2)
Hint NCERT XI Pg # 169

110. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out
(1) DNA (2) Histones
(3) Polysaccharides (4) RNA
Ans. (1)
Hint NCERT XII Pg # 201

111. Family Fabaceae differs from Solanaceae and Liliaceae. With respect to the stamens, pick out the characteristics specific to family. Fabaceae but not found in Solanaceae or Liliaceae.
(1) Polyadelphous and epipetalous stamens
(2) Monoadelphous and Monothecous anthers
(3) Epiphyllous and Dithecous anthers
(4) Diadelphous and Dithecous anthers
Ans. (4)
Hint NCERT XI Pg # 79

112. Large, colourful, fragrant flowers with nectar are seen in:
(1) bird pollinated plants (2) bat pollinated plants
(3) wind pollinated plants (4) insect pollinated plants
Ans. (4)
Hint NCERT XII Pg # 30

113. Spraying of which of the following phytohormone on juvenile conifers helps in hastening the maturity period, that leads to early seed production ?
(1) Gibberellic Acid (2) Zeatin
(3) Abscisic Acid (4) Indole-3-butyric Acid
Ans. (1)
Hint NCERT XI Pg # 249

114. Axile placentation is observed in
(1) China rose, Beans and Lupin
(2) Tomato, Dianthus and Pea
(3) China rose, Petunia and Lemon
(4) Mustard, Cucumber and Primrose
Ans. (3)
Hint NCERT XI Pg # 75 & 80

115. Among eukaryotes, replication of DNA takes place in -
(1) S phase (2) G_1 phase
(3) G_2 phase (4) M phase
Ans. (1)
Hint NCERT XII Pg # 107

116. How many ATP and $NADPH_2$ are required for the synthesis of one molecule of Glucose during Calvin cycle ?
(1) 18 ATP and 12 $NADPH_2$
(2) 12 ATP and 16 $NADPH_2$
(3) 18 ATP and 16 $NADPH_2$
(4) 12 ATP and 12 $NADPH_2$
Ans. (1)
Hint NCERT XI Pg # 218

117. In gene gun method used to introduce alien DNA into host cells, microparticles of _____ metal are used.
(1) Zinc (2) Tungsten or gold
(3) Silver (4) Copper
Ans. (2)
Hint NCERT XII Pg # 201

118. The thickness of ozone in a column of air in the atmosphere is measured in terms of :
(1) Decibels (2) Decameter
(3) Kilobase (4) Dobson units
Ans. (4)
Hint NCERT XII Pg # 282

119. Unequivocal proof that DNA is the genetic material was first proposed by
(1) Alfred Hershey and Martha Chase
(2) Avery, Macleoid and McCarthy
(3) Wilkins and Franklin
(4) Frederick Griffith
Ans. (1)
Hint NCERT XII Pg # 101

120. In the equation
$\boxed{GPP - R = NPP}$
GPP is Gross Primary Productivity
NPP is Net Primary Productivity
R here is ____.
(1) Respiratory quotient
(2) Respiratory loss
(3) Reproductive allocation
(4) Photosynthetically active radiation
Ans. (2)
Hint NCERT XII Pg # 243

121. What is the role of RNA polymerase III in the process of transcription in Eukaryotes ?
(1) Transcription of tRNA, 5 srRNA and snRNA
(2) Transcription of precursor of mRNA
(3) Transcription of only snRNAs
(4) Transcription of rRNAs (28S, 18S and 5.8S)

Ans. **(1)**

Hint **NCERT XII Pg # 111**

122. Which micronutrient is required for splitting of water molecule during photosynthesis ?
(1) molybdenum (2) magnesium
(3) copper (4) manganese

Ans. **(4)**

Hint **NCERT XI Pg # 198**

123. In angiosperm, the haploid, diploid and triploid structures of a fertilized embryo sac sequentially are:
(1) Antipodals, synergids, and primary endosperm nucleus
(2) Synergids, Zygote and Primary endosperm nucleus
(3) Synergids, antipodals and Polar nuclei
(4) Synergids, Primary endosperm nucleus and zygote

Ans. **(2)**

Hint **NCERT XII Pg # 34**

124. The phenomenon of pleiotropism refers to
(1) presence of two alleles, each of the two genes controlling a single trait.
(2) a single gene affecting multiple phenotypic expression.
(3) more than two genes affecting a single character.
(4) presence of several alleles of a single gene controlling a single crossover.

Ans. **(2)**

Hint **NCERT XII Pg # 85**

125. Given below are two statements : One is labelled as **Assertion A** and the other is labelled as **Reason R:**
Assertion A : ATP is used at two steps in glycolysis.
Reason R : First ATP is used in converting glucose into glucose-6-phosphate and second ATP is used in conversion of fructose-6-phosphate into fructose-1-6-diphosphate.
In the light of the above statements, choose the **correct** answer from the options given below :
(1) Both **A** and **R** are true but **R** is NOT the correct explanation of **A**.
(2) **A** is true but **R** is false.
(3) **A** is false but **R** is true.
(4) Both **A** and **R** are true and **R** is the correct explanation of **A**.

Ans. **(4)**

Hint **NCERT XI Pg # 229**

126. Cellulose does not form blue colour with Iodine because
(1) It is a helical molecule.
(2) It does not contain complex helices and hence cannot hold iodine molecules.
(3) It breakes down when iodine reacts with it.
(4) It is a disaccharide.

Ans. **(2)**

Hint **NCERT XI Pg # 148**

127. Which hormone promotes internode/petiole elongation in deep water rice?
(1) Kinetin (2) Ethylene
(3) 2, 4–D (4) GA_3

Ans. **(2)**

Hint **NCERT XI Pg # 250**

128. Expressed Sequence Tags (ESTs) refers to
(1) All genes that are expressed as proteins.
(2) All genes whether expressed or unexpressed.
(3) Certain important expressed genes.
(4) All genes that are expressed as RNA.

Ans. **(4)**

Hint **NCERT XII Pg # 119**

129. Given below are two statements :
Statement I : The forces generated by transpiration can lift a xylem-sized column of water over 130 meters height.
Statement II : Transpiration cools leaf surfaces sometimes 10 to 15 degrees, by evaporative cooling.
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 incorrect.
(2) **Statement I** is correct but **Statement II** is incorrect.
(3) **Statement I** is incorrect but **Statement II** is correct
(4) Both **Statement I** and **Statement II** are correct.

Ans. **(4)**

Hint **NCERT XI Pg # 189**

130. Upon exposure to UV radiation, DNA stained with ethidium bromide will show
(1) Bright blue colour (2) Bright yellow colour
(3) Bright orange colour (4) Bright red colour

Ans. **(3)**

Hint **NCERT XII Pg # 198**

131. The historic Convention on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro in the year:
(1) 1992 (2) 1986
(3) 2002 (4) 1985

Ans. **(1)**

Hint **NCERT XII Pg # 267**

132. The reaction centre in PS II has an absorption maxima at
(1) 700 nm (2) 660 nm
(3) 780 nm (4) 680 nm

Ans. **(4)**

Hint **NCERT XI Pg # 211**

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

Assertion A : The first stage of gametophyte in the life cycle of moss is protonema stage.

Reason R : Protonema develops directly from spores produced in capsule.

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

(1) Both **A** and **R** are correct but **R** is NOT the correct explanation of **A**.

(2) **A** is correct but **R** is not correct.

(3) **A** is not correct but **R** is correct.

(4) Both **A** and **R** are correct and **R** is the correct explanation of **A**.

Ans. **(4)**

Hint **NCERT XI Pg # 36**

134. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus. This phenomenon may be called as:

(1) Dedifferentiation

(2) Development

(3) Senescence

(4) Differentiation

Ans. **(1)**

Hint **NCERT XII Pg # 177**

135. Given below are two statements:

Statement I : Endarch and exarch are the terms often used for describing the position of secondary xylem in the plant body.

Statement II : Exarch condition is the most common feature of the root system.

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

(1) Both **Statement I** and **Statement II** are false.

(2) **Statement I** is correct but **Statement II** is false.

(3) **Statement I** is incorrect but **Statement II** is true.

(4) Both **Statement I** and **Statement II** are true.

Ans. **(3)**

Hint **NCERT XI Pg # 87**

Botany : Section-B (Q. No. 136 to 150)

136. Identify the **correct** statements:

A. Lenticels are the lens-shaped openings permitting the exchange of gases.

B. Bark formed early in the season is called hard bark.

C. Bark is a technical term that refers to all tissues exterior to vascular cambium.

D. Bark refers to periderm and secondary phloem.

E. Phellogen is single-layered in thickness.

Choose the correct answer from the options given below:

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

Ans. **(1)**

Hint **NCERT XI Pg # 96 & 97**

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

List I	List II
A. Cohesion	I. More attraction in liquid phase
B. Adhesion	II. Mutual attraction among water molecules
C. Surface tension	III. Water loss in liquid phase
D. Guttation	IV. Attraction towards polar surfaces

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

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

Ans. **(4)**

Hint **NCERT XI Pg # 188**

138. Match **List I** with **List II**:

List I	List II
A. M Phase	I. Proteins are synthesized
B. G_2 Phase	II. Inactive phase
C. Quiescent stage	III. Interval between mitosis and initiation of DNA replication
D. G_1 Phase	IV. Equational division

Choose the correct answer from the options given below:

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

Ans. **(2)**

Hint **NCERT XI Pg # 163 & 164**

139. Which of the following statements are correct about Klinefelter's Syndrome?

A. This disorder was first described by Langdon Down (1866).
B. Such an individual has overall masculine development. However, the feminine development is also expressed.
C. The affected individual is short statured.
D. Physical, psychomotor and mental development is retarded.
E. Such individuals are sterile.

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

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

Ans. **(2)**

Hint **NCERT XII Pg # 92**

140. Given below are two statements :

Statement I : Gause's 'Competitive Exclusion Principle' states that two closely related species competing for the same resources cannot co-exist indefinitely and competitively inferior one will be eliminated eventually.

Statement II : In general, carnivores are more adversely affected by competition than herbivores.

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

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

Ans. **(2)**

Hint **NCERT XII Pg # 235**

141. How many different proteins does the ribosome consist of?

(1) 60 (2) 40
(3) 20 (4) 80

Ans. **(4)**

Hint **NCERT XII Pg # 115**

142. Which of the following combinations is required for chemiosmosis?

(1) membrane, proton pump, proton gradient, NADP synthase
(2) proton pump, electron gradient, ATP synthase
(3) proton pump, electron gradient, NADP synthase
(4) membrane, proton pump, proton gradient, ATP synthase

Ans. **(4)**

Hint **NCERT XI Pg # 215**

143. Which one of the following statements is **NOT** correct?

(1) Algal blooms caused by excess of organic matter in water improve water quality and promote fisheries.
(2) Water hyacinth grows abundantly in eutrophic water bodies and leads to an imbalance in the ecosystem dynamics of the water body.
(3) The amount of some toxic substances of industrial waste water increases in the organisms at successive trophic levels.
(4) The micro-organisms involved in biodegradation of organic matter in a sewage polluted water body consume a lot of oxygen causing the death of aquatic organisms.

Ans. **(1)**

Hint **NCERT XII Pg # 275 & 276**

144. Match **List I** with **List II** :

List I (Interaction)	List II (Species A and B)
A. Mutualism	I. +(A), O(B)
B. Commensalism	II. –(A), O(B)
C. Amensalism	III. +(A), –(B)
D. Parasitism	IV. +(A), +(B)

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

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

Ans. **(1)**

Hint **NCERT XII Pg # 232**

145. Main steps in the formation of Recombinant DNA are given below. Arrange these steps in a correct sequence.

A. Insertion of recombinant DNA into the host cell.
B. Cutting of DNA at specific location by restriction enzyme.
C. Isolation of desired DNA fragment.
D. Amplification of gene of interest using PCR.

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

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

Ans. (4)

Hint NCERT XII Pg # 201

146. Match **List I** with **List II** :

List I	List II
A. Iron	I. Synthesis of auxin
B. Zinc	II. Component of nitrate reductase
C. Boron	III. Activator of catalase
D. Molybdenum	IV. Cell elongation and differentiation

Choose the correct answer from the options given below:

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

Ans. (2)

Hint NCERT XI Pg # 197 & 198

147. Match **List I** with **List II** :

List I	List II
A. Oxidative decarboxylation	I. Citrate synthase
B. Glycolysis	II. Pyruvate dehydrogenase
C. Oxidative phosphorylation	III. Electron transport sytem
D. Tricarboxylic acid cycle	IV. EMP pathway

Choose the correct answer from the options given below:

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

Ans. (3)

Hint NCERT XI Pg # 228, 231 & 232

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

Assertion A : In gymnosperms the pollen grains are released from the microsporangium and carried by air currents.

Reason R : Air currents carry the pollen grains to the mouth of the archegonia where the male gametes are discharged and pollen tube is not formed.

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

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

Ans. (2)

Hint NCERT XI Pg # 39

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

Assertion A : A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem.

Reason R : Internode of the shoot gets condensed to produce different floral appendages laterally at successive nodes instead of leaves.

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

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

Ans. (4)

Hint NCERT XI Pg # 71

150. Melonate inhibits the growth of pathogenic bacteria by inhibiting the activity of

(1) Amylase
(2) Lipase
(3) Dinitrogenase
(4) Succinic dehydrogenase

Ans. (4)

Hint NCERT XI Pg # 158

Zoology : Section-A (Q. No. 151 to 185)

151. Given below are two statements :

Statement I : A protein is imagined as a line, the left end represented by first amino acid (C-terminal) and the right end represented by last amino acid (N-terminal).

Statement II : Adult human haemoglobin, consists of 4 subunits (two subunits of α type and two subunits β type.)

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

(1) Both statement **I** and Statement **II** are false.

(2) Statement **I** is true but Statement **II** is false.

(3) Statement **I** is false but Statement **II** is true.

(4) Both statement **I** and Statement **II** are true.

Ans. (3)

Hint NCERT XI Pg # 149 & 151

152. Radial symmetry is NOT found in adults of phylum _____.

(1) Hemichordata (2) Coelenterata

(3) Echinodermata (4) Ctenophora

Ans. (1)

Hint NCERT XI Pg # 47

153. Which of the following statements are correct regarding female reproductive cycle ?

A. In non-primate mammals cyclical changes during reproduction are called oestrus cycle.

B. First menstrual cycle begins at puberty and is called menopause.

C. Lack of menstruation may be indicative of pregnancy.

D. Cyclic menstruation extends between menarche and menopause.

Choose the **most appropriate** answer from the options given below :

(1) A and B only (2) A, B and C only

(3) A, C and D only (4) A and D only

Ans. (3)

Hint NCERT XII Pg # 49 & 50

154. Given below are statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A : Nephrons are of two types : Cortical & Juxta medullary, based on their relative position in cortex and medulla.

Reason R : Juxta medullary nephrons have short loop of Henle whereas, cortical nephrons have longer loop of Henle.

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

(1) Both **A** and **R** are true but **R** is NOT the correct explanation of **A**.

(2) **A** is true but **R** is false.

(3) **A** is false but **R** is true.

(4) Both **A** and **R** are true and **R** is the correct explanation of **A**.

Ans. (2)

Hint NCERT XI Pg # 293

155. Match **List I** with **List II** with respect to human eye.

List I	**List II**
A. Fovea	I. Visible coloured portion of eye that regulates diameter of pupil.
B. Iris	II. External layer of eye formed of dense connective tissue.
C. Blind spot	III. Point of greatest visual acuity or resolution.
D. Sclera	IV. Point where optic nerve leaves the eyeball and photoreceptor cells are absent.

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

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

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

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

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

Ans. (4)

Hint NCERT XI Pg # 323 & 324

156. Which of the following are NOT considered as the part of endomembrane system ?

A. Mitochondria
B. Endoplasmic Reticulum
C. Chloroplasts
D. Golgi complex
E. Peroxisomes

Choose the **most appropriate** answer from the options given below :

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

Ans. (1)

Hint NCERT XI Pg # 133

157. Broad palm with single palm crease is visible in a person suffering from -

(1) Turner's syndrome
(2) Klinefelter's syndrome
(3) Thalassemia
(4) Down's syndrome

Ans. (4)

Hint NCERT XII Pg # 91

158. Match **List I** with **List II**.

List I		**List II**	
A.	P - wave	I.	Beginning of systole
B.	Q - wave	II.	Repolarisation of ventricles
C.	QRS complex	III.	Depolarisation of atria
D.	T - wave	IV.	Depolarisation of ventricles

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

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

Ans. (4)

Hint NCERT XI Pg # 286

159. Which one of the following common sexually transmitted diseases is completely curable when detected early and treated properly ?

(1) Gonorrhoea (2) Hepatitis-B
(3) HIV Infection (4) Genital herpes

Ans. (1)

Hint NCERT XII Pg # 63

160. Match **List I** with **List II**.

List I (Cells)		**List II (Secretion)**	
A.	Peptic cells	I.	Mucus
B.	Goblet cells	II.	Bile juice
C.	Oxyntic cells	III.	Proenzyme pepsinogen
D.	Hepatic cells	IV.	HCl and intrinsic factor for absorption of vitamin B_{12}

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

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

Ans. (2)

Hint NCERT XI Pg # 262

161. Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A : Endometrium is necessary for implantation of blastocyst.

Reason R : In the absence of fertilization, the corpus luteum degenerates that causes disintegration of endometrium.

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

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

Ans. (1)

Hint NCERT XII Pg # 51 & 53

162. Which of the following is not a cloning vector ?

(1) YAC (2) pBR322
(3) Probe (4) BAC

Ans. (3)

Hint NCERT XII Pg # 199 & 119

163. Match **List I** with **List II**.

List I		**List II**	
A.	*Taenia*	I.	Nephridia
B.	*Paramoecium*	II.	Contractile vacuole
C.	*Periplaneta*	III.	Flame cells
D.	*Pheretima*	IV.	Urecose gland

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

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

Ans. (2)

Hint NCERT XI Pg # 134, 114 & 291

164. Given below are two statements :

Statement I : Ligaments are dense irregular tissue.

Statement II : Cartilage is dense regular tissue.

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

(1) Both **Statement I** and **Statement II** are false.

(2) **Statement I** is true but **Statement II** is false.

(3) **Statement I** is false but **Statement II** is true.

(4) Both **Statement I** and **Statement II** are true.

Ans. (1)

Hint NCERT XI Pg # 103 & 104

165. Which of the following functions is carried out by cytoskeleton in a cell ?

(1) Protein synthesis

(2) Motility

(3) Transportation

(4) Nuclear division

Ans. (2)

Hint NCERT XI Pg # 136

166. Match **List I** with **List II**.

List I	List II
A. Gene 'a'	I. β-galactosidase
B. Gene 'y'	II. Transacetylase
C. Gene 'i'	III. Permease
D. Gene 'z'	IV. Repressor protein

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

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

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

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

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

Ans. (1)

Hint NCERT XII Pg # 117

167. Which of the following statements is correct ?

(1) Biomagnification refers to increase in concentration of the toxicant at successive trophic levels.

(2) Presence of large amount of nutrients in water restricts 'Algal Bloom'

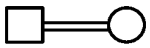
(3) Algal Bloom decreases fish mortality

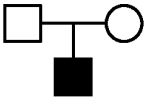
(4) Eutrophication refers to increase in domestic sewage and waste water in lakes.

Ans. (1)

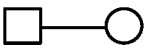
Hint NCERT XII Pg # 275 & 276

168. Which one of the following symbols represents mating between relatives in human pedigree analysis?

(1) 

(2) 

(3) 

(4) 

Ans. (1)

Hint NCERT XII Pg # 88

169. Once the undigested and unabsorbed substances enter the caecum, their backflow is prevented by -

(1) Ileo - caecal valve

(2) Gastro - oesophageal sphincter

(3) Pyloric sphincter

(4) Sphincter of Oddi

Ans. (1)

Hint NCERT XI Pg # 264

170. Which one of the following techniques does not serve the purpose of early diagnosis of a disease for its early treatment ?

(1) Serum and Urine analysis

(2) Polymerase Chain Reaction (PCR) technique

(3) Enzyme Linked Immuno-Sorbent Assay (ELISA) technique

(4) Recombinant DNA Technology

Ans. (1)

Hint NCERT XII Pg # 212

171. Given below are two statements :

Statement I : Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.

Statement II : When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor.

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

(1) Both **Statement I** and **Statement II** are false.

(2) **Statement I** is true but **Statement II** is false.

(3) **Statement I** is false but **Statement II** is true.

(4) Both **Statement I** and **Statement II** are true.

Ans. (4)

Hint NCERT XI Pg # 157

172. Match **List I** with **List II**.

List I (Type of Joint)		**List II (Found between)**
A. Cartilaginous Joint	I.	Between flat skull bones
B. Ball and Socket Joint	II.	Between adjacent vertebrae in vertebral column
C. Fibrous Joint	III.	Between carpal and metacarpal of thumb
D. Saddle Joint	IV.	Between Humerus and Pectoral girdle

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

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

Ans. **(1)**

Hint **NCERT XI Pg # 312**

173. Given below are two statements :

Statement I : Vas deferens receives a duct from seminal vesicle and opens into urethra as the ejaculatory duct.

Statement II : The cavity of the cervix is called cervical canal which along with vagina forms birth canal.

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

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

Ans. **(4)**

Hint **NCERT XII Pg # 46**

174. In which blood corpuscles, the HIV undergoes replication and produces progeny viruses ?

(1) B-lymphocytes (2) Basophils
(3) Eosinophils (4) T_H cells

Ans. **(4)**

Hint **NCERT XII Pg # 156**

175. Match **List I** with **List II**.

List I		**List II**
A. Heroin	I.	Effect on cardiovascular system
B. Marijuana	II.	Slow down body function
C. Cocaine	III.	Painkiller
D. Morphine	IV.	Interfere with transport of dopamine

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

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

Ans. **(4)**

Hint **NCERT XII Pg # 158 & 159**

176. Vital capacity of lung is_____ .

(1) IRV + ERV + TV + RV
(2) IRV + ERV + TV - RV
(3) IRV + ERV + TV
(4) IRV + ERV

Ans. **(3)**

Hint **NCERT XI Pg # 272**

177. Select the correct group/set of Australian Marsupials exhibiting adaptive radiation.

(1) Numbat, Spotted cuscus, Flying phalanger
(2) Mole, Flying squirrel, Tasmanian tiger cat
(3) Lemur, Anteater, Wolf
(4) Tasmanian wolf, Bobcat, Marsupial mole

Ans. **(1)**

Hint **NCERT XII Pg # 133**

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

List I	**List II**
(A) CCK	(I) Kidney
(B) GIP	(II) Heart
(C) ANF	(III) Gastric gland
(D) ADH	(IV) Pancreas

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

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

Ans. **(4)**

Hint **NCERT XI Pg # 333, 337 & 338**

179. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A : Amniocentesis for sex determination is one of the strategies of Reproductive and Child Health Care Programme.

Reason R : Ban on amniocentesis checks increasing menace of female foeticide.

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

Ans. **(3)**

Hint **NCERT XII Pg # 58**

180. Given below are two statements:

Statement I : RNA mutates at a faster rate.

Statement II : Viruses having RNA genome and shorter life span mutate and evolve faster.

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

(1) Both **Statement I** and **Statement II** are false.

(2) **Statement I** is true but **Statement II** is false.

(3) **Statement I** false but **Statement II** is true.

(4) Both **Statement I** and **Statement II** are true.

Ans. (4)

Hint NCERT XII Pg # 103

181. Match **List I** with **List II.**

List I	List II
A. Vasectomy	I. Oral method
B. Coitus interruptus	II. Barrier method
C. Cervical caps	III. Surgical method
D. Saheli	IV. Natural method

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

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

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

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

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

Ans. (1)

Hint NCERT XII Pg # 60 & 61

182. Given below are two statements:

Statement I : Electrostatic precipitator is most widely used in thermal power plant.

Statement II : Electrostatic precipitator in thermal power plant removes ionising radiations

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 incorrect.

(2) **Statement I** is correct but **Statement II** is incorrect.

(3) **Statement I** incorrect but **Statement II** is correct.

(4) Both **Statement I** and **Statement II** are correct.

Ans. (2)

Hint NCERT XII Pg # 271

183. Given below are two statements:

Statement I : In prokaryotes, the positively charged DNA is held with some negatively charged proteins in a region called nucleoid.

Statement II : In eukaryotes, the negatively charged DNA is wrapped around the positively charged histone octamer to form nucleosome.

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

(1) Both **Statement I** and **Statement II** are false.

(2) **Statement I** is correct but **Statement II** is false.

(3) **Statement I** incorrect but **Statement II** is true.

(4) Both **Statement I** and **Statement II** are true.

Ans. (3)

Hint NCERT XII Pg # 99

184. Match **List I** with **List II.**

List I	List II
A. Ringworm	I. *Haemophilus influenzae*
B. Filariasis	II. *Trichophyton*
C. Malaria	III. *Wuchereria bancrofti*
D. Pneumonia	IV. *Plasmodium vivax*

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

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

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

Ans. (4)

Hint NCERT XII Pg # 147 & 149

185. Match **List I** with **List II.**

List I (Interacting species)	List II (Name of Interaction)
A. A Leopard and a Lion in a forest/grassland	I. Competition
B. A Cuckoo laying egg in a Crow's nest	II. Brood parasitism
C. Fungi and root of a higher plant in Mycorrtizae	III. Mutualism
D. A cattle egret and a Cattle in a field	IV. Commensalism

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

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

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

Ans. (4)

Hint NCERT XII Pg # 236 & 237

Zoology : Section-B (Q. No. 186 to 200)

186. Which of the following statements are correct ?

A. Basophils are most abundant cells of the total WBCs
B. Basophils secrete histamine, serotonin and heparin
C. Basophils are involved in inflammatory response
D. Basophils have kidney shaped nucleus
E. Basophils are agranulocytes

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

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

Ans. (2)

Hint NCERT XI Pg # 279

187. Match **List I** with **List II.**

List I	List II
A. Mast cells	I. Ciliated epithelium
B. Inner surface of bronchiole	II. Areolar connective tissue
C. Blood	III. Cuboidal epithelium
D. Tubular parts of nephron	IV. specialised connective tissue

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

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

Ans. (2)

Hint NCERT XI Pg # 101 & 103

188. Select the correct statements.

A. Tetrad formation is seen during Leptotene.
B. During Anaphase, the centromeres split and chromatids separate.
C. Terminalization takes place during Pachytene.
D. Nucleolus, Golgi complex and ER are reformed during Telophase.
E. Crossing over takes place between sister chromatids of homologous chromosome.

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

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

Ans. (1)

Hint NCERT XI Pg # 168 & 166

189. In cockroach, excretion is brought about by-

A. Phallic gland
B. Urecose gland
C. Nephrocytes
D. Fat body
E. Collaterial glands

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

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

Ans. (2)

Hint NCERT XI Pg #114

190. Given below are two statements:

Statement I : During G_0 phase of cell cycle, the cell is metabolically inactive.

Statement II : The centrosome undergoes duplication during S phase of interphase.

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

Ans. (3)

Hint NCERT XI Pg # 163 & 164

191. Select the correct statements with reference to chordates.

A. Presence of mid-dorsal, solid and double nerve cord.
B. Presence of closed circulatory system
C. Presence of paired pharyngeal gillslits
D. Presence of dorsal heart
E. Triploblastic pseudocoelomate animals

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

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

Ans. (1)

Hint NCERT XI Pg # 55

192. Match **List I** with **List II.**

List I	List II
A. Logistic growth	I. Unlimited resource availability condition
B. Exponential growth	II. Limited resource availability condition
C. Expanding age pyramid	III. The percent individuals of pre-reproductive age is largest followed by reproductive and post reproductive age groups
D. Stable age pyramid	IV. The percent individuals of pre-reproductives and reproductive age group are same

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

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

Ans. (4)

Hint NCERT XII Pg # 227, 230 & 231

193. Which one of the following is the sequence on corresponding coding strand, if the sequence on mRNA formed is as follows

5' AUCGAUCGAUCGAUCGAUCG AUCG AUCG 3'?

(1) 3' UAGCUAGCUAGCUAGCUA GCUAGCUAGC 5'
(2) 5' ATCGATCGATCGATCGATCG ATCGATCG 3'
(3) 3' ATCGATCGATCGATCGATCG ATCGATCG 5'
(4) 5' UAGCUAGCUAGCUAGCUAGC UAGC UAGC 3'

Ans. (2)

Hint NCERT XII Pg # 108

194. Which of the following is characteristic feature of cockroach regarding sexual dimorphism?

(1) Presence of anal styles
(2) Presence of sclerites
(3) Presence of anal cerci
(4) Dark brown body colour and anal cerci

Ans. (1)

Hint NCERT XI Pg # 112

195. Which of the following statements are correct regarding skeletal muscle ?

A. Muscle bundles are held together by collagenous connective tissue layer called fascicle.
B. Sarcoplasmic reticulum of muscle fibre is a store house of calcium ions.
C. Striated appearance of skeletal muscle fibre is due to distribution pattern of actin and myosin proteins.
D. M line is considered as functional unit of contraction called sarcomere.

Choose the ***most appropriate*** answer from the options given below:

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

Ans. (1)

Hint NCERT XI Pg # 304

196. The unique mammalian characteristics are :

(1) hairs, pinna and mammary glands
(2) hairs, pinna and indirect development
(3) pinna, monocondylic skull and mammary glands
(4) hairs, tympanic membrane and mammary glands

Ans. (1)

Hint NCERT XI Pg # 59 & 60

197. Which one of the following is NOT an advantage of inbreeding?

(1) It exposes harmful recessive genes that are eliminated by selection.
(2) Elimination of less desirable genes and accumulation of superior genes takes place due to it.
(3) It decreases the productivity of inbred population, after continuous inbreeding.
(4) It decreases homozygosity.

Ans. (3)

Hint NCERT XII Pg # 167

198. The parts of human brain that helps in regulation of sexual behaviour, expression of excitement, pleasure, rage, fear etc. are :

(1) Corpora quadrigemina & hippocampus
(2) Brain stem & epithalamus
(3) Corpus callosum and thalamus
(4) Limbic system & hypothalamus

Ans. (4)

Hint NCERT XI Pg # 321

199. Which of the following statements are correct?

A. An excessive loss of body fluid from the body switches off osmoreceptors.
B. ADH facilitates water reabsorption to prevent diuresis.
C. ANF causes vasodilation.
D. ADH causes increase in blood pressure.
E. ADH is responsible for decrease in GFR.

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

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

Ans. (1)

Hint NCERT XI Pg # 297

200. Which of the following are NOT under the control of thyroid hormone?

A. Maintenance of water and electrolyte balance
B. Regulation of basal metabolic rate
C. Normal rhythm of sleep-wake cycle
D. Development of immune system
E. Support the process of R.B.Cs formation

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

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

Ans. (2)

Hint NCERT XI Pg # 334