NEET 2014 Question Paper with Solutions

Physics

Topic – unit and dimension
Concept – dimension
Subject Concept – dimension of F, V, and time
Concept Field – comparison of dimension
Question Level – easy
Expected time to solve – 30 sec

1. If force (F), velocity (V) and time (T) are taken as fundamental units, then the dimensions of mass are

(1) $[F\ V\ T^{-1}]$ (2) $[F\ V\ T^{-2}]$ (3) $[F\ V^{-1}\ T^{-1}]$ (4) $[F\ V^{-1}\ T]$

Sol. (4)

$F = [M\ V\ T^{-1}]$

$\Rightarrow M = [F\ V^{-1}\ T]$

Topic - kinematics
Concept – 2-D motion
Subject Concept – projectile motion
Concept Field – projectile trajectory
Question Level – easy
Expected time to solve – 45 sec

2. A projectile is fired from the surface of the earth with a velocity of 5 ms^{-1} and angle θ with the horizontal. Another projectile fired from another planet with a velocity of 3 ms^{-1} at the same angle follows a trajectory which is identical with the trajectory of the projectile fired from the earth. The value of the acceleration due to gravity on the planet is (in ms^{-2}) is (given g = 9.8 ms^{-2})

(1) 3.5 (2) 5.9 (3) 16.3 (4) 110.8

Sol. (1)

$$y = x\tan\theta - \frac{gx^2}{2u^2\cos^2\theta}$$

For equal trajectories for same angle of projection

$$\frac{g}{u^2} = \text{constant}$$

$$\Rightarrow \frac{9.8}{5^2} = \frac{g'}{3^2}$$

$$g' = \frac{9.8\times 9}{25} = 3.528\ m/s^2 = 3.5\ m/s^2$$

Topic - kinematics
Concept – motion in a plane

Subject Concept – displacement
Concept Field – average velocity
Question Level – easy
Expected time to solve – 40 sec

3. A particle is moving such that its position coordinates (x, y) are
(2m, 3m) at time t = 0,
(6m, 7m) at time t = 2 s and
(13m, 14m) at time t = 5 s
Average velocity vector $\left(\vec{V}_{av}\right)$ from t = 0 to t = 5 s is

(1) $\frac{1}{5}\left(13\hat{i}+14\hat{j}\right)$ (2) $\frac{7}{3}\left(\hat{i}+\hat{j}\right)$ (3) $2\left(\hat{i}+\hat{j}\right)$ (4) $\frac{11}{5}\left(\hat{i}+\hat{j}\right)$

Sol. (4)

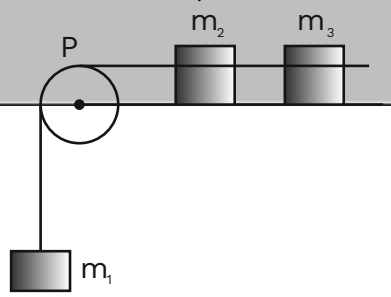
$$\vec{V}_{av}=\frac{\left(x_2-x_1\right)\hat{i}+\left(y_2-y_1\right)\hat{j}}{t_2-t_1}$$

$$=\frac{\left(13-2\right)\hat{i}+\left(14-3\right)\hat{j}}{5-0}$$

$$=\frac{11\hat{i}+11\hat{j}}{5}=\frac{11}{5}\left(\hat{i}+\hat{j}\right)$$

Topic – force and NLM
Concept – NLM
Subject Concept – pulley-block system
Concept Field – acceleration
Question Level – easy
Expected time to solve – 40 sec

4. A system consists of three masses m_1, m_2 and m_3 connected by a string passing over a pulley P. The mass m_1 hangs freely and m_2 and m_3 are on a rough horizontal table (the coefficient of friction = μ) The pulley is frictionless and of negligible mass. The downward acceleration of mass m_1 is (Assume $m_1 = m_2 = m_3 = m$)

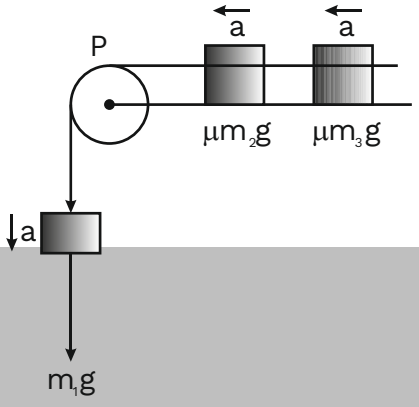


(1) $\frac{g\left(1-g\mu\right)}{9}$ (2) $\frac{2g\mu}{3}$ (3) $\frac{g\left(1-2\mu\right)}{3}$ (4) $\frac{g\left(1-2\mu\right)}{2}$

Sol. (3)

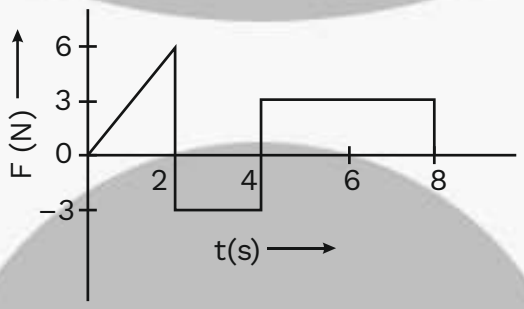
$$a = \frac{m_1 g - \mu\left(m_2 + m_3\right) g}{m_1 + m_2 + m_3} = \frac{m\left[g - 2\mu g\right]}{3m}$$

$$= \frac{g}{3}\left[1 - 2\mu\right]$$



Topic – force and NLM
Concept – NLM
Subject Concept – force-time curve
Concept Field – change in momentum
Question Level – easy
Expected time to solve – 45 sec

5. The force F acting on a particle of mass m is indicated by the force-time graph shown below. The change in momentum of the particle over the time interval from zero to 8 s is



(1) 24 Ns (2) 20 Ns (3) 12 Ns (4) 6 Ns

Sol. (3)

Change in momentum = Area below the F versus t graph in that interval

$$= \left(\frac{1}{2} \times 2 \times 6\right) - \left(2 \times 3\right) + \left(4 \times 3\right)$$

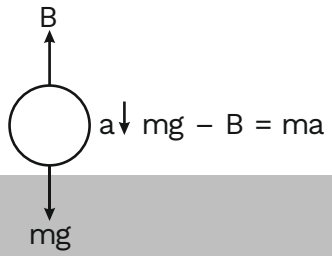
= 6 – 6 + 12 = Ns

Topic - kinematics
Concept – motion in straight line
Subject Concept – motion under gravity
Concept Field – acceleration
Question Level – easy
Expected time to solve – 35 sec

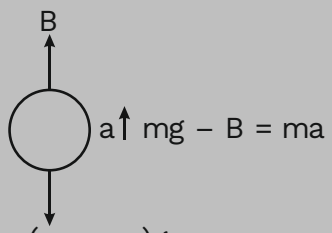
6. A balloon with mass m is descending down with an acceleration a (where a < g). How much mass should be removed from it so that it starts moving up with an acceleration a?

(1) $\frac{2ma}{g+a}$ (2) $\frac{2ma}{g-a}$ (3) $\frac{ma}{g+a}$ (4) $\frac{ma}{g-a}$

Sol. (1)



.....(i)



$B - (m - m_0)g = (m - m_0)a$ .....(ii)

Equation (i) + equation (ii)

$\Rightarrow mg - mg + m_0g = ma + ma - m_0a$

$\Rightarrow m_0 = \frac{2ma}{g+a}$

Topic - mechanics
Concept – centre of mass and rotational motion
Subject Concept – explosion of mass
Concept Field – kinetic energy
Question Level – easy
Expected time to solve – 45 sec

7. A body of mass (4m) is lying in x-y plane at rest. It suddenly explodes into three pieces. Two pieces each of mass (m) move perpendicular to each other with equal speeds (v). The total kinetic energy generated due to explosion is

(1) mv^2 (2) $\frac{3}{2}mv^2$ (3) $2\ mv^2$ (4) $4\ mv^2$

Sol. (2)

Initial momentum = $P_i = 0$

Final momentum $P_f = 0 = mv\hat{i} + mv\hat{j} + \overline{P_3}$

$\Rightarrow P_3 = mv\sqrt{2}$

Total KE $= \frac{P_3^2}{2\times 2m} + \frac{1}{2}mv^2 + \frac{1}{2}mv^2$

$$= \frac{2m^2v^2}{4m} + mv^2 - \frac{3mv^2}{2}$$

Topic – oscillation and waves
Concept – periodic motion
Subject Concept – time period
Concept Field – acceleration
Question Level – easy
Expected time to solve – 30 sec

8. The oscillation of a body on a smooth horizontal surface is represented by the equation,

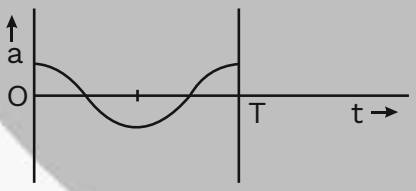
$$X = A\cos(\omega t)$$

where X = displacement at time t

ω = frequency of oscillation

Which one of the following graphs shows correctly the variation a with t?
(Here a = acceleration at time t and T = time period)

(1)



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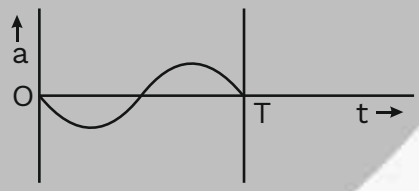
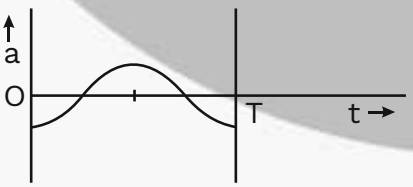
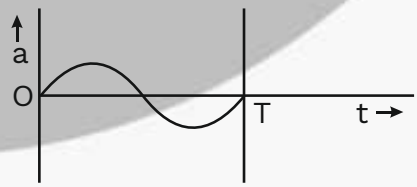


(3)

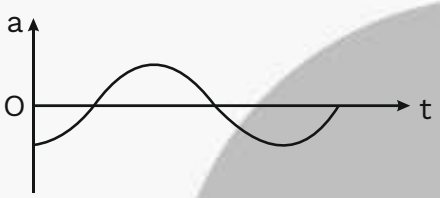


(4)



Sol. (3)

$$X = A\cos\omega t$$



$$v = \frac{dx}{dt} = -A\omega\sin\omega t$$

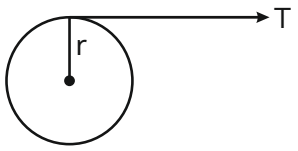
$$a = \frac{d^2x}{dt^2} = -A\omega^2\cos\omega t \; X$$

Topic - mechanics
Concept – centre of mass and rotational motion
Subject Concept – rotational motion
Concept Field – angular acceleration
Question Level – easy
Expected time to solve – 40 sec

9. A solid cylinder of mass 50 kg and radius 0.5 m is free to rotate about the horizontal axis. A massless string is wound round the cylinder with one end attached to it and other hanging freely. Tension in the string required to produce an angular acceleration of 2 revolutions s^{-2} is

(1) 25 N (2) 50 N (3) 78.5 N (4) 157 N

Sol. (4)



$Tr = I\alpha$

$$T = \frac{I\alpha}{r} = \frac{mr^2}{2} \times \frac{\alpha}{r} = \frac{mr\alpha}{2}$$

$$= \frac{50 \times 0.5 \times 2 \times 2\pi}{2} N = 157 \text{ N}$$

Topic - mechanics
Concept – centre of mass and rotational motion
Subject Concept – rolling of solid sphere
Concept Field – acceleration
Question Level – easy
Expected time to solve – 45 sec

10. The ratio of the accelerations for a solid sphere (mass m and radius R) rolling down an incline of angle 'θ' without slipping and slipping down the incline without rolling is

(1) 5 : 7 (2) 2 : 3 (3) 2 : 5 (4) 7 : 5

Sol. (1)

$$a_{slipping} = g\sin\theta$$

$$a_{rolling} = \frac{g\sin\theta}{1 + \frac{K^2}{r^2}} = \frac{5}{7} g\sin\theta$$

$$\frac{a_{rolling}}{a_{slipping}} = \frac{5}{7}$$

Topic - gravitation
Concept – gravitational force
Subject Concept – gravitational field
Concept Field – escape velocity
Question Level – easy
Expected time to solve – 40 sec

11. A black hole is an object whose gravitational field is so strong that even light cannot escape from it. To what approximate radius would earth (mass = 5.98×10^{24} kg) have to be compressed to be a black hole?

(1) 10^{-9} m (2) 10^{-6} m (3) 10^{-2} m (4) 100 m

Sol. (3)

$$V_e = \sqrt{\frac{2GM}{R}} = C$$

$$\Rightarrow R = \frac{2GM}{C^2} = \frac{2 \times 6.67 \times 10^{-11} \times 5.98 \times 10^{24}}{\left(3 \times 10^8\right)^2}$$

$$= \frac{2 \times 6.67 \times 5.98}{9} \times 10^{-3} m$$

$$= 8.86 \times 10^{-3} m \approx 10^{-2} m$$

Topic - gravitation

Concept – gravitational force

Subject Concept – gravitational field

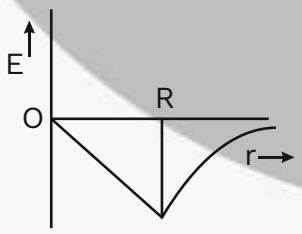
Concept Field – variation in gravitational field with distance

Question Level – easy

Expected time to solve – 40 sec

12. Dependence of intensity of gravitational field (E) of earth with distance (r) from centre of earth is correctly represented by

(1)



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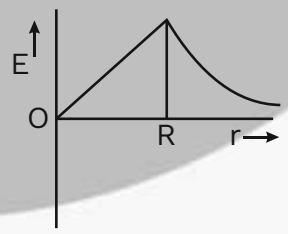

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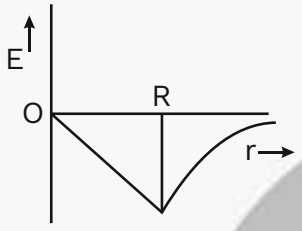
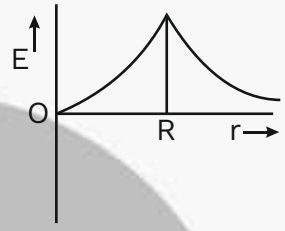


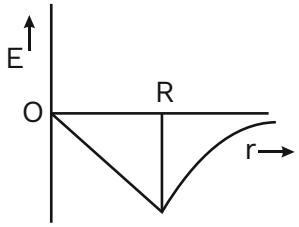
(4)



Sol. (1)

$$E_{in} = -\frac{GMr}{R^3}$$

$$E_{out} = -\frac{GM}{r^2}$$



Topic - mechanics

Concept – mechanical property of solids

Subject Concept – linear expansion
Concept Field – young's modulus coefficient
Question Level – easy
Expected time to solve – 45 sec

13. Copper of fixed volume V is drawn into wire of length l. When this wire is subjected to a constant force F, the extension produced in the wire is Δl. Which of the following graphs is a straight line?

(1) Δl versus $\frac{1}{l}$ (2) Δl versus l^2 (3) Δl versus $\frac{1}{l^2}$ (4) Δl versus l

Sol. (2)

$$V = Al,\ Y = \frac{Fl}{A\Delta l} \Rightarrow \Delta l \frac{Fl}{AY} = \frac{Fl^2}{VY}$$

$$\Rightarrow \Delta l \propto l^2$$

Topic - mechanics
Concept – fluid mechanics
Subject Concept – surface tension
Concept Field – energy
Question Level – easy
Expected time to solve – 40 sec

14. A certain number of spherical drops of a liquid of radius r coalesce to form a single drop of radius R and volume V. If 'T' is the surface tension of the liquid, then

(1) Energy $= 4VT\left(\frac{1}{r} - \frac{1}{R}\right)$ is released

(2) Energy $= 3VT\left(\frac{1}{r} + \frac{1}{R}\right)$ is absorbed

(3) Energy $= 3VT\left(\frac{1}{r} - \frac{1}{R}\right)$ is released

(4) Energy is neither released nor absorbed

Sol. (3)

Energy released = $(A_f - A_i)T$

$$A_f = 4\pi R^2 = \frac{3}{3} 4\pi \frac{R^3}{R} = \frac{3V}{R}$$

$$A_i - n \times 4\pi r^2 - \frac{V}{\frac{4}{3}\pi r^3} 4\pi^2 - \frac{3V}{r}$$

$$\Rightarrow \text{Energy released} = 3VT\left[\frac{1}{r} - \frac{1}{R}\right]$$

Topic – thermal physics
Concept – KTG
Subject Concept – heat transfer

Concept Field – specific heat and latent heat
Question Level – easy
Expected time to solve – 45 sec

15. Steam at 100°C is passed into 20 g of water at 10°C. When water acquires a temperature of 80°C, the mass of water present will be:
[Take specific heat of water = 1 cal g^{-1} $°C^{-1}$ and latent heat of steam = 540 cal g^{-1}]
(1) 24 g (2) 31.5 g (3) 42.5 g (4) 22.5 g

Sol. (4)
Heat gain by water = Heat lost by steam
$20 \times 1 \times (80 - 10) = m \times 540 + m \times 1 \times (100 - 80)$
$\Rightarrow$ $1400 = 560\ m$
$\Rightarrow$ $m = 2.5$ g
Total mass of water = 20 + 2.5 = 22.5 g

Topic – thermal physics
Concept – KTG
Subject Concept – heat transfer
Concept Field – newton's law of cooling
Question Level – easy
Expected time to solve – 45 sec

16. Certain quantity of water cools from 70°C to 60°C in the first 5 minutes and to 54°C in the next 5 minutes. The temperature of the surroundings is
(1) 45°C (2) 20°C (3) 42°C (4) 10°C

Sol. (1)
Newtons law of cooling $\frac{\theta_1 - \theta_2}{\Delta t} = K\left[\frac{\theta_1 + \theta_2}{2} - \theta_0\right]$.
First $\Rightarrow$ $\frac{70 - 60}{5} = K\left[65 - \theta_0\right]$
$\Rightarrow$ $2 = K\left[65 - \theta_0\right]$ .....(i)
Diving (i) and (ii)
$\frac{5}{3} = \frac{65 - \theta_0}{57 - \theta_0}$
$\Rightarrow$ $285 - 5\theta_0 = 195 - 3\theta_0$
$\Rightarrow$ $2\theta_0 = 90$
$\theta_0 = 45°$

Topic – thermal physics
Concept – thermodynamics
Subject Concept – thermodynamic process
Concept Field – isothermal and adiabatic process
Question Level – easy

Expected time to solve – 40 sec

17. A monoatomic gas at a pressure P, having a volume V expands isothermally to a volume 2 V and then adiabatically to a volume 16 V. The final pressure of the gas is (take $\gamma = \frac{5}{3}$)

(1) 64 P (2) 32 P (3) $\frac{P}{64}$ (4) 16 P

Sol. (3)

Step – 1 Isothermal Expansion

$PV = P_2 2V \quad \Rightarrow \quad P_2 = \frac{P}{2}$

Step – 2 Adiabatic Expansion

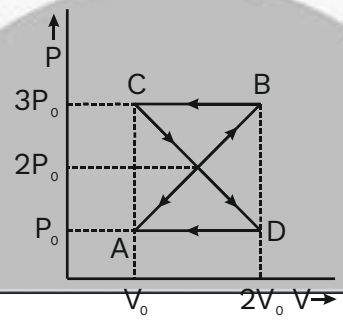
$P_2V_2^{\gamma} = P_3V_3^{\gamma}$

$\Rightarrow \frac{P}{2}(2V)^{\frac{5}{3}} = P_3(16V)^{\frac{5}{3}}$

$\Rightarrow P_3 = \frac{P}{2}\left(\frac{2V}{16V}\right)^{\frac{5}{3}} = \frac{P}{2} \times \left(\frac{1}{8}\right)^{\frac{5}{3}} = \frac{P}{64}$

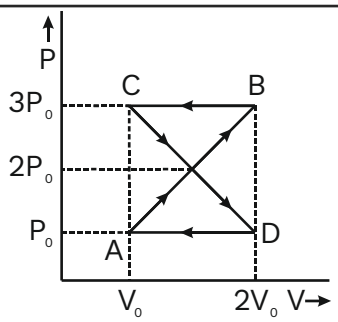
Topic – thermal physics
Concept – thermodynamics
Subject Concept – thermodynamic process
Concept Field – work done
Question Level – easy
Expected time to solve – 45 sec

18. A thermodynamic system undergoes cyclic process ABCDA as shown in figure. The work done by the system in the cycle is



(1) P_0V_0 (2) $2P_0V_0$ (3) $\frac{P_0V_0}{2}$ (4) Zero

Sol. (4)



W = Area of BCE + Area of ADE

$= -W_0 + W_0 = 0$

Topic – thermal physics
Concept – KTG
Subject Concept – speed of gases
Concept Field – mean free path
Question Level – easy
Expected time to solve – 30 sec

19. The mean free path of molecules of a gas, (radius r) is inversely proportional to

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

Sol. (2)

$$\lambda = \frac{1}{\lambda d^2 n\sqrt{2}} = \frac{1}{4\pi r^2 n\sqrt{2}}$$

$$\lambda \propto \frac{1}{r^2}$$

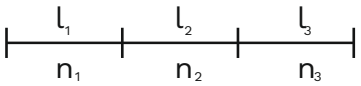
Topic – oscillation and waves
Concept – oscillation in string
Subject Concept – frequency
Concept Field – fundamental frequency
Question Level – moderate
Expected time to solve – 40 sec

20. If n_1, n_2 and n_3 are the fundamental frequencies of three segments into which a string is divided, then the original fundamental frequency n of the string is given by

(1) $\frac{1}{n} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$ (2) $\frac{1}{\sqrt{n}} = \frac{1}{\sqrt{n_1}} + \frac{1}{\sqrt{n_2}} + \frac{1}{\sqrt{n_3}}$

(3) $\sqrt{n} = \sqrt{n_1} + \sqrt{n_2} + \sqrt{n_3}$ (4) $n = n_1 + n_2 + n_3$

Sol. (1)



$$n_1 = \frac{1}{2l_1}\sqrt{\frac{T}{\mu}}; \quad n_2 = \frac{1}{2l_2}\sqrt{\frac{T}{\mu}}; \quad n_3 = \frac{1}{2l_3}\sqrt{\frac{T}{\mu}}$$

$$n = \frac{1}{2l}\sqrt{\frac{T}{\mu}} \qquad \left(l = l_1 + l_2 + l_3\right)$$

$$\therefore \quad \frac{1}{n} = \frac{2l}{\sqrt{\frac{T}{\mu}}} = \frac{2l_1}{\sqrt{\frac{T}{\mu}}} + \frac{2l_2}{\sqrt{\frac{T}{\mu}}} + \frac{2l_3}{\sqrt{\frac{T}{\mu}}} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$$

Topic – oscillation and waves
Concept – natural oscillation
Subject Concept – frequency
Concept Field – number of oscillation
Question Level – easy
Expected time to solve – 35 sec

21. The number of possible natural oscillations of air column in a pipe closed at one end of length 85 cm whose frequencies lie below 1250 Hz are (velocity of sound = 340 ms^{-1})

(1) 4 (2) 5 (3) 7 (4) 6

Sol. (4)

$l_c = 0.85$ m

$$f_0 = \frac{v}{4l_c} = \frac{340\ ms^{-1}}{4 \times 0.85 m} = 10\ Hz$$

$f_n = (2n + 1)f_0 = f_0, 3f_0, 5f_0, 7f_0, 9f_0, 11f_0, 13f_0$

$= 100$ Hz, 300 Hz, 500 Hz, 700 Hz, 900 Hz, 1100 Hz

Topic - waves
Concept – sound waves
Subject Concept – frequency of sound waves
Concept Field – speed of sound
Question Level – easy
Expected time to solve – 45 sec

22. A speeding motorcyclist sees traffic jam ahead of him. He slows down to 36 km/hour. He finds that traffic has eased and a car moving ahead of him at 18 km/hour is honking at a frequency of 1392 Hz. If the speed of sound is 343 m/s, the frequency of the honk as heard by him will be

(1) 1332 Hz (2) 1372 Hz (3) 1412 Hz (4) 1454 Hz

Sol. (3)

$v_0 = 36$ km/h = 10 m/s $\xrightarrow{\text{O}}$ $v_0 = 18$ km/h = 5 m/s $\xrightarrow{\text{S}}$ $f = 1392$ Hz

$$f' = f\left[\frac{v + v_0}{v + v_s}\right] = 1392 \times \left(\frac{343 + 10}{343 + 5}\right) Hz$$

$$= 1392 \times \frac{353}{348} Hz = 1412\ Hz$$

Topic - electrostatics

Concept – capacitor and capacitance

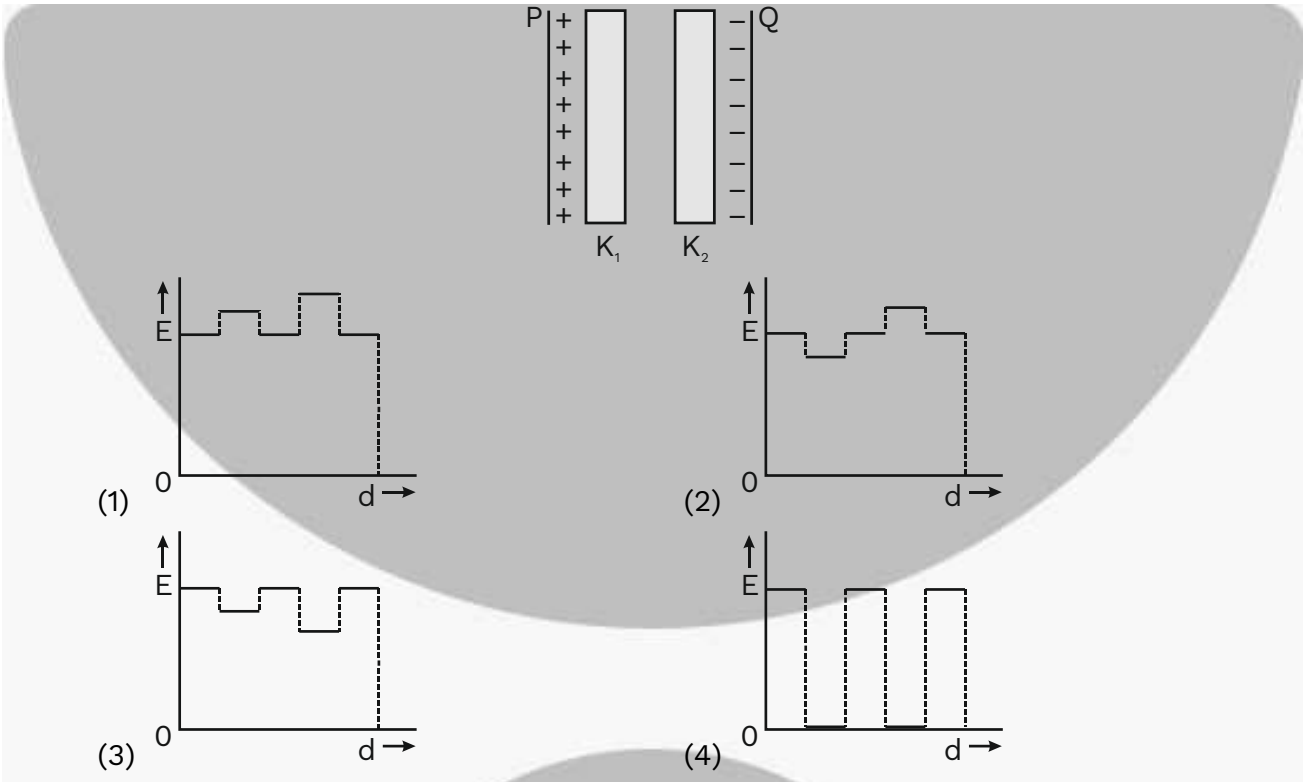
Subject Concept – parallel plate capacitor

Concept Field – variation in electric field due to dielectric

Question Level – easy

Expected time to solve – 45 sec

23. Two thin dielectric slabs of dielectric constants K_1 and K_2 ($K_1 < K_2$) are inserted between plates of a parallel plate capacitor, as shown in the figure. The variation of electric field E between the plates with distance d as measured from plate P is correctly shown by



Sol. (3)

Electric field inside parallel plate capacitor having charge Q at place where dielectric is absent $= \frac{Q}{A\varepsilon_0}$

where dielectric is present $= \frac{Q}{KA\varepsilon_0}$

Topic - electrostatics

Concept – electric field

Subject Concept – electric field due to sphere

Concept Field – electric potential

Question Level – easy

Expected time to solve – 40 sec

24. A conducting sphere of radius R is given a charge Q. The electric potential and the electric field at the centre of the sphere respectively are

(1) Zero and $\frac{Q}{4\pi\varepsilon_0 R^2}$ (2) $\frac{Q}{4\pi\varepsilon_0 R}$ and zero

(3) $\frac{Q}{4\pi\varepsilon_0 R}$ and $\frac{Q}{4\pi\varepsilon_0 R^2}$ (4) Both are zero

Sol. (2)

Electric potential, $V = \frac{Q}{4\pi\varepsilon_0 R}$

Electric field E = 0.

Topic - electrostatics
Concept – electric charge
Subject Concept – electric force
Concept Field – electric potential
Question Level – easy
Expected time to solve – 45 sec

25. In a region, the potential is represented by V(x, y, z) = 6x – 8xy – 8y + 6yz, where V is in volts and x, y, z are in metres. The electric force experienced by a charge of 2 coulomb situated at point (1, 1, 1) is

(1) $6\sqrt{5}$ N (2) 30 N (3) 24 N (4) $4\sqrt{35}$ N

Sol. (4)

$V = 6x - 8xy - 8y + 6yz$

$E_x = \frac{\partial V}{\partial x} = -(6 - 8y) = 2$

$E_y = \frac{\partial V}{\partial y} = -(-8x - 8 + 6z) = 10$

$E_z = -\frac{\partial V}{\partial z} = -6y = -6$

$E = \sqrt{E_x^2 + E_y^2 + E_z^2} = \sqrt{4 + 100 + 36} = \sqrt{140}$

$= 2\sqrt{35}\,N/C$

$F = qE = 4\sqrt{35}$ N

Topic - electromagnetism
Concept – current electricity
Subject Concept – electric potential
Concept Field – power loss
Question Level – moderate
Expected time to solve – 45 sec

26. Two cities are 150 km apart. Electric power is sent from one city to another city through copper wires. The fall of potential per km is 8 volt and the average resistance per km is 0.5Ω. The power loss in the wire is

(1) 19.2 W (2) 19.2 kW (3) 19.2 J (4) 12.2 kW

Sol. (2)

Resistance $= 150 \times 0.5 = 75\Omega$

$I = \frac{\Delta V}{\Delta R} = \frac{8}{0.5} = 16A$

$P = I^2R = (16)^2 \times 75$ W = 19200 = 19.2 kW

Topic - electromagnetism

Concept – current electricity

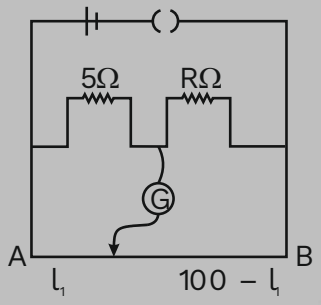
Subject Concept – electric circuit

Concept Field – meter bridge

Question Level – moderate

Expected time to solve – 60 sec

27. The resistances in the two arms of the meter bridge are 5Ω and $R\Omega$, respectively. When the resistance R is shunted with an equal resistance, the new balance point is at 1.6 l_1. The resistance R, is:



(1) 10Ω (2) 15Ω (3) 20Ω (4) 25Ω

Sol. (2)

Initially, $\frac{5}{l_1} = \frac{R}{100 - l_1}$ .....(i)

Finally, $\frac{5}{1.6 l_1} = \frac{R}{2(100 - 1.6 l_1)}$ .....(ii)

$\Rightarrow \frac{R}{1.6(100 - l_1)} = \frac{R}{2(100 - 1.6 l_1)}$

$\Rightarrow$ 160 – 1.6 l_1 = 200 – 3.2 l_1

$\Rightarrow$ 1.6 l_1 = 40

$\Rightarrow$ l_1 = 25

From Equation (i),

$\frac{5}{25} = \frac{R}{75}$

$\Rightarrow R = 15\Omega$.

Topic - electromagnetism

Concept – current electricity

Subject Concept – potentiometer

Concept Field – internal resistance of cell

Question Level – easy

Expected time to solve – 45 sec

28. A potentiometer circuit has been set up for finding the internal resistance of a given cell. The main battery, used across the potentiometer wire, has an emf of 2.0 V and a negligible internal resistance. The potentiometer wire itself is 4 m long. When the resistance, R, connected across the given cell, has values of

(i) Infinity

(ii) $9.5\,\Omega$

the 'balancing lengths', on the potentiometer wire are found to be 3 m and 2.85 m, respectively.

The value of internal resistance of the cell is

(1) $0.25\,\Omega$ (2) $0.95\,\Omega$ (3) $0.5\,\Omega$ (4) $0.75\,\Omega$

Sol. (3)

$$r = \left(\frac{l_1}{l_2} - 1\right)R$$

$$= \left(\frac{3}{2.85} - 1\right)9.5\,\Omega = \frac{0.15}{2.85} \times 9.5\,\Omega$$

$$= 0.5\,\Omega$$

Topic - electromagnetism

Concept – bar magnet

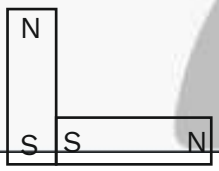
Subject Concept – magnetic dipole

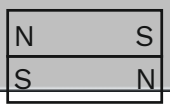
Concept Field – magnetic dipole moment

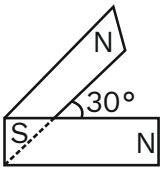
Question Level – easy

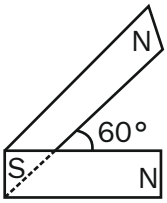
Expected time to solve – 60 sec

29. Following figures show the arrangement of bar magnets in different configurations. Each magnet has magnetic dipole moment $\vec{m}$. Which configuration has highest net magnetic dipole moment?

(a) 

(b) 

(c) 

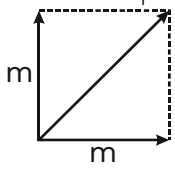
(d) 

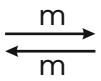
b

(1) a (2) b (3) c (4) d

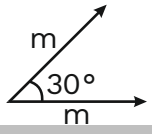
Sol. (3)

a. $M_1 = m\sqrt{2}$



b. 

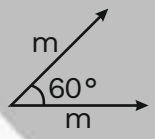
$\Rightarrow \quad M_2 = 0$

c. 

$$M_3 = m\sqrt{(1+\cos 30°)2}$$

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

$$= m\sqrt{2+\sqrt{3}}$$

d. 

$$M_4 = 2m\cos 30°$$

$$= m\sqrt{3}$$

Topic - electromagnetism
Concept – current electricity
Subject Concept – galvanometer
Concept Field – ammeter
Question Level – easy
Expected time to solve – 40 sec

30. In an ammeter 0.2% of main current passes through the galvanometer. If resistance of galvanometer is G, the resistance of ammeter will be

(1) $\frac{1}{499}G$ (2) $\frac{499}{500}G$ (3) $\frac{1}{500}G$ (4) $\frac{500}{499}G$

Sol. (3)

$$n = \frac{I}{I_g} = \frac{100}{0.2} = 500$$

$$R_A = \frac{G}{n} = \frac{G}{500}$$

Topic - electromagnetism
Concept – current carrying conductor
Subject Concept – magnetic field
Concept Field – magnetic field intensity

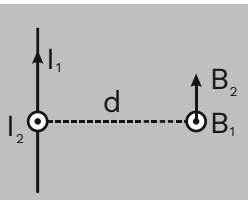
Question Level – easy

Expected time to solve – 40 sec

31. Two identical long conducting wires AOB and COD are placed at right angle to each other, with one above other such that O is their common point for the two. The wires carry I_1 and I_2 currents, respectively. Point P is lying at distance d from O along a direction perpendicular to the plane containing the wires. The magnetic field at the point P will be

(1) $\frac{\mu_0}{2\pi d}\left(\frac{I_1}{I_2}\right)$ (2) $\frac{\mu_0}{2\pi d}\left(I_1+I_2\right)$ (3) $\frac{\mu_0}{2\pi d}\left(I_1^2-I_2^2\right)$ (4) $\frac{\mu_0}{2\pi d}\left(I_1^2+I_2^2\right)^{1/2}$

Sol. (4)



$$B=\sqrt{B_1^2+B_2^2}$$

$$=\frac{\mu_0}{2\pi d}\left(I_1^2+I_2^2\right)^{1/2}$$

Topic - electromagnetism

Concept – magnetic field

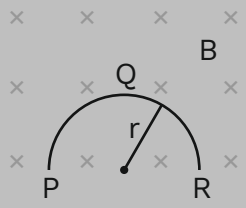
Subject Concept – magnetic field due to semi-circular ring

Concept Field – potential difference

Question Level – easy

Expected time to solve – 45 sec

32. A thin semi-circular conducting ring (PQR) of radius r is falling with its plane vertical in a horizontal magnetic field B, as shown in figure. The potential difference developed across the ring when its speed is v, is



(1) Zero (2) $Bv\pi r^2/2$ and P is at higher potential

(3) πrBv and R is at higher potential (4) 2rBv and R is at higher potential

Sol. (4)

$\varepsilon = BL_{eff}v$ (Leff = Diameter)

$= B2Rv$

Topic - electromagnetism

Concept – current electricity

Subject Concept – transformer

Concept Field – efficiency of transformer

Question Level – easy

Expected time to solve – 40 sec

33. A transformer having efficiency of 90% is working on 200 V and 3 kW power supply. If the current in the secondary coil is 6A, the voltage across the secondary coil and the current in the primary coil respectively are

(1) 300 V, 15 A (2) 450 V, 15 A (3) 450 V, 13.5 A (4) 600 V, 15 A

Sol. (2)

$$\text{Power output} = 3\text{kW} \times \frac{90}{100} = 2.7 \text{ kW}$$

$$I_b = 6A$$

$$V_s = \frac{2.7 \text{ kW}}{6A} = 450 \text{ V}$$

$$I_p = \frac{3 \text{ kW}}{200 \text{ V}} = 15 \text{ A}$$

Topic – oscillation and waves
Concept – wave motion
Subject Concept – reflection of light waves
Concept Field – force
Question Level – easy
Expected time to solve – 40 sec

34. Light with an energy flux of 25×10^4 Wm^{-2} falls on a perfectly reflecting surface at normal incidence. If the surface area is 15 cm^2, the average force exerted on the surface is

(1) 1.25×10^{-6} N (2) 2.50×10^{-6} N (3) 1.20×10^{-6} N (4) 3.0×10^{-6} N

Sol. (2)

$$F_{av} = \frac{2IA}{c} = \frac{2 \times 25 \times 10^4 \times 15 \times 10^{-4}}{3 \times 10^8} N$$

$= 250 \times 10^{-8}$ B = 2.5×10^{-6} N

Topic - waves
Concept – light waves
Subject Concept – single slit experiment
Concept Field – fringes
Question Level – easy
Expected time to solve – 45 sec

35. A beam of light of λ = 600 nm from a distant source falls on a single slit 1 mm wide and the resulting diffraction pattern is observed on a screen 2 m away. The distance between first dark fringes on either side of the central bright fringe is

(1) 1.2 cm (2) 1.2 mm (3) 2.4 cm (4) 2.4 mm

Sol. (4)

Distance between 1^{st} order dark fringes = width of principal max

$$x = \frac{2\lambda D}{d} = \frac{2 \times 600 \times 10^{-9} \times 2}{10^{-3}}$$

$= 2400 \times 10^{-6}$

$= 2.4 \times 10^{-3}$m = 2.4 mm

Topic - waves
Concept – young's double slit experiment
Subject Concept – intensity of light
Concept Field – path difference
Question Level – easy
Expected time to solve – 45 sec

36. In the Young's double-slit experiment, the intensity of light at a point on the screen where the path difference is λ is K, (λ being the wavelength of light used). The intensity at a point where the path difference is $\frac{\lambda}{4}$, will be

(1) K (2) $\frac{K}{4}$ (3) $\frac{K}{2}$ (4) Zero

Sol. (3)

Path difference λ means maxima $I_{max} = K$

$$I = K\cos^2\frac{\phi}{2} = K\cos^2\left[\frac{2\pi}{\lambda} \times \frac{\lambda}{4} \times \frac{1}{2}\right]$$

$$= K\cos^2\frac{\pi}{4}$$

$$= \frac{K}{2}$$

Topic - optics
Concept – ray optics
Subject Concept – microscope
Concept Field – focal length
Question Level – easy
Expected time to solve – 40 sec

37. If the focal length of objective lens is increased then magnifying power of

(1) Microscope will increase but that of telescope decrease
(2) Microscope and telescope both will increase
(3) Microscope and telescope both will decrease
(4) Microscope will decrease but that of telescope will increase

Sol. (4)

$$\text{MP of microscope} = \frac{L}{f_0}\left[1 + \frac{P}{f_e}\right]$$

$$\text{MP of telescope} = \frac{f_0}{f_e}\left[1 + \frac{f_e}{D}\right]$$

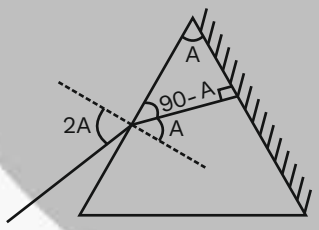
Topic - optics
Concept – ray optics
Subject Concept – prism
Concept Field – refraction
Question Level – easy
Expected time to solve – 40 sec

38. The angle of a prism is A. One of its refracting surfaces is silvered. Light rays falling at an angle of incidence 2A on the first surface returns back through the same path after suffering reflection at the silvered surface. The refractive index μ, of the prism is

(1) $2\sin A$ (2) $2\cos A$ (3) $\frac{1}{2}\cos A$ (4) $\tan A$

Sol. (2)

Normal incidence at silvered surface



$\because \quad \mu = \frac{\sin i}{\sin r}$ so, $\frac{\sin 2A}{\sin A} = \frac{2\sin A\cos A}{\sin A} = 2\cos A$

Topic – EM waves
Concept – photo electric effect
Subject Concept – emission of photo electron
Concept Field – work function
Question Level – easy
Expected time to solve – 40 sec

39. When the energy of the incident radiation is increased by 20%, the kinetic energy of the photoelectrons emitted from a metal surface increased from 0.5 eV to 0.8 eV. The work function of the metal is

(1) 0.65 eV (2) 1.0 eV (3) 1.3 eV (4) 1.5 eV

Sol. (2)

$E = h\nu - \phi$

$\Rightarrow \quad 0.5 = h\nu - \phi$ .....(1)

Again $0.8 = 1.2\ h\nu - \phi$ .....(2)

From equation $(1) \times 1.2 \Rightarrow 0.6 = 1.2\ h\nu - 1.2\ \phi$

Equation (2) $0.8 = 1.2\ h\nu - \phi$

$\quad - \quad - \quad +$

$-0.2 = -0.2\ \phi$

$\phi = 1$ eV

Topic – dual nature of radiation and matter
Concept – matter waves
Subject Concept – de-Broglie wavelength
Concept Field – kinetic energy
Question Level – easy
Expected time to solve – 30 sec

40. If the kinetic energy of the particle is increased to 16 times its previous value, the percentage change in the de-Broglie wavelength of the particle is

(1) 25 (2) 75 (3) 60 (4) 50

Sol. (2)

$$\lambda = \frac{h}{p} = \frac{h}{\sqrt{2mE}} \qquad \left(\because p = \sqrt{2me}\right)$$

$$\lambda' = \frac{h}{\sqrt{2m(16\ E)}} = \frac{\lambda}{4} = 0.25\ \lambda$$

% change = –75%

Topic – modern physics
Concept – atomic physics
Subject Concept – H-atom
Concept Field – spectrum of H-atom
Question Level – easy
Expected time to solve – 45 sec

41. Hydrogen atom in ground state is excited by a monochromatic radiation of $\lambda = 975$ Å . Number of spectral lines in the resulting spectrum emitted will be

(1) 3 (2) 2 (3) 6 (4) 10

Sol. (3)

$$\text{Energy incident} = \frac{hc}{\lambda} = \frac{6.63\times10^{-34}\times3\times10^{8}}{975\times10^{-10}\times1.6\times10^{-19}}\text{eV}$$

$$= 12.75\ \text{eV}$$

The Hydrogen atom will be excited to n = 4

$$\text{Number of spectral lines} = \frac{4(4-1)}{2} = 6$$

Topic – modern physics
Concept – nuclear physics
Subject Concept – binding energy
Concept Field – nuclear reaction
Question Level – easy
Expected time to solve – 40 sec

42. The binding energy per nucleon of $^{7}_{3}Li$ and $^{4}_{2}He$ nuclei are 5.60 MeV and 7.06 MeV, respectively. In the nuclear reaction $^{7}_{3}Li + ^{1}_{1}H \rightarrow ^{4}_{2}He + ^{4}_{2}He + Q$, the value of energy Q released is

(1) 19.6 MeV (2) −2.4 MeV (3) 8.4 MeV (4) 17.3 MeV

Sol. (4)

Q = 2(BE of He) – (BE of Li)

= 2 × (4 × 7.06) – (7 × 5.60)

= 56.48 – 39.2 = 17.3 MeV

Topic – modern physics
Concept – nuclear physics
Subject Concept – nuclear decay
Concept Field – half life
Question Level – easy
Expected time to solve – 35 sec

43. A radio isotope X with a half life 1.4 × 109 years decays of Y which is stable. A sample of the rock from a cave was found to contain X and Y in the ratio 1 : 7. The age of the rock is

(1) 1.96×10^9 years (2) 3.92×10^9 years

(3) 4.20×10^9 years (4) 8.40×10^9 years

Sol. (3)

X : Y = 1 : 7

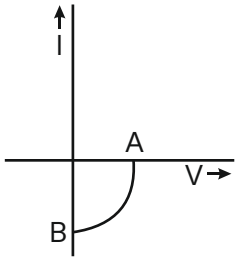
X : (X + Y) = 1 : 8 = $1 : 2^3$

$\Rightarrow$ 3 half life

$\therefore \quad \Delta T = 3 \times 1.4 \times 10^9 \text{ yrs} = 4.2 = 10^9 \text{ yrs}.$

Topic – semiconductor and logic gates
Concept – semiconductor
Subject Concept – diode
Concept Field – solar cell
Question Level – easy
Expected time to solve – 30 sec

44. The given graph represents V – I characteristic for a semiconductor device.



Which of the following statement is correct?

(1) It is V – I characteristic for solar cell where point A represents open circuit voltage and point B short circuit current

(2) It is for a solar cell and points A and B represent open circuit voltage and current, respectively

(3) It is for a photodiode and points A and B represent open circuit voltage and current, respectively

(4) It is for a LED and points A and B represents open circuit voltage and short circuit current respectively

Sol. (1)

Solar cell $\rightarrow$ Open circuit I = 0, potential V = emf

$\rightarrow$ Short circuit I = I, potential V = 0

Topic – semiconductor and logic gates

Concept – semiconductor

Subject Concept – p-n junction diode

Concept Field – barrier potential

Question Level – easy

Expected time to solve – 40 sec

45. The barrier potential of a p-n junction depends on :

a. Type of semiconductor material

b. Amount of doping

c. Temperature

Which one of the following is correct?

(1) a and b only (2) b only (3) b and c only (4) a, b and c

Sol. (4)

It depends on all.

Answer Key

Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A.	**4**	**1**	**4**	**3**	**3**	**1**	**2**	**3**	**4**	**1**	**3**	**1**	**2**	**3**	**4**
Q.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
A.	**1**	**3**	**4**	**2**	**1**	**4**	**3**	**3**	**2**	**4**	**2**	**2**	**3**	**3**	**3**
Q.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
A.	**4**	**4**	**2**	**2**	**4**	**3**	**4**	**2**	**2**	**2**	**3**	**4**	**3**	**1**	**4**

NEET UG 2014 May 4 Chemistry

Question Type: NEET
Difficulty of question : Moderate
Expected time to solve : 20 sec.
Topic : Physical Chemistry
Concept : Atomic Structure

1. What is the maximum number of orbitals that can be identified with the following quantum number n = 3, l = 1, m = 0

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

Sol. (1)

It is 3p orbitals with magnetic Q.N = 0

So, it should be $3p_z$.

Question Type: NEET
Difficulty of question : Moderate
Expected time to solve : 25 sec.
Topic: Physical Chemistry
Concept: Atomic Structure

2. Calculate the energy in corresponding to light of wavelength 45 nm : (Planck's constant h = 6.63×10^{-34} Js: speed of light c = 3×10^8 ms^{-1})

(1) 6.67×10^{15} (2) 6.67×10^{11} (3) 4.42×10^{-15} (4) 4.42×10^{-18}

Sol. (4)

$$sE = \frac{hc}{\lambda} = \frac{6.63 \times 10^{-34} \times 3 \times 10^8}{45 \times 10^{-9}} = 4.4 \times 10^{-18}$$

Question Type: NEET
Difficulty of question : Moderate
Expected time to solve : 25 sec.
Topic: Physical Chemistry
Concept: Mole Concept

3. Equal masses of H_2, O_2 and methane have been taken in a container of volume V at temperature 27°C in identical conditions. The ratio of the volumes of gases H_2 : O_2 : methane would be :

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

Sol. (3)

H_2	O_2	CH_4
2	32	16
$\frac{1}{16}$	1	$\frac{1}{2}$
16	1	2 mole ratio

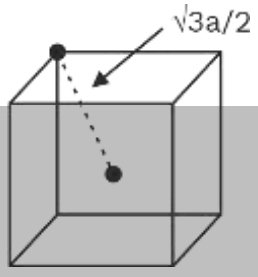
Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.

Topic: Physical Chemistry
Concept: Solid State

4. If a is the length of the side of a cube , the distance between the body centred atom and one corner atom in the cube will be

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

Sol. (4)



Question Type: NEET
Difficulty of question : Easy
Expected time to solve : 20 sec.
Topic : Physical Chemistry
Concept : Surface Chemistry

5. Which property of colloids is not dependent on the charge on colloidal particles ?

(A) Coagulation (B) Electrophoresis
(C) Electro–osmosis (D) Tyndall effect

Sol. (4)

Tyndall effect is due to scattering of light and not due to charge.

Question Type: NEET
Difficulty of question : Easy
Expected time to solve : 20 sec.
Topic : Physical Chemistry
Concept : Ionic Equilibrium

6. Which of the following salts will give highest pH in water ?

(A) KCl (B) NaCl (C) Na_2CO_3 (D) $CuSO_4$

Sol. (3)

Na_2CO_3 is basic due to hydrolysis of CO_3^{2-} ion.

$$CO_3^{2-} + H_2O \rightleftharpoons HCO_3^- + OH^-$$

Question Type: NEET
Difficulty of question: Easy
Expected time to solve: 25 sec.
Topic: Physical Chemistry
Concept: Solution & Colligative Property

7. Of the following 0.10m aqueous solutions, which one will exhibit the largest freezing point depression?

(1) KCl (2) $C_6H_{12}O_6$ (3) $Al_2(SO_4)_3$ (4) K_2SO_4

Sol. (3)

$\Delta T_f = iK_f m$

I is highest for $Al_2(SO_4)_3$

Question Type: NEET
Difficulty of question : Moderate
Expected time to solve : 30 sec.
Topic : Physical Chemistry
Concept : Mole Concept

8. When 22.4 litres of $H_2(g)$ is mixed with 11.2 litres of Cl_2 (g), each at S.T. P. , the moles of HCl (g) formed is equal to :

(1) 1 mol of HCl (g) (2) 2 mol of HCl (g)

(3) 0 .5 mol of HCl (g) (4) 1.5 mol of HCl (g)

Sol. (1)

$$H_2 + Cl_2 \longrightarrow 2HCl$$

22.4 lt 11.2 lt

1 mole $\frac{1}{2}$ mole

Limiting reagent is Cl_2. So, 1 mole HCl is formed.

Question Type: NEET
Difficulty of question : Moderate
Expected time to solve : 35 sec.
Topic : Physical Chemistry
Concept : Electrochemistry

9. When 0.1 mol MnO_4^{2-} is oxidised the quantity of electricity required to completely oxidise MnO_4^{2-} to MnO_4^- is

(1) 96500 C (2) 2 x 96500 C (3) 9650 C (4) 96.50 C

Sol. (3)

$$MnO_4^{2-} \longrightarrow MnO_4^-$$

0.1 mole

v.f. = 1

So, 0.1 mole = 96500 × 0.1

= 9650 C charge is required

Question Type: NEET
Difficulty of question: Hard
Expected time to solve: 40 sec.
Topic: Physical Chemistry
Concept: Thermodynamics & Ionic Equilibrium

10. Using the Gibbs energy change, $\Delta G^\circ = +63.3$kJ,
for the following reaction,
Ag_2CO_3 (g) $\rightleftharpoons$ $2Ag^+$ (aq) + CO_3^{2-} (aq)

the K_{sp} of Ag_2CO_3 (s) in water at 25°C is : (R = 8.314 J K^{-1} mol^{-1})

(1) 3 .2 x 10^{-26} (2) 8 .0 x 10^{-12} (3) 2.9 x 10^{-3} (4) 7.9 x 10^{-2}

Sol. (2)

$\Delta G° = -2.303\ RT \log K_{sp}$

$-11.09 = \log K_{sp}$

$8 \times 10^{-12} = K_{sp}$

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 35 sec.
Topic: Physical Chemistry
Concept: Electrochemistry

11. The weight of silver (at wt. = 108) displaced by a quantity of electricity which displaces 5600 mL of O_2 at STP will be :

(1) 5.4 g (2) 10.8 g (3) 54.0 g (4) 108.0 g

Sol. (4)

$$n_{O_2} = \frac{5600}{22400} = \frac{1}{4}$$

$$\frac{W_{Ag}}{108} \times 1 = \frac{W_{O_2}}{M_{O_2}} \times 4 \qquad (2H_2O \longrightarrow O_2 + 4H^+ + 4e^-)$$

$$\frac{W_{Ag}}{108} = \frac{1}{4} \times 4$$

$$w_{Ag} = 108\ g$$

Question Type: NEET
Difficulty of question: Easy
Expected time to solve: 25 sec.
Topic: Physical Chemistry
Concept: Surface Chemistry

12. Which of the following statements is correct for the spontaneous adsorption of a gas? (1) ΔS is negative and, therefore, ΔH should be highly positive

(2) ΔS is negative and therefore, ΔH should be highly negative

(3) ΔS is positive and, therefore, ΔH should be negative

(4) ΔS is positive and, therefore, ΔH should also be highly positive

Sol. (2)

$\Delta G = \Delta H - T\Delta S$

ΔS = -ve for absorption, so ΔH must be –ve to make $\Delta G = -ve$

$\Delta G = \Delta H - T\Delta S$

Question Type: NEET
Difficulty of question : Easy
Expected time to solve : 25 sec.
Topic : Physical Chemistry
Concept : Chemical Equilibrium

13. For the reversible reaction :

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + Heat$

The equilibrium shifts in forward direction :

(1) By Increasing the concentration of $NH_3(g)$

(2) By decreasing the pressure

(3) By decreasing the concentrations of $N_2(g)$ and $H_2(g)$

(4) By increasing pressure and decreasing temperature

Sol. (4)

According to Le-Chatalier principle.

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 35 sec.
Topic: Physical Chemistry
Concept: Thermodynamics

14. For the reaction: $X_2O_4(l) \longrightarrow 2XO_2(g)$

$\Delta U = 2.1$ k cal, $\Delta S = 20$ cal K^{-1} at 300 K

Hence ΔG is

(1) 2.7 k cal (2) –2.7 k cal (3) 9.3 k cal (4) –9.3 k cal

Sol. (2)

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

$$= 2.1 + \frac{2 \times 2 \times 300}{1000} = 1.2$$

$$\Delta G = \Delta H - T\Delta S$$

$$= 3.3 - 300 \times \frac{26}{1000} = 3.3 - 6 = -2.7 \text{ K cal}$$

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 35 sec.
Topic: Physical Chemistry
Concept: Chemical Equilibrium

15. For a given exothermic reaction, K_P and K'_P are the equilibrium constants at temperatures T_1 and T_2, respectively. Assuming that heat of reaction is constant in temperature range between T_1 and T_2, it is readily observed that

(1) $K_P > K_P'$ (2) $K_P < K_P'$ (3) $K_P = K_P'$ (4) $K_P = \frac{1}{K_P'}$

Sol. (1)

$$\log \frac{K_2}{K_1} = \frac{\Delta H^\circ}{2.303R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

$T_2 > T_1$ So $K_P < K_p'$ (exothermic reaction)

(assuming $T_2 > T_1$. Although it is not mentioned, which temperature is higher If $T_1 > T_2$ then $K_P > K_p'$ then answer should be (2))

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 25 sec.
Topic: Inorganic Chemistry
Concept: Periodic Table

16. Which of the following orders of ionic radii is correctly represented ?

(1) $H^- > H^+ > H$ (2) $Na^+ > F^- > O^{2-}$

(3) $O^{2-} > F^- > Na^+$ (4) $Al^{3+} > Mg^{2+} > N^{3-}$

Sol. (3)

For isoelectronic species/ions, ionic radius increases when anionic charge increases and cationic charge decreases.

Question Type: NEET
Difficulty of question : Moderate
Expected time to solve : 35 sec.
Topic: Physical Chemistry
Concept: Mole Concept

17. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reactant is left in excess and how much?

(At. wt. Mg = 24 ; O = 16)

(1) Mg, 0.16 g (2) O_2, 0.16 g (3) Mg, 0.44 g (4) O_2, 0.28 g

Sol. (1)

$$Mg + \frac{1}{2}O_2 \longrightarrow MgO$$

$$\frac{1.0}{24} \quad \frac{0.56}{32}$$

$$\frac{0.5}{12} \quad \frac{0.07}{4}$$

$$\left(\frac{0.5}{12} - x\right)\left(\frac{0.07}{4} - \frac{x}{2}\right)$$

Oxygen is limiting reagent so $\frac{0.07}{4} - \frac{x}{2} = 0$

$$x = \frac{0.07}{2}$$

$$\text{Excess Mg} = \frac{0.5}{12} - \frac{0.07}{2} \text{ mole}$$

$$\text{mass of Mg is} = 1 - 0.7 \times 12 = 0.16 \text{ gram}$$

Question Type: NEET
Difficulty of question: Easy
Expected time to solve: 25 sec.
Topic: Physical Chemistry
Concept: Redox Reaction

18. The pair of compounds that can exist together is:

(1) $FeCl_3$, $SnCl_2$ (2) $HgCl_2$, $SnCl_2$

(3) $FeCl_2$, $SnCl_2$ (4) $FeCl_3$. KI

Sol. (3)

$FeCl_2$, $SnCl_2$ (both are reducing agent and have lower oxidation no.)

Question Type: NEET
Difficulty of question : Easy
Expected time to solve : 25 sec.
Topic: Physical Chemistry
Concept: Atomic Structure

19. Be^{2+} is isoelectronic with which of the following ions?

(1) H^+ (2) Li^+ (3) Na+ (4) Mg^{2+}

Sol. (2)

$Be^2 = 1s^2 = Li^+$

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 25 sec.
Topic: Inorganic Chemistry
Concept: Chemical Bonding

20. Which of the following molecules has the maximum dipole moment ?

(1) CO_2 (2) CH_4 (3) NH_3 (4) NF_3

Sol. (3)

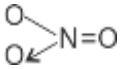
CO_2	CH_4	NH_3	NF_3
$\mu = 0$	$\mu = 0$	$\mu = 1.47D$	$\mu = 0.23D$

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 25 sec.
Topic: Inorganic Chemistry
Concept: Chemical Bonding

21. Which one of the following species has plane triangular shape ?

(1) N_3 (2) NO_3^- (3) NO_2^- (4) CO_2

Sol. (2)



sp_2 (triangular planer)

Question Type: NEET
Difficulty of question: Easy
Expected time to solve: 20 sec.
Topic: Inorganic Chemistry
Concept: p-block

22. Acidity of diprotic acids in aqueous solutions increases in the order

(1) $H_2S < H_2Se < H_2Te$

(2) $H_2Se < H_2S < H_2Te$

(3) $H_2Te < H_2S < H_2Se$

(4) $H_2Se < H_2Te < H_2S$

Sol. (1)

$H_2O < H_2S < H_2Se < H_2Te$ (acidic strength)

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Inorganic Chemistry
Concept: p-block

23. (a) $H_2O_2 + O_3 \rightarrow H_2O + 2O_2$

(b) $H_2O_2 + Ag_2O \rightarrow 2Ag + H_2O + O_2$

Role of hydrogen peroxide in the above reactions is respectively –

(1) Oxidizing in (a) and reducing in (b)

(2) Reducing in (a) and oxidizing in (b)

(3) Reducing in (a) and (b)

(4) Oxidizing in (a) and (b)

Sol. (3)

O_3 is reduced into O^{-2} ion and

Ag_2O is reduced to Ag so

H_2O_2 is reducing agent in both (a) and (b)

Question Type: NEET
Difficulty of question: Easy
Expected time to solve: 25 sec.
Topic: Organic Chemistry
Concept: Chemistry in everyday life

24. Artificial sweetener which is stable under cold conditions only is

(1) Saccharine (2) Sucralose (3) Aspartame (4) Alitame

Sol. (3)

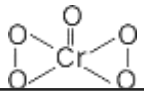
Aspartame is stable at cold conditions abut unstable at cooking temperature.

Question Type: NEET
Difficulty of question: Easy
Expected time to solve: 25 sec.
Topic: Physical Chemistry
Concept: Redox Reaction

25. In acidic medium, H_2O_2 changes $Cr_2O_7^{-2}$ to CrO_5 which has two (–O–O) bonds. Oxidation state of Cr in CrO_5 is

(1) +5 (2) +3 (3) +6 (4) –10

Sol. (3)



Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 25 sec.
Topic: Physical Chemistry
Concept: Redox Reaction

26. The reaction of aqueous $KMnO_4$ with H_2O_2 in acidic conditions gives

(1) Mn^{4+} and O_2 (2) Mn^{2+} and O_2

(3) Mn^{2+} and O_3 (4) Mn^{4+} and MnO_2

Sol. (2)

$$3H_2SO_4 + 2KMnO_4 + 5H_2O_2 \longrightarrow 5O_2 + 2MnSO_4 + 8H_2O + K_2SO_4$$

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Inorganic Chemistry
Concept: Coordination Compound

27. Among the following complexes the one which shows zero crystal field stabilization energy (CFSE) is

(1) $[Mn(H_2O)_6]^{3+}$ (2) $[Fe(H_2O)_6]^{3+}$

(3) $[Co(H_2O)_6]^{2+}$ (4) $[Co(H_2O)_6]^{3+}$

Sol. (2)

$[Fe(H_2O)_6]^{3+}$

$Fe^{+2} = 3d^5 (t_{2g}^{1,1,1} e_g^{1,1})$

So C.F.S.E. is = $[-0.4 \times 3 + 0.6 \times 2]\ \Delta_0 = 0$

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Inorganic Chemistry
Concept: d-block Elements

28. Magnetic moment 2.83 BM is given by which of the following ions?

(At. nos. Ti = 22, Cr = 24, Mn = 25, Ni = 28)

(1) Ti^{3+} (2) Ni^{2+} (3) Cr^{3+} (4) Mn^{2+}

Sol. (2)

$\mu = 2.83$, n = 2

So Ni^{2+} $(3d^8\ 4s^0)$

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Inorganic Chemistry
Concept: Coordination Compound

29. Which of the following complexes is used to be as an anticancer agent?

(1) mer-$[Co(NH_3)_3Cl]$

(2) cis-$[PtCl_2(NH_3)_2]$

(3) cis-$K_2[PtCl_2Br_2]$

(4) Na_2CoCl_4

Sol. (2)

CiS - $[PtCl_2(NH_3)_2]$ known as Cis platin is used as an anticancer agent.

Question Type: NEET
Difficulty of question: Easy
Expected time to solve: 25 sec.
Topic: Inorganic Chemistry
Concept: Periodic Table

30. Reason of lanthanoid contraction is :–

(1) Negligible screening effect of 'f' orbitals

(2) Increasing nuclear charge

(3) Decreasing nuclear charge

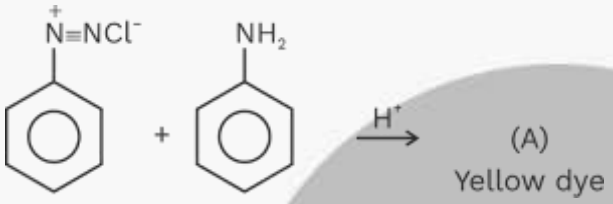
(4) Decreasing screening effect

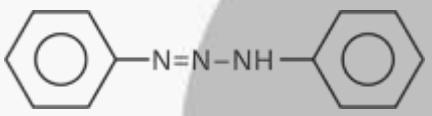
Sol. (1)

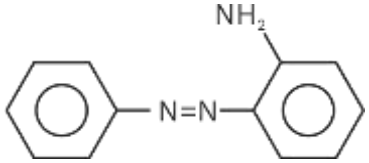
Poor screening effect of f-orbital.

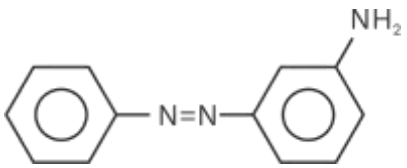
Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 35 sec.
Topic: Organic Chemistry
Concept: N-containing Compounds (Amine)

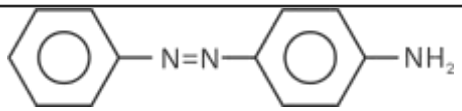
31. In the following reaction, the product (A) is :–



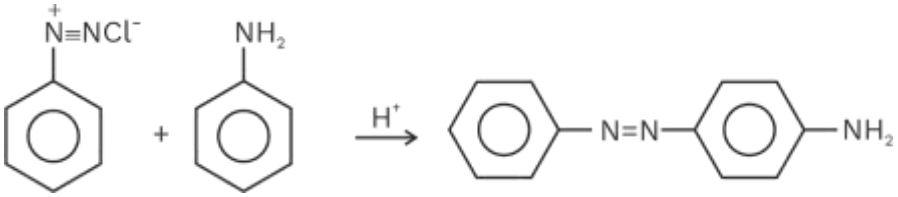
(1) 

(2) 

(3) 

(4) 

Sol. (4)



It is an electrophilic substation reaction.

Coupling reaction of aniline takes place at the para-position to NH_2 group in benezene nucleus gives azodye.

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Organic Chemistry
Concept: N-containing Compounds

32. Which of the following will be most stable diazonium salt $RN_2^+X^-$?

(1) $CH_3N_2X^-$ (2) $C_6H_5N_2^+X^-$

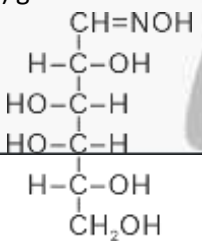
(3) $CH_3CH_2N_2^+X^-$ (4) $C_6H_5CH_2N_2^+X^-$

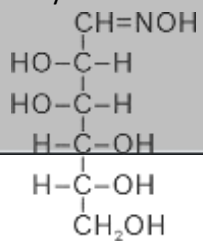
Sol. (2)

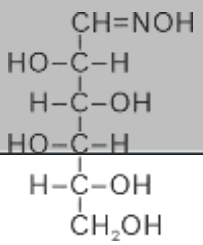
Benzene diazonium chlorides is most stable due to conjugation.

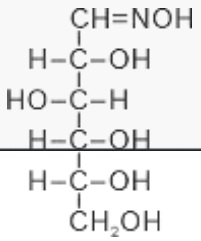
Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 35 sec.
Topic: Organic Chemistry
Concept: Biomoelcules

33. D(+) glucose reacts with hydroxylamine and yields an oxime. The structure of the oxime would be

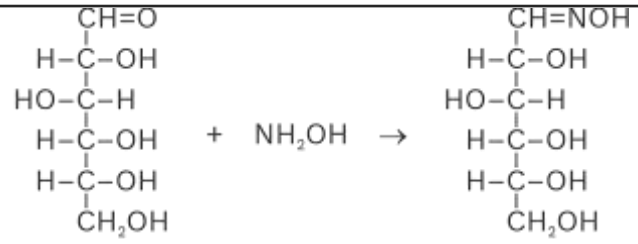
(1) 

(2) 

(3) 

(4) 

Sol. (4)



D(+) glucose Oxime

Question Type: NEET
Difficulty of question : Moderate
Expected time to solve : 25 sec.
Topic: Organic Chemistry
Concept: Biomolecules

34. Which of the following hormones is produced under the condition of stress which stimulates glycogenolysis in the liver of human beings?

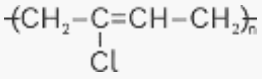
(1) Thyroxin (2) Insulin (3) Adrenaline (4) Estradiol

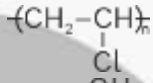
Sol. (3)

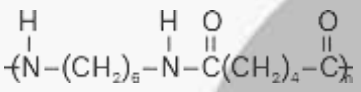
Adrenaline hormone is produced by adrenal glands after receiving a massage from the brain that a stressful situation has presented itself. It is commonly known as fight or flight hormone.

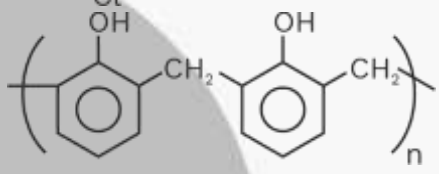
Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Organic Chemistry
Concept: Polymer

35. Which one of the following is an example of a thermosetting polymer?

(1) 

(2) 

(3) 

(4) 

Sol. (4)

(1) Neoprene rubber

(2) PVC is a thermoplastic

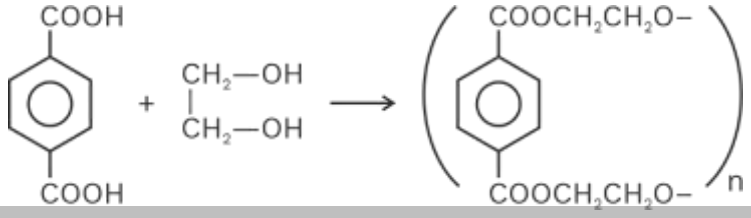
(3) Nylon-6,6 is a fiber

(4) Bakelite is a thermosetting polymer

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Organic Chemistry
Concept: Polymer

36. Which of the following organic compounds polymerizes to form the polyester Dacron? (1) Propylene and para HO – (C_6H_4) – OH
(2) Benzoic acid and ethanol
(3) Terephthalic acid and ethylene glycol
(4) Benzoic acid and para HO – (C_6H_4) – OH

Sol. (3)



Question Type: NEET
Difficulty of question: Easy
Expected time to solve: 20 sec.
Topic: Organic Chemistry
Concept: Environmental Chemistry

37. Which one of the following is not a common component of Photochemical Smog?
(1) Ozone (2) Acrolein
(3) Peroxyacetyl nitrate (4) Chlorofluorocarbons

Sol. (4)

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Organic Chemistry
Concept: Some Basic Principle & Techniq

38. In the Kjeldahl's method for estimation of nitrogen present in a soil sample, ammonia evolved from 0.75 gm of sample neutralized 10 mL of 1 M H_2SO_4, The percentage of nitrogen in the soil is ;
(1) 37.33 (2) 45.33 (3) 35.33 (4) 43.33

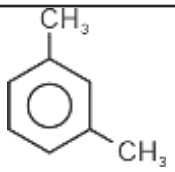
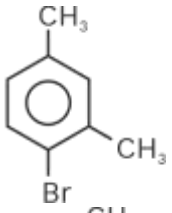
Sol. (1)
Volume of 1 M H_2SO_4 = 10 m mol
Volume of NH_3 consumed = 20 m mol

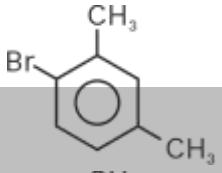
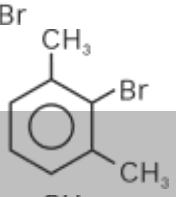
$$\text{Weigth of N} = \frac{14 \times 20}{1000}\text{g} = 0.280\ \text{g}$$

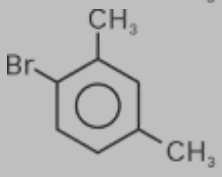
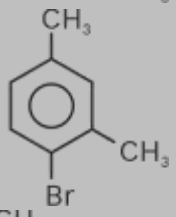
$$\%\text{N} = \frac{0.280}{0.75} \times 100 = 37.33\%$$

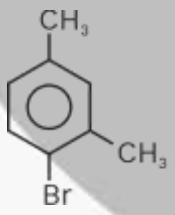
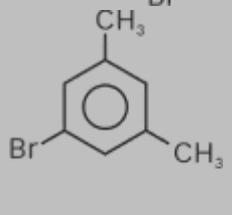
Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 35 sec.
Topic: Organic Chemistry
Concept: Electrophilic Substitution Reaction

39. What products are formed when the following compound is treated with Br_2 in the presence of $FeBr_3$?

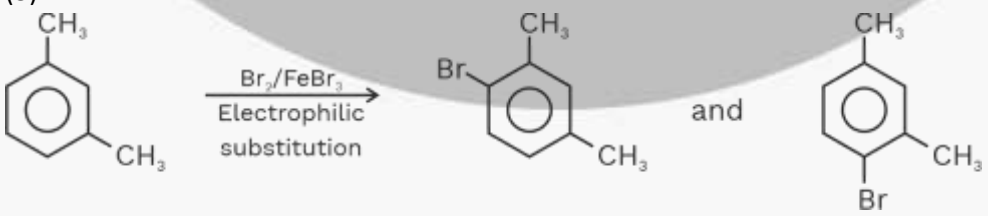
(1)  and 

(2)  and 

(3)  and 

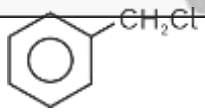
(4)  and 

Sol. (3)

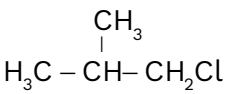


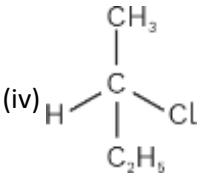
Question Type: NEET
Difficulty of question : Moderate
Expected time to solve :
Topic : Organic Chemistry
Concept : GOC

40. Which of the following compounds will undergo racemisation when solution of KOH hydrolysis?

(i) 

(ii) $CH_3CH_2CH_2Cl$

(iii) 

(iv) 

(1) (i) and (ii) (2) (ii) and (iv) (3) (iii) and (iv) (4) (i) and (iv)

Sol. (Bonus)

Answer is only (iv) but there is no correct option.

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Organic Chemistry
Concept: Alcohol, Phenol, Ether

41. Among the following sets of reactants which one produces anisole ?

(1) CH_3CHO ; RMgX

(2) C_6H_5OH ; NaOH ; CH_3I

(3) C_6H_5OH ; neutral $FeCl_3$

(4) $C_6H_5 - CH_3$; CH_3COCl; $AlCl_3$

Sol. (2)

$$(1)\ CH_3 - CH = O + RMgx \rightarrow CH_3 - \underset{\text{alchol}}{\overset{\overset{R}{|}}{CH}} - OH$$

$$(2)\ C_6H_5 - OH + NaOH \rightarrow C_6H_5 - ONa \xrightarrow[S_N^2]{CH_3Cl} \underset{\text{(Anisole)}}{C_6H_5 - OCH_3} \quad \text{(Williamson's synthesis)}$$

$$(3)\ C_6H_5OH + \text{neutral } FeCl_3 \rightarrow \text{Violet colour complex}$$

$$(4)\ C_6H_5 - CH_3 + CH_3COCl + AlCl_3 \rightarrow \text{Para} - \text{methyl acetophenone}$$

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 25 sec.
Topic: Organic Chemistry
Concept: GOC

42. Which of the following will not be soluble in sodium hydrogen carbonate?

(1) 2, 4, 6-trinitrophenol

(2) Benzoic acid

(3) o-Nitrophenol

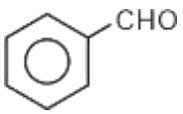
(4) Benzenesulphonic acid

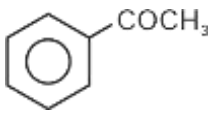
Sol. (3)

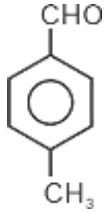
Acids stronger than H_2CO_3 give CO_2 gas with sodium hydrogen carbonate and also soluble in it.

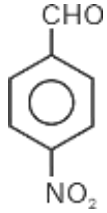
Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 35 sec.
Topic: Organic Chemistry
Concept: GOC & Carbonyl Compound

43. Which one is most reactive towards Nucleophilic addition reaction?

(1) 

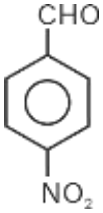
(2) 

(3) 

(4) 

Sol. (4)

Electron withdrawing (-I, -M) groups increases reactivity towards nucleophilic addition reaction.



In NO_2 (-I, -M) group increases reactivity towards nucleophilic addition reaction at CHO group.

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 30 sec.
Topic: Organic Chemistry
Concept: Hydrocarbon (Alkene)

44. Identify Z in the sequence of reactions:

$$CH_3CH_2CH=CH_2 \xrightarrow[H_2O_2]{HBr} Y \xrightarrow{C_2H_5ONa} Z$$

(1) $CH_3-(CH_2)_3-O-CH_2CH_3$

(2) $(CH_3)_2CH_2-O-CH_2CH_3$

(3) $CH_3(CH_2)_4-O-CH_3$

(4) $CH_3CH_2-CH(CH_3)-O-CH_2CH_3$

Sol. (1)

$$CH_3CH_2CH=CH_2 \xrightarrow[H_2O_2]{HBr} CH_3CH_2\underset{H}{\overset{Br}{C}}HCH_2 \xrightarrow{C_2H_5ONa} CH_3-(CH_2)_3-OCH_2CH_3$$

HBr in presence of peroxide gives anti Markovnikoff addition product.

1° alkyl halide on reaction with C_2H_5ONa gives S_N2 reaction.

Question Type: NEET
Difficulty of question: Moderate
Expected time to solve: 25 sec.
Topic: Organic Chemistry
Concept: Hydrocarbon (Alkene)

45. Which of the following organic compounds has same hybridization as its combustion product CO_2 ?

(1) Ethane (2) Ethyne (3) Ethene (4) Ethanol

Sol. (2)

In Ethyne $(CH \equiv CH)$ both carbon atoms are sp hybrid as the hybridisation of combusting product, carbon atom of O=C=O (CO_2)

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 30 secs
Topic: Plant Kingdom
Concept: Division in Plant Kingdom
Sub-concept: Algae
Concept field: Reproduction in Algae

1. Which one of the following shows isogamy with non-flagellated gametes?
(1) *Sargassum* (2) *Ectocarpus* (3) *Ulothrix* (4) *Spirogyra*

Answer (4)

Sol. In *Spirogyra*, gametes are similar in size (isogametes) and non-flagellated (non-motile).

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biological Classification
Concept: Five Kingdom Classification
Sub-concept: Criteria for Classification
Concept field: Criteria for Classification

2. Five kingdom system of classification suggested by R.H. Whittaker is not based on
(1) Presence or absence of a well-defined nucleus
(2) Mode of reproduction
(3) Mode of nutrition
(4) Complexity of body organisation

Answer (1)

Sol. The main criteria for classification used by R.H. Whittaker includes cell structure, body organization, mode of nutrition, reproduction and phylogenetic relationship.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biological Classification
Concept: Kingdom Fungi
Sub-concept: Basidiomycetes
Concept field: Economical Importance of Fungi

3. Which one of the following fungi contains hallucinogens?
(1) *Morchella esculenta* (2) *Amanita muscaria*
(3) *Neurospora* sp. (4) *Ustilago* sp.

Answer (2)

Sol. *Amanita muscaria* is a poisonous mushroom with hallucinogenic properties.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biological Classification
Concept: Kingdom Monera
Sub-concept: Archaebacteria and Eubacteria
Concept field: Archaebacteria and Eubacteria

4. Archaebacteria differ from eubacteria in

(1) Cell membrane structure (2) Mode of nutrition
(3) Cell shape (4) Mode of reproduction

Answer (1)

Sol. Cell membrane of archaebacteria possesses branched lipid chain.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 30 secs
Topic: Plant Kingdom
Concept: Divisions of Plant Kingdom
Sub-concept: Algae
Concept field: Chlorophyceae

5. Which one of the following is wrong about *Chara*?
(1) Upper oogonium and lower round antheridium
(2) Globule and nucule present on the same plant
(3) Upper antheridium and lower oogonium
(4) Globule is male reproductive structure

Answer (3)

Sol. In *Chara* – upper sex organ is nuclule/oogonium.
Lower – sex organ is globule/antheridium.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Plant Kingdom
Concept: Bryophytes
Sub-concept: Mosses
Concept field: Mosses

6. Which of the following is responsible for peat formation?
(1) *Marchantia* (2) *Riccia* (3) *Funaria* (4) *Sphagnum*

Answer (4)

Sol. Mosses like sphagnum produces peat which is used as a fuel.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 30 secs
Topic: Morphology of Flowering Plants
Concept: Flower
Sub-concept: Gynoecium
Concept field: Plantation

7. Placenta and pericarp are both edible portions in
(1) Apple (2) Banana (3) Tomato (4) Potato

Answer (3)

Sol. In tomato, edible part is pericarp and placenta.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Morphology of Flowering Plants
Concept: Flower
Sub-concept: Aestivation
Concept field: Aestivation

8. When the margins of sepals or petals overlap one another without any particular direction, the condition is termed as
(1) Vexillary (2) Imbricate (3) Twisted (4) Valvate

Answer (2)

Sol. Imbricate aestivation is found in *Cassia* and gulmohur.

Class 11th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 30 secs
Topic: Anatomy of Flowering Plants
Concept: Anatomy of Flowering Plants
Sub-concept: Dicto: Root and Stems
Concept field: Dicto: Root and Stems

9. You are given a fairly old piece of dicot stem and a dicot root. Which of the following anatomical structures will you use to distinguish between the two?
(1) Secondary xylem (2) Secondary phloem
(3) Protoxylem (4) Cortical cells

Answer (3)

Sol.
- Protoxylem is used to differentiate between dicto stem and dicot root.
- Protoxylem lies towards the centre (pith) and metaxylem lies towards the periphery in dicot stems (endarch condition).
- Whereas in dicot root, the protoxylem lies towards the periphery and metaxylem lies towards the centre, this condition in exarch.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Morphology of Flowering Plants
Concept: The Seed
Sub-concept: Structure of Monocotyledonous Seed
Concept field: Structure of Monocotyledonous Seed

10. Which one of the following statements is correct?
(1) The seed in grasses is not endospermic
(2) Mango is a parthenocarpic fruit
(3) A proteinaceous aleurone layer is present in maize grain
(4) A sterile pistil is called a staminode

Answer (3)

Sol. In maize grain, a proteinaceous aleurone layer is present.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Anatomy of Flowering Plants
Concept: Permanent Tissues
Sub-concept: Complex Tissues

Concept field: Xylem

11. Tracheids differ from other tracheary elements in

(1) Having casparian strips (2) Being imperforate

(3) Lacking nucleus (4) Being lignified

Answer (2)

Sol. Vessels have perforations through which they are interconnected.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 15 secs
Topic: Morphology of Flowering Plants
Concept: The Root
Sub-concept: Modifications of Root
Concept field: Modifications of Root

12. An example of edible underground stem is

(1) Carrot (2) Groundnut (3) Sweet potato (4) Potato

Answer (4)

Sol. Potato is a modification of stem and it is edible whereas, carrots and sweet potato all modification of roots.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Cell: The Unit of Life
Concept: Prokaryotic Cell
Sub-concept: Mesosomes
Concept field: Mesosomes

13. Which structures perform the function of mitochondria in bacteria?

(1) Nucleoid (2) Ribosomes (3) Cell wall (4) Mesosomes

Answer (4)

Sol. Mesosomes perform the function of mitochondria like respiration and secretion process in bacteria.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 40 secs
Topic: Locomotion and Movement
Concept: Muscle
Sub-concept: Structure of Contractile Proteins
Concept field: Structure of Contractile Proteins

14. The solid linear cytoskeletal elements having a diameter of 6 nm and made up of a single type of monomer are known as

(1) Microtubules (2) Microfilaments

(3) Intermediate filaments (4) Lamins

Answer (2)

Sol. Microfilaments are polymers of actin proteins of approximately 8 nm in diameter.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Transport in Plants
Concept: Water Transport in Plants

Sub-concept: Plasmolysis
Concept field: Plasmolysis

15. The osmotic expansion of a cell kept in water is chiefly regulated by
(1) Mitochondria (2) Vacuoles (3) Plastids (4) Ribosomes

Answer (2)

Sol. Vacuoles in a cell help in osmotic regulation.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Cell Cycle and Cell Division
Concept: Cell Cycle
Sub-concept: Interphase and M Phase
Concept field: M Phase

16. During which phase(s) of cell cycle, amount of DNA in a cell remains at 4C level if the initial amount is denoted as 2C?
(1) G_0 and G_1 (2) G_1 and S (3) Only G_2 (4) G_2 and M

Answer (3)

Sol. DNA of both levels 2C and 4C are found in M phase.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 40 secs
Topic: Cell: The Unit of Life
Concept: Eukaryotic Cell
Sub-concept: Eukaryotic Cell Organelles
Concept field: Eukaryotic Cell Organelles

17. Match the following and select the correct answer

Column I	Column II
a. Centriole	(i) Infoldings in mitochondria
b. Chlorophyll	(ii) Thylakoids
c. Cristae	(iii) Nucleic acids
d. Ribozymes	(iv) Basal body cilia or flagella

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

Answer (1)

Sol. Ribozyme is an enzyme containing RNA. Cristae is infoldings in mitochondria.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 35 secs
Topic: Plant Growth and Development
Concept: Plant Growth Regulators
Sub-concept: Discovery of PGRs
Concept field: Discovery of PGRs

18. Dr. F. Went noted that if coleoptile tips were removed and placed on agar for one hour, the agar would produce a bending when placed on one side of freshly cut coleoptile stumps. What significance is this experiment of?
(1) It made possible the isolation and exact identification of auxin.

(2) It is the basis for quantitative determination of small amounts of growth-promoting substances.
(3) It supports the hypothesis that IAA is auxin.
(4) It demonstrated polar movement of auxins.

Answer (1)

Sol. Auxin was isolated by F.W. went from *Avena* coleoptile tip.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 30 secs
Topic: Mineral Nutrition
Concept: Essential Mineral Elements
Sub-concept: Deficiency Symptoms of Essential Elements
Concept field: Deficiency Symptoms of Essential Elements

19. Deficiency symptoms of nitrogen and potassium are visible first in

(1) Senescent leaves (2) Young leaves
(3) Roots (4) Buds

Answer (1)

Sol. Deficiency symptoms of nitrogen and potassium are visible first in senescent leaves.

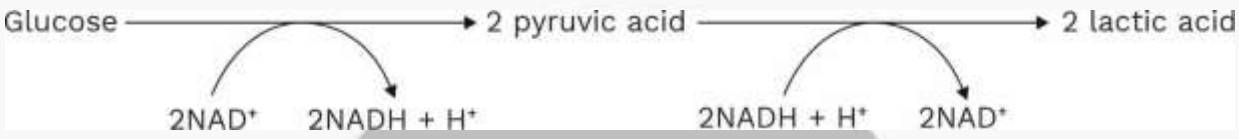
Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Respiration
Concept: Fermentation
Sub-concept: Production of Fermentation
Concept field: Production of Fermentation

20. In which one of the following processes CO_2 is not released?

(1) Aerobic respiration in plants (2) Aerobic respiration in animals
(3) Alcoholic fermentation (4) Lactate fermentation

Answer (4)

Sol. CO_2 is not released in lactate fermentation.



Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 15 secs
Topic: Photosynthesis in Higher Plants
Concept: Types of Photosynthesis
Sub-concept: Types of Photosynthesis
Concept field: Types of Photosynthesis

21. Anoxygenic photosynthesis is characteristic of

(1) *Rhodospirillum* (2) *Spirogyra*
(3) *Chlamydomonas* (4) *Ulva*

Answer (1)

Sol. Anoxygenic photosynthesis is characteristic feature of *Rhodospirillum.*

Class 11th
Question type: AIPMT
Difficulty of question: Moderate

Expected time to solve: 30 secs
Topic: Plant Growth and Development
Concept: Photoperiodism
Sub-concept: Effect of Light on Plant
Concept field: Effect of Light on Plant

22. A few normal seedlings of tomato were kept in a dark room. After a few days they were found to have become white-coloured like albinos. Which of the following terms will you use to describe them?
(1) Mutated (2) Embolised (3) Etiolated (4) Defoliated

Answer (3)

Sol. When plant is placed in dark for about 36 hours, depigmentation takes place which is known as etiolation.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Plant Growth and Development
Concept: Plant Growth Inhibitors
Sub-concept: ABA
Concept field: ABA

23. Which one of the following growth regulators is known as 'stress hormone'?
(1) Abscisic acid (2) Ethylene (3) GA_3 (4) Indole acetic acid

Answer (1)

Sol. ABA (abscisic acid) is commonly called as stress hormone.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Sexual Reproduction in Flowering Plants
Concept: Pollination
Sub-concept: Kinds of Pollination
Concept field: Geitonogamy

24. Geitonogamy involves
(1) Fertilisation of a flower by the pollen from another flower of the same plant
(2) Fertilization of a flower by the pollen from the same flower
(3) Fertilization of a flower by the pollen from a flower of another plant in the same population
(4) Fertilisation of a flower by the pollen from a flower of another plant belonging to a distant population

Answer (1)

Sol. Transfer of pollen grains from anther to stigma of another flower of same plant is called as Geitonogamy.

Class 11th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 30 secs
Topic: Plant Kingdom
Concept: Divisions in Plant Kingdom
Sub-concept: Pteridophytes and Angiosperms
Concept field: Pteridophytes and Angiosperms

25. Male gametophyte with least number of cells is present in
(1) *Pteris* (2) *Funaria* (3) *Lilium* (4) *Pinus*

Answer (3)

Sol. *Lilium* (angiosperm) has male gametophyte with least number of cells.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Morphology of Flowering Plants
Concept: Fruit
Sub-concept: Aggregate Fruit
Concept field: Aggregate Fruit

26. An aggregate fruit is one which develops from
(1) Multicarpellary syncarpous gynoecium
(2) Multicarpellary apocarpus gynoecium
(3) Complete inflorescence
(4) Multicarpellary superior ovary

Answer (2)
Sol. Aggregate fruits develop from multicarpellary apocarpus gynoecium.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Sexual Reproduction in Flowering Plants
Concept: Stamen, Microsporangium and Pollen Grain
Sub-concept: Pollen Grain
Concept field: Pollen Products

27. Pollen tablets are available in the market for
(1) *In vitro* fertilization
(2) Breeding programmes
(3) Supplementing food
(4) *Ex situ* conservation

Answer (3)
Sol. Pollen grains are used as pollen tablets for supplementing food.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Sexual Reproduction in Plants
Concept: Pistil, Ovule and Embryo Sac
Sub-concept: Female Gametophyte
Concept field: Female Gametophyte

28. Function of filiform apparatus is to
(1) Recognize the suitable pollen at stigma
(2) Stimulate division of generative cell
(3) Produce nectar
(4) Guide the entry of pollen tube

Answer (4)
Sol. Filiform apparatus helps the pollen grain by guiding the pollen tube into the synergid.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 30 secs
Topic: Sexual Reproduction in Flowering Plants
Concept: Post Fertilization Structures and Events
Sub-concept: Seed

Concept field: Albuminous and Non-albuminous Seeds

29. Non-albuminous seed is produced in

(1) Maize (2) Castor (3) Wheat (4) Pea

Answer (4)

Sol. Non albuminous seed is produced in pea.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biological Classification
Concept: Virus, Viroids, Prions and Lichens
Sub-concept: Virus Structure
Concept field: Virus Structure

30. Which of the following shows coiled RNA strand and capsomeres?

(1) Polio virus (2) Tobacco mosaic virus
(3) Measles virus (4) Retrovirus

Answer (2)

Sol. Tobacco mosaic virus shows coiled RNA strand and capsomere.

Class 11th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 30 secs
Topic: Molecular Basis of Inheritance
Concept: Regulation of Gene Expression
Sub-concept: The Lac Operon
Concept field: The Lac Operon

31. Which one of the following is wrongly matched?

(1) Transcription-Writing information from DNA to t-RNA
(2) Translation-Using information in m-RNA to make protein
(3) Repressor protein-Binds to operator to stop enzyme synthesis
(4) Operon-Structural genes, operator and promoter

Answer (4)

Sol. Operon includes a regulator gene, promoter gene, operator gene and structural gene.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Molecular Basis of Inheritance
Concept: The Search for Genetic Material
Sub-concept: Transforming Principle
Concept field: Transforming Principle

32. Transformation was discovered by

(1) Meselson and Stahl (2) Hershey and Chase
(3) Griffith (4) Watson and Crick

Answer (3)

Sol. Fredrick Griffin 1928, performed transformation experiment on *Streptococcus pneumoniae*.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 20 secs
Topic: Principles of Inheritance and Variation

Concept: Inheritance of Two Genes
Sub-concept: Epistatic Effect
Concept field: Dominant Epistasis

33. Fruit colour in squash is an example of
(1) Recessive epistasis (2) Dominant epistasis
(3) Complementary genes (4) Inhibitory genes

Answer (2)

Sol. Fruit colour in squash is an example of dominant epistasis.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Biological Classification
Concept: Viruses, Viroids and Lichens
Sub-concept: Structure of Virus
Concept field: Structure of Virus

34. Viruses have
(1) DNA enclosed in a protein coat (2) Prokaryotic nucleus
(3) Single chromosome (4) Both DNA and RNA

Answer (1)

Sol. Viruses have DNA enclosed in a protein covering.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biotechnology and its Applications
Concept: Biotechnology Applications in Medicine
Sub-concept: Genetically Engineered Insulin
Concept field: Genetically Engineered Insulin

35. The first human hormone produced by recombinant DNA technology is
(1) Insulin (2) Estrogen (3) Thyroxin (4) Progesterone

Answer (1)

Sol. Insulin is the first hormone produced by recombinant DNA technology.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biotechnology: Principles and Processes
Concept: Processes of Recombinant DNA Technology
Sub-concept: Amplification of Gene of Interest
Concept field: Amplification of Gene of Interest

36. An analysis of chromosomal DNA using the southern hybridisation technique does not use
(1) Electrophoresis (2) Blotting
(3) Autoradiography (4) PCR

Answer (4)

Sol. PCR (polymerase chain reaction) is a technique for DNA amplification.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biotechnology: Principles and Processes

Concept: Processes of Recombinant DNA Technology
Sub-concept: Amplification of Gene of Interest by using PCR
Concept field: Amplification of Gene of Interest by using PCR

37. In vitro clonal propagation in plants is characterized by
(1) PCR and RAPD (2) Northern blotting
(3) Electrophoresis and HPLC (4) Microscopy

Answer (1)

Sol. PCR and RAPD are used in in-nitro clonal propagation in plants.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Plant Kingdom
Concept: Algae
Sub-concept: Chlorophyceae
Concept field: Uses of Green Algae

38. An alga which can be employed as food for human being is
(1) *Ulothrix* (2) *Chlorella* (3) *Spirogyra* (4) *Polysiphonia*

Answer (2)

Sol. *Chlorella* is rich in proteins. Due to this property, it is used as food supplement even by space travellers.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biotechnology: Principles and Processes
Concept: Tools of Recombinant DNA Technology
Sub-concept: Cloning Vectors
Concept field: Cloning Vectors

39. Which vector can clone only a small fragment of DNA?
(1) Bacterial artificial chromosome (2) Yeast artificial chromosome
(3) Plasmid (4) Cosmid

Answer (3)

Sol. Plasmid can clone a small fragment of DNA about 10 kbp size.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Biodiversity and Conservation
Concept: Conservation
Sub-concept: Conservation Techniques
Concept field: *Ex-situ* and *In-situ* Conservation

40. An example of ex situ conservation is
(1) National Park (2) Seed Bank
(3) Wildlife Sanctuary (4) Sacred Grove

Answer (2)

Sol. Seed bank is an example of *ex-situ* conservation. Where the seeds are preserved outside their habitat.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 30 secs

Topic: Biological Classification
Concept: Viruses, Viroids and Lichens
Sub-concept: Lichens
Concept field: Lichens

41. A location with luxuriant growth of lichens on the trees indicates that the

(1) Trees are very healthy
(2) Trees are heavily infested
(3) Location is highly polluted
(4) Location is not polluted

Answer (4)

Sol. Lichens are great indicators of SO_2 pollution. They don't go in such polluted areas.

Class 12th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 40 secs
Topic: Ecosystem
Concept: Structure
Sub-concept: Function
Concept field: Function

42. Match the following and select the correct option

(a) Earthworm
(b) Succession
(c) Ecosystem service
(d) Population growth

(i) Pioneer species
(ii) Detritivore
(iii) Natality
(iv) Pollination

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

Answer (4)

Sol.
- Earthworm is detrivore in nature.
- Pioneer species is a part of succession.
- Pollination is a service provided by the ecosystem.
- Natality is the ratio of live births to the total population of that area is natality which falls under population growth.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Biodiversity and Conservation
Concept: Loss of Biodiversity
Sub-concept: Categories
Concept field: Categories

43. ~~A species facing extremely high risk of extinction in the immediate future is called~~

(1) Vulnerable
(2) Endemic
(3) Critically Endangered
(4) Extinct

Answer (3)

Sol. An IUCN Red List critically endangered species is one that has been categorised by the International Union for Conservation of Nature as facing an extremely high risk of extinction in the wild.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Environmental Issues

Concept: Air Pollution and its Control
Sub-concept: Ozone Depletion in the Stratosphere
Concept field: Stratosphere

44. The zone of atmosphere in which the ozone layer is present is called
(1) Ionosphere (2) Mesosphere (3) Stratosphere (4) Troposphere

Answer (3)
Sol. Ozone layer is present in stratosphere.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Biodiversity and Conservation
Concept: Biodiversity
Sub-concept: Loss of Biodiversity
Concept field: IUCN

45. The organization which publishes the Red List of species is
(1) ICFRE (2) IUCN (3) UNEP (4) WWF

Answer (2)
Sol. IUCN publish the Red List.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Animal Kingdom
Concept: Classification of Animals
Sub-concept: Phylum Distribution
Concept field: Phylum Cnidaria

46. Select the Taxon mentioned that represents both marine and freshwater species
(1) Echinoderms (2) Ctenophora
(3) Cephalochordata (4) Cnidaria

Answer (4)
Sol. Cnidaria represents both marine and freshwater species.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Animal Kingdom
Concept: Classification of Animals
Sub-concept: Phylum-Coelenterate (Cnidaria)
Concept field: Sea-Fern

47. Which one of the following living organisms completely lacks a cell wall?
(1) Cyanobacteria (2) Sea - fan (*Gorgonia*)
(3) *Saccharomyces* (4) Blue - green algae

Answer (2)
Sol. *Gorgonia* completely lacks a cell wall.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Animal Kingdom
Concept: Classification of Animals
Sub-concept: Phylum-Platyhelminthes

Concept field: *Planaria*

48. *Planaria* possess high capacity of

(1) Metamorphosis (2) Regeneration

(3) Alternation of generation (4) Bioluminescence

Answer (2)

Sol. *Planaria* possess high capacity of regeneration.

Class 11th

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 20 secs

Topic: Animal Kingdom

Concept: Classification of Animals

Sub-concept: Phylum-Chordata

Concept field: *Torpedo*

49. A marine cartilaginous fish that can produce electric current is

(1) *Pristis* (2) *Torpedo* (3) *Trygon* (4) *Scoltodon*

Answer (2)

Sol. *Torpedo* also called (electric ray) is a marine cartilaginous fish and it can produce electric current.

Class 11th

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Structural Organisation in Animals

Concept: Animal Tissue

Sub-concept: Connective Tissue

Concept field: Areolar Tissue

50. Choose the correctly matched pair

(1) Tendon - Specialized connective tissue

(2) Adipose tissue - Dense connective tissue

(3) Areolar tissue - Loose connective tissue

(4) Cartilage - Loose connective tissue

Answer (3)

Sol.

- Tendon is a touch band of fibrous connective tissue that connects muscle to bone.
- Adipose tissue is group of fat-cell present in body in stored form.
- Areolar tissue is loose connective tissue.
- Cartilage – It is firm, flexible connective tissue found in various forms in the larynx and respiratory tract.

Class 11th

Question type: AIPMT

Difficulty of question: Difficult

Expected time to solve: 30 secs

Topic: Structural Organisation in Animals

Concept: Animal Tissue

Sub-concept: Epithelial Tissue

Concept field: Cuboidal Epithelium

51. Choose the correctly matched pair:

(1) Inner lining of salivary ducts – Ciliated epithelium

(2) Moist surface of buccal cavity-Glandular epithelium

(3) Tubular parts of nephrons-Cuboidal epithelium

(4) Inner surface of bronchioles-Squamous epithelium

Answer (3)

Sol. Cuboidal epithelium is present in tubular parts of nephrons and plays an important role in secretion and absorption.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Cell Cycle and Cell Division
Concept: Phases of Cell Cycle
Sub-concept: Mitosis
Concept field: S Phases

52. In 'S' phase of the cell cycle
(1) Amount of DNA doubles in each cell
(2) Amount of DNA remains same in each cell
(3) Chromosome number is increased
(4) Amount of DNA is reduced to half in each cell

Answer (1)
Sol. Amount of DNA doubles in each cell in S-phase of cell cycle.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Biological Classification
Concept: Kingdom Monera
Sub-concept: Eubacteria
Concept field: Structure

53. The motile bacteria are able to move by
(1) Fimbriae (2) Flagella (3) Cilia (4) Pili

Answer (2)
Sol. Flagella helps in providing motility to bacteria.

Class 11th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 40 secs
Topic: Biomolecules
Concept: How to Analyse Chemical Composition
Sub-concept: Enzymes
Concept field: Succinic Dehydrogenase

54. Select the option which is not correct with respect to enzyme action
(1) Substrate binds with enzyme at its active site
(2) Addition of lot of succinate does not reverse the inhibition of succinic dehydrogenase by malonate
(3) A non-competitive inhibitor binds the enzyme at a site distinct from that which binds the substrate
(4) Malonate is a competitive inhibitor of succinic dehydrogenase

Answer (2)
Sol. Inhibition of succinic dehydrogenase by malonate (resembles the substrate succinate structure) is an example of competitive inhibition.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Biomolecules

Concept: How to Analyse Chemical Composition
Sub-concept: Carbohydrates
Concept field: Non-Reducing Carbohydrates

55. Which one of the following is a non-reducing carbohydrate?
(1) Maltose (2) Sucrose (3) Lactose (4) Ribose 5-phosphate

Answer (2)

Sol. Sucrose is a non-reducing sugar since its chemical structure doesn't allow certain organic compounds to form a hemiacetal.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Cell Cycle and Cell Division
Concept: Cell Cycle
Sub-concept: Meiosis-I
Concept field: Pachytene

56. The enzyme recombinase is required at which stage of meiosis?
(1) Pachytene (2) Zygotene (3) Diplotene (4) Diakinesis

Answer (1)

Sol. Recombinase is required at pachytene stage of meiosis.

Class 11th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Digestion and Absorption
Concept: Digestive System
Sub-concept: Digestion of Food
Concept field: Digestion of Milk in Infant

57. The initial step in the digestion of milk in humans is carried out by?
(1) Lipase (2) Trypsin (3) Rennin (4) Pepsin

Answer (3)

Sol. Renin helps in initial step in the digestion of milk in humans.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Digestion and Absorption
Concept: Digestion of Food
Sub-concept: Absorption of Digested Products
Concept field: Different Organs

58. Fructose is absorbed into the blood through mucosa cells of intestine by the process called
(1) Active transport (2) Facilitated transport
(3) Simple diffusion (4) Co-transport mechanism

Answer (2)

Sol. Fructose is absorbed by fascinated transport.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Breathing and Exchange of Gases
Concept: Exchange of Gases

Sub-concept: Transport of Carbon Dioxide
Concept field: Bicarbonate Ions

59. Approximately seventy percent of carbon-dioxide absorbed by the blood will be transported to the lungs
(1) As bicarbonate ions
(2) In the form of dissolved gas molecules
(3) By binding to R.B.C.
(4) As carbamino-haemoglobin

Answer (1)

Sol. 70% of CO_2 absorbed by blood will be transported to the lungs as bicarbonate ions.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Body Fluid and Circulation
Concept: Blood
Sub-concept: Blood Groups
Concept field: Blood Group AB

60. Person with blood group AB is considered as universal recipient because he has
(1) Both A and B antigens on RBC but no antibodies in the plasma
(2) Both A and B antibodies in the plasma
(3) No antigen on RBC and no antibody in the plasma
(4) Both A and B antigens in the plasma but no antibodies

Answer (1)

Sol. Person with blood group AB will not have any antibodies for blood group A or B in his plasma, therefore considered universal recipient.

Class 11th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 30 secs
Topic: Neural Control and Coordination
Concept: Human Neural System
Sub-concept: Autonomic Neural System
Concept field: Parasympathetic Neural System

61. How do parasympathetic neural signals affect the working of the heart?
(1) Reduce both heart rate and cardiac output
(2) Heart rate is increased without affecting the cardiac output
(3) Both heart rate and cardiac output increase
(4) Heart rate decreases but cardiac output increases

Answer (1)

Sol. Parasympathetic neural signals slow down the working of heart. It reduces both heart rate and cardia output.

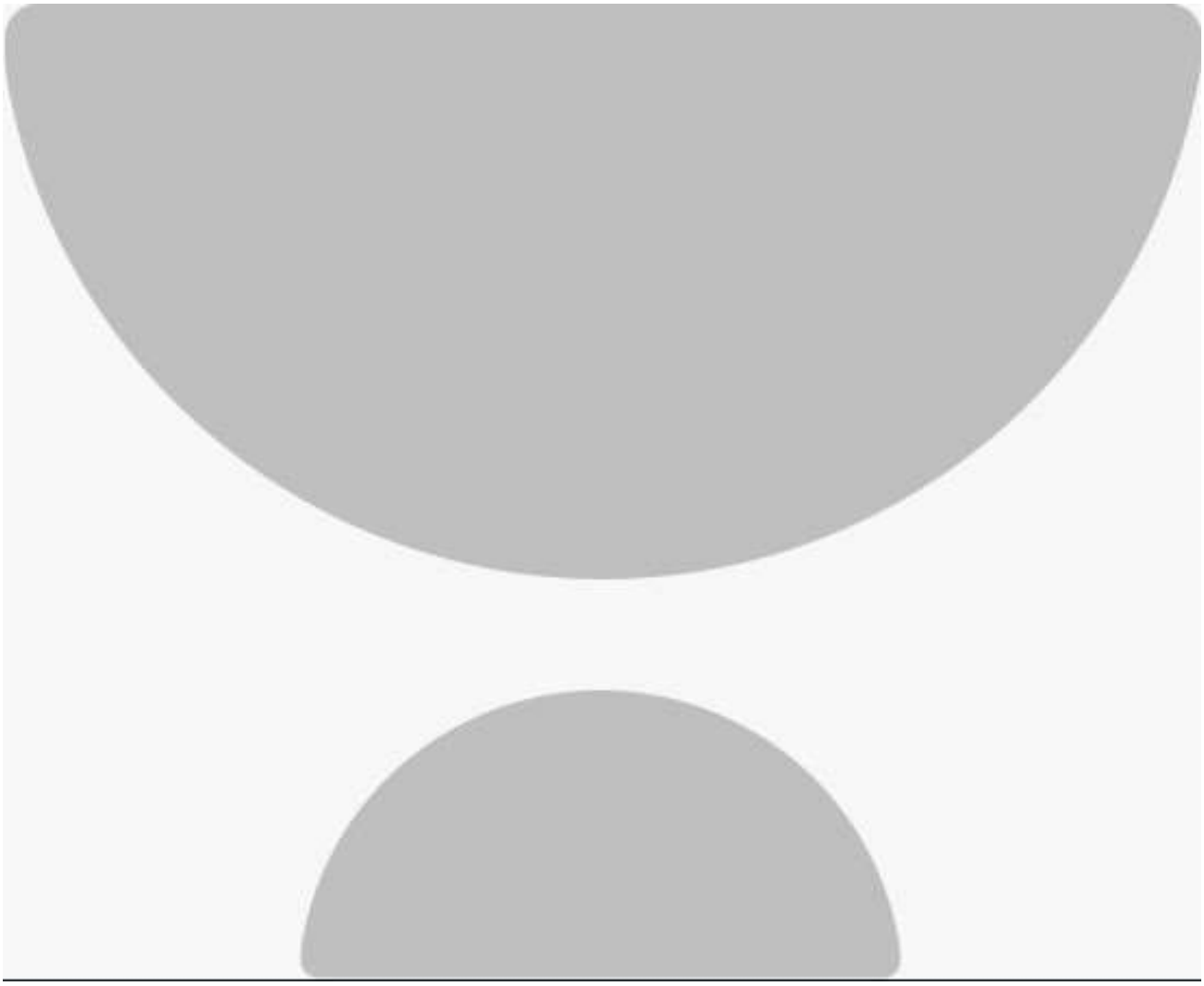
Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 40 secs
Topic: Excretory Products and their Elimination
Concept: Human Excretory System
Sub-concept: Function of the Tubule
Concept field: DCT

62. Which of the following causes an increase in sodium reabsorption in the distal convoluted tubule?
(1) Increase in aldosterone levels (2) Increase in antidiuretic hormone levels

(3) Decrease in aldosterone levels (4) Decrease in antidiuretic hormone levels

Answer (1)

Sol. Increase in aldosterone levels leads to an increase in sodium reabsorption in DCT of nephron.



Class 11th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 45 secs
Topic: Locomotion and Movement
Concept: Skeletal System
Sub-concept: Joints of Hand
Concept field: Joints in Carpals – Gliding Joint

63. Select the correct matching of the type of the joint with the example in human skeletal system:

Type of joint	Example
(1) Cartilaginous joint	between frontal and pariental
(2) Pivot joint	between third and fourth cervical vertebrae
(3) Hinge joint	between humerus and pectoral girdle
(4) Gliding joint	between carpals

Answer (4)
Sol. Gliding joint is between carpals.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Neural Control and Coordination
Concept: Neuron as Structural Functional Unit of Neural System
Sub-concept: Generation and Conduction of Nerve Impulse
Concept field: Impulse Conduction

64. Stimulation of a muscle fibre by a motor neuron occurs at
(1) The neuromuscular junction (2) The transverse tubules
(3) The myofibril (4) The sacroplasmic reticulum

Answer (1)
Sol. A neuromuscular junction is a chemical synapse between a motor neuron and a muscle fibre.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Neural Control and Coordination
Concept: Central Neural System
Sub-concept: Forebrain
Concept field: Hypothalamus

65. Injury localized to the hypothalamus would most likely disrupt
(1) Short term memory
(2) Co-ordination during locomotion
(3) Executive function, such as decision making
(4) Regulation of body temperature

Answer (4)
Sol. Hypothalamus is a portion of the brain that regulates body temperature, thirst, appetite, emotions, sleep, wake cycle etc.

Class 11th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 35 secs
Topic: Neural Control and Coordination
Concept: Sensory Reception and Processing

Sub-concept: Eye
Concept field: Derivative of Retinal

66. Which one of the following statements is not correct?
(1) Retinal is the light absorbing portion of visual photo pigments
(2) In retina the rods have the photopigment rhodopsin while cones have three different photopigments
(3) Retinal is a derivative of vitamin C
(4) Rhodopsin is the purplish red protein present in rods only

Answer (3)

Sol. Retinal is a derivative of vitamin A.

Class 11th
Question type: AIPMT
Difficulty of question: Different
Expected time to solve: 45 secs
Topic: Chemical Coordination and Integration
Concept: Human Endocrine System
Sub-concept: Pineal Gland
Concept field: Melanin

67. Identify the hormone with its correct matching of source and function
(1) Oxytocin - posterior pituitary, growth and maintenance of mammary glands
(2) Melatonin - pineal gland, regulates the normal rhythm of sleepwake cycle
(3) Progesterone - corpus-luteum, stimulation of growth and activities of female secondary sex organs
(4) Atrial natriuretic factor - ventricular wall increases the blood pressure

Answer (2)

Sol. Melatonin is a hormone secreted by the pineal gland which inhibits melanin formation regulates the normal rhythm.

Class 11th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 40 secs
Topic: Chemical Coordination and Integration
Concept: Human Endocrine System
Sub-concept: Adrenal Gland
Concept field: Adrenaline Hormone

68. Fight-or-flight reactions cause activation of
(1) The parathyroid glands, leading to increased metabolic rate
(2) The kidney, leading to suppression of reninangiotensin-aldosterone pathway
(3) The adrenal medulla, leading to increased secretion of epinephrine and norepinephrene
(4) The pancreas leading to a reduction in the blood sugar levels

Answer (3)

Sol. Adrenaline (fight or flight hormone) is released from adrenal medulla and leads to secretion of epinephrin and norepinephrine.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Human Reproduction
Concept: The Male Reproductive System
Sub-concept: Parts of Male Reproductive System
Concept field: Urethra

69. The shared terminal duct of the reproductive and urinary system in the human male is

(1) Urethra (2) Ureter (3) Vas deferens (4) Vasa efferentia

Answer (1)

Sol. Urethra serves for both, urinary as well as reproductive duct.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Human Reproduction
Concept: The Female Reproductive System
Sub-concept: Menstrual Cycle
Concept field: Progesterone

70. The main function of mammalian corpus luteum is to produce

(1) Estrogen only (2) Progesterone
(3) Human chorionic gonadotropin (4) Relaxin only

Answer (2)

Sol. Corpus luteum produces progesterone.

Class 12th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 45 secs
Topic: Human Reproduction
Concept: The Female Reproductive System
Sub-concept: Placenta
Concept field: Placental Hormones

71. Select the correct option describing gonadotropin activity in a normal pregnant female

(1) High level of FSH and LH stimulates the thickening of endometrium
(2) High level of FSH and LH facilitate implantation of the embryo
(3) High level of hCG stimulates the synthesis of estrogen and progesterone
(4) High level of hCG stimulates the thickening of endometrium

Answer (3)

Sol. High level of hCG stimulates the synthesis of estrogen and progesterone.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Human Reproduction
Concept: The Male Reproductive System
Sub-concept: Tubectomy
Concept field: Vas Deferens

72. Tubectomy is a method of sterilization in which

(1) Small part of the fallopian tube is removed or tied up
(2) Ovaries are removed surgically
(3) Small part of vas deferens is removed or tied up
(4) Uterus is removed surgically

Answer (1)

Sol. Tubectomy is a surgical procedure in which small part of vas deferens is removed and tied up.

Class 12th
Question type: AIPMT

Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Reproductive Health
Concept: Population Stabilisation and Birth Control
Sub-concept: IUDs
Concept field: LNG-20

73. Which of the following is a hormone releasing Intra Uterine Device (IUD)?
(1) Multiload 375 (2) LNG-20 (3) Cervical cap (4) Vault

Answer (2)

Sol. LNG-20 is a hormone releasing IUD.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 25 secs
Topic: Reproductive Health
Concept: Infertility
Sub-concept: IVF
Concept field: ZIFT

74. Assisted reproductive technology, IVF involves transfer of
(1) Ovum into the fallopian tube
(2) Zygote into the fallopian tube
(3) Zygote into the uterus
(4) Embryo with 16 blastomeres into the fallopian tube

Answer (2)

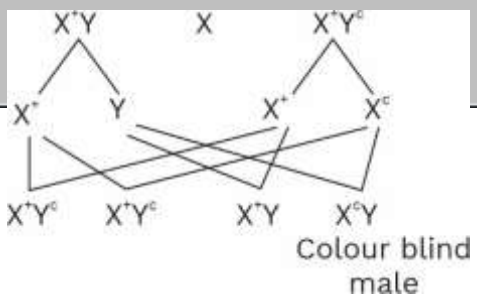
Sol. ART is IVF involves transfer of zygote into fallopian tube.

Class 12th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 40 secs
Topic: Principles of Inheritance and Variation
Concept: Mendel's Law of Inheritance
Sub-concept: Genetic Disorders
Concept field: Mendelian Disorder – Colour Blindness

75. A man whose father was colour blind marries a woman who had a colour blind mother and normal father. What percentage of male children of this couple will be colour blind?
(1) 25% (2) 0% (3) 50% (4) 75%

Answer (3)

Sol.



∴ Probability of colour blind male = 50%

Class 12th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 40 secs
Topic: Evolution

Concept: Hardy – Weinberg Principle
Sub-concept: Frequency of Allele
Concept field: Calculation

76. In a population of 1000 individuals 360 belong to genotype AA, 480 to Aa and the remaining 160 to aa. Based on this data, the frequency of allele A in the population is

(1) 0.4 (2) 0.5 (3) 0.6 (4) 0.7

Answer (3)

Sol. Hardy Weinberg principle

$p^2 + 2pq + q^2 = 1$

$(p + q)^2 = 1$

(AA) p^2 = 360 out of 1000 individual or p^2 = 36 out of 100

q^2 = 160 out of 1000 or q^2 = 16 out of 100

So, $q = \sqrt{1.6} = 0.4$

As $p + q = 1$

So, p is 0.6.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Principles of Inheritance and Variation
Concept: Genetic Disorders
Sub-concept: Chromosomal Disorder
Concept field: Turner's Syndrome

77. A human female with Turner's syndrome

(1) Has 45 chromosomes with XO
(2) Has one additional X chromosome
(3) Exhibits male characters
(4) Is able to produce children with normal husband

Answer (1)

Sol. A human female with Turner's syndrome has 45 chromosomes with XO.

Class 12th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 40 secs
Topic: Molecular Basis of Inheritance
Concept: Transcription
Sub-concept: Direction of Synthesis
Concept field: Direction of Reading of the Template

78. Select the correct option.

	Direction of RNA synthesis	Direction of reading of the template DNA strand
(1)	5′ – 3′	3′ – 5′
(2)	3′ – 5′	5′ – 3′
(3)	5′ – 3′	5′ – 3′
(4)	3′ – 5′	3′ – 5′

Answer (1)

Sol. The RNA synthesis always occurs in 5′ – 3′ while the reading of the template DNA is done in the 3′ – 5′.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Biotechnology – Principles and Processes

Concept: Tools of Recombinant DNA Technology
Sub-concept: Cloning Vectors
Concept field: BAC and YAC

79. Commonly used vectors for human genome sequencing are
(1) T-DNA (2) BAC and YAC
(3) Expression Vectors (4) T/A Cloning Vectors

Answer (2)

Sol. BAC and YAC

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 20 secs
Topic: Evolution
Concept: What are the Evidences for Evolution
Sub-concept: Embryological Support for Evolution
Concept field: Examples of Homologous and Analogous Organs

80. Forelimbs of cat, lizard used in walking; forelimbs of whale used in swimming and forelimbs of bats used in flying are an example of
(1) Analogous organs (2) Adaptive radiation
(3) Homologous organs (4) Convergent evolution

Answer (3)

Sol. Homologous organs are those organs that are similar in their internal structure but perform different functions in organisms of different species.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Evolution
Concept: What are the Evidences for Evolution
Sub-concept: Embryological Support for Evolution
Concept field: Analogous Organs

81. Which one of the following are analogous structures?
(1) Wings of bat and wings of pigeon
(2) Gills of prawn and lungs of man
(3) Thorns of *Bougainvillea* and tendrils of *Cucurbita*
(4) Flippers of dolphin and legs of horse

Answer (2)

Sol. Analogous organs share variation in internal structure but perform same functions.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 30 secs
Topic: Human Health and Disease
Concept: Drugs and Alcohol Abuse
Sub-concept: Cocaine
Concept field: Datura

82. Which is the particular type of drug that is obtained from the plant whose one flowering branch is shown below?

(1) Hallucinogen (2) Depressant (3) Stimulant (4) Pain-killer

Answer (1)

Sol. Datura (produce cocaine) produces hallucinations.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 35 secs
Topic: Human Health and Disease
Concept: AIDS
Sub-concept: Replication of Retrovirus
Concept field: Symptoms Appearance of AIDS

83. At which stage of HIV infection does one usually show symptoms of AIDS?
(1) Within 15 days of sexual contact with an infected person
(2) When the infected retro virus enters host cells
(3) When HIV damages large number of helper Lymphocytes
(4) When the viral DNA is produced by reverse transcriptase

Answer (3)

Sol. Symptoms of AIDS appears when HIV damages large number of helper T-lymphocytes.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Strategies for Enhancement in Food Production
Concept: Tissue Culture
Sub-concept: Plant Tissue Culture
Concept field: Apical and Axillary Meristems

84. To obtain virus-free healthy plants from a diseased one by tissue culture technique, which part/parts of the diseased plant will be taken?
(1) Apical meristem only (2) Palisade parenchyma
(3) Both apical and axillary meristems (4) Epidermis only

Answer (3)

Sol. Both apical and axillary meristems are virus free.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Microbes in Human Welfare
Concept: Microbes in Sewage Treatment
Sub-concept: Secondary Treatment
Concept field: Gases Produced in Anaerobic Sludge

85. What gases are produced in anaerobic sludge digesters?
(1) Methane and CO_2 only
(2) Methane, hydrogen sulphide and CO_2
(3) Methane, hydrogen sulphide and O_2
(4) Hydrogen sulphide and CO_2

Answer (2)

Sol. Methane, hydrogen sulphide and CO_2.

Class 12th
Question type: AIPMT
Difficulty of question: Easy
Expected time to solve: 30 secs
Topic: Organisms and Populations
Concept: Biodiversity Conservation
Sub-concept: How Do We Conserve Biodiversity
Concept field: In-situ Conservation

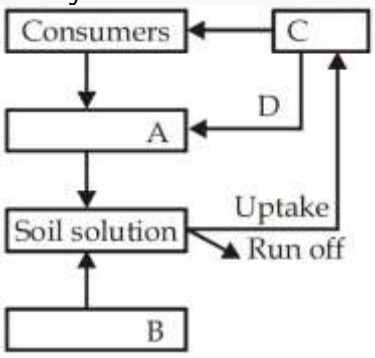
86. Just as a person moving from Delhi to Shimla to escape the heat for the duration of hot summer, thousands of migratory birds from Siberia and other extremely cold northern regions move to
(1) Western Ghat
(2) Meghalaya
(3) Corbett National Park
(4) Keolado National Park

Answer (4)

Sol. Keolado National Park

Class 12th
Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 50 secs
Topic: Ecosystem
Concept: Ecosystem – Phosphorous Cycle
Sub-concept: Phosphorous Cycling in Terrestrial in Ecosystem
Concept field: Detritus

87. Given below is a simplified model of phosphorus cycling in a terrestrial ecosystem with four blanks (A-D). Identify the blanks.



	A	B	C	D
(1)	Rock minerals	Detritus	Litter fall	Producers
(2)	Litter fall	Producers	Rock minerals	Detritus
(3)	Detritus	Rock minerals	Producers	Litter fall
(4)	Producers	Litter fall	Rock minerals	Detritus

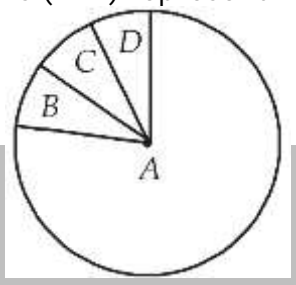
Answer (3)

Sol. A – Detritus
B – Rock minerals
C – Producers
D – Litter fall

Class 12th

Question type: AIPMT
Difficulty of question: Difficult
Expected time to solve: 50 secs
Topic: Biodiversity and Conservation
Concept: Biodiversity
Sub-concept: How many Species are there on Earth and How many in India
Concept field: Representation of Global Biodiversity

88. Given below is the representation of the extent of global diversity of invertebrates. What groups the four portions (A-D) represent respectively?



	A	B	C	D
(1)	Insects	Crustaceans	Other animal groups	Molluscs
(2)	Crustaceans	Insects	Molluscs	Other animal groups
(3)	Molluscs	Other animal groups	Crustaceans	Insects
(4)	Insects	Molluscs	Crustaceans	Other animal groups

Answer (4)

Sol. A – Insects
B – Molluscs
C – Crustaceans
D – Other animal groups

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Environmental Issues
Concept: Air Pollution and its Control
Sub-concept: Electrostatic Precipitator
Concept field: Scrubber's Use

89. A scrubber in the exhaust of a chemical industrial plant removes
(1) Gases like sulphur dioxide
(2) Particulate matter of the size 5 micrometer or above
(3) Gases like ozone and methane
(4) Particulate matter of the size 2.5 micrometer or less

Answer (1)

Sol. Scrubber in the exhaust of a chemical plant removes gases like SO_2.

Class 12th
Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Ecosystem
Concept: Energy Flow
Sub-concept: Food Chain and Web
Concept field: Energy Flow in Food Chain and Web

90. If 20 J of energy is trapped at producer level, then how much energy will be available to peacock as food in the following chain?

Plant → Mice → Snake → Peacock

(1) 0.02 J (2) 0.002 J (3) 0.2 J (4) 0.0002 J

Answer (1)

Sol. Plant → Mice → Snake → Peacock

20J 2J 0.2J 0.02J

Since 10% energy get utilised at every level.