

NEET 2013 Question Paper with Solution

Physics

Topic- Kinematics

Concept-Motion in a plane

Subject concept- 2-D motion

Concept Field- Acceleration, velocity

Question Level- Easy

Expected time to solve- 30 sec

1. The position vector of a particle \vec{R} as a function of time is given by:

$$\vec{R} = 4 \sin(20t) \hat{i} + 4 \cos(2\pi t) \hat{j}$$

Where R is in meters, t is seconds \hat{i} and \hat{j} denote unit vectors along x-and y-directions, respectively. Which one of the following statements is wrong for the motion of particle?

- (1) Magnitude of acceleration vector is $\frac{v^2}{R}$, where v is the velocity of particle
(2) Magnitude of the velocity of particle is 8 meter/second
(3) path of the particle is a circle of radius 4 meter.
(4) Acceleration vector is along - \vec{R}

Sol.

(2)

$$x = 4 \sin(2\pi t), y = 4 \cos(2\pi t)$$

$$\text{Squaring and adding } x^2 + y^2 = 4^2 \Rightarrow R = 4$$

\Rightarrow Circular motion

$$V = \omega R = (2\pi)(4) = 8\pi$$

Topic- EM wave

Concept-Energy of EM waves

Subject concept- Spectrum

Concept Field- Order of energy

Question Level-Easy

Expected time to solve-20 sec

2. The energy of the EM waves is of the order of 15 keV. To which part of the spectrum does it belong?

- (1) Infra-red rays (2) Ultraviolet rays (3) γ -rays (4) X-ray

Sol. (4)

E-of x-ray

E (100 eV to 100 keV)

Topic- Optics

Concept-Ray optics

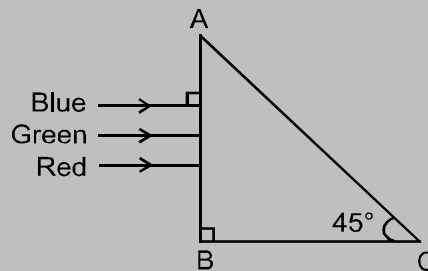
Subject concept- Prism

Concept Field- Refraction

Question Level-Easy

Expected time to solve- 25 sec

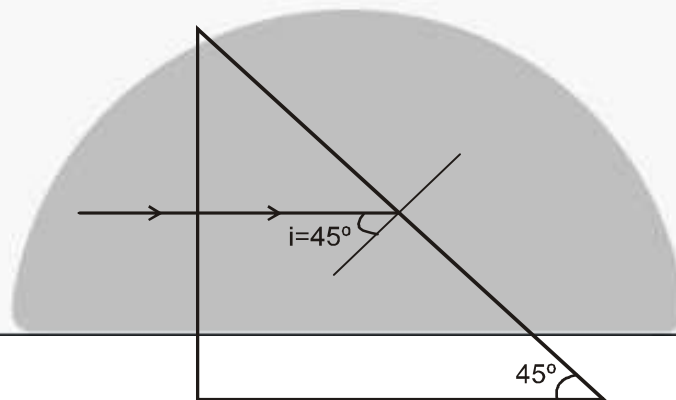
3. A beam of light consisting of red, green and blue colours is incident on a right angled prism. The refractive index of the material of the prism for the above red, green and blue wavelengths are 1.39, 1.44 and 1.47, respectively.



The prism will:

- (1) Separate all the three colours from one another
- (2) not separate the three colours at all
- (3) separate the red colour part from the green and blue colours
- (4) separate the blue colour part from the red and green colours

Sol. (3)



For TIR

$$i > i_c \text{ so } c \sin i > \sin i_c$$

$$\sin 45^\circ > \frac{1}{\mu} \Rightarrow \mu > \sqrt{2} \Rightarrow \mu > 1.414$$

Since μ of green and violet are greater than 1.414 so they will total internal refracted.
But red colour will be extracted.

Topic-Kinematics

Concept- Motion in a straight line

Subject concept- Relative motion

Concept Field- Relative velocity

Question Level-Easy

Expected time to solve- 20 sec

4. Two particles A and B, move with constant velocities \vec{v}_1 and \vec{v}_2 . At the initial moment their position vector are \vec{r}_1 and \vec{r}_2 respectively. The condition for particles A and B for their collision is:

(1) $\vec{r}_1 \cdot \vec{v}_1 = \vec{r}_2 \cdot \vec{v}_2$

(2) $\vec{r}_1 \times \vec{v}_1 = \vec{r}_2 \times \vec{v}_2$

(3) $\vec{r}_1 - \vec{v}_1 = \vec{v}_1 - \vec{v}_2$

(4) $\frac{\vec{r}_1 - \vec{r}_2}{|\vec{r}_1 - \vec{r}_2|} = \frac{\vec{v}_2 - \vec{v}_1}{|\vec{v}_2 - \vec{v}_1|}$

Sol. (4)



For collision $\vec{v}_{B/A}$ should be along $B \rightarrow A$ ($\vec{r}_{A/B}$)

$$\text{So, } \frac{\vec{v}_2 - \vec{v}_1}{|\vec{v}_2 - \vec{v}_1|} = \frac{\vec{r}_1 - \vec{r}_2}{|\vec{r}_1 - \vec{r}_2|}$$

Topic-Optics

Concept-Wave optics

Subject concept- Huygens's wavelet

Concept Field- Phase difference

Question Level- Moderate

Expected time to solve-30 sec

5. At the first minimum adjacent to the central maximum of a single-slit diffraction pattern, the phase difference between the Huygens's wavelet from the edge of the slit and the wavelet from the midpoint of the slit is :

(1) $\frac{\pi}{2}$ radian

(2) π radian

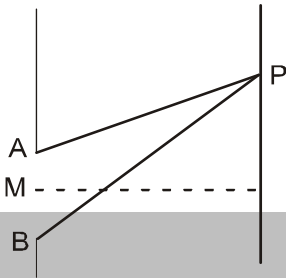
(3) $\frac{\pi}{8}$ radian

(4) $\frac{\pi}{4}$ radian

Sol. (2)

For first minima

$$AP - BP = \lambda$$



$$AP - MP = \frac{\lambda}{2}$$

$$\text{So, phase difference} = \frac{2\pi}{\lambda} \times \frac{\lambda}{2} = \pi$$

Topic-Electromagnetism

Concept-Moving charge and magnetism

Subject concept- Motion of a charge in magnetic field

Concept Field- Energy acquired by alpha particle

Question Level-Easy

Expected time to solve- 30 sec

6. A proton and alpha particle both enter a region of uniform magnetic field B, moving at right angles to field B. If the radius of circular orbits for both the particles is equal and the kinetic energy acquired by proton is 1 MeV the energy acquired by the alpha particle will be:

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

Sol. (3)

$$R = \frac{mV}{qB} = \frac{\sqrt{2m(kE)}}{qB}$$

Since R is same so $KE \propto \frac{q^2}{m}$

So KE of α particle will be $\frac{(2)^2}{4} = \text{same} = 1 \text{ MeV}$

Topic- Electrostatics

Concept-Electric current

Subject concept- Electric circuit

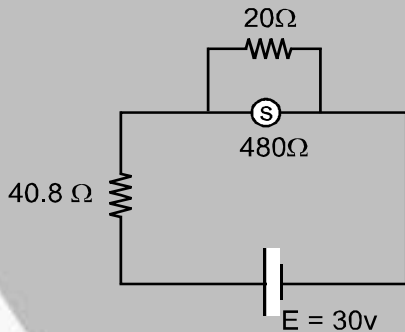
Concept Field- Ammeter reading

Question Level-Easy

Expected time to solve- 25 sec

7. A circuit contains an ammeter, a battery of 30V and a resistance 40.8 ohm all connected in series. If the ammeter has a coil of resistance 480 ohm and a shunt of 20 ohm, the reading in the ammeter will be:
(1) 0.25 A (2) 2 A (3) 1 A (4) 0.5 A

Sol. (4)



$$\text{Resistance of ammeter} = \frac{480 \times 20}{480 + 20} = 19.2 \Omega.$$

$$i = \frac{30}{40.8 + 19.2} = 0.5 \text{ A}$$

Topic-Mechanics

Concept-Fluid dynamics

Subject concept-Mechanical properties of fluids

Concept Field- Density

Question Level-Easy

Expected time to solve- 20 sec

8. The value of coefficient of volume expansion of glycerine is $5 \times 10^{-4} \text{ K}^{-1}$. The fractional change in the density of glycerine for a rise of 40°C in its temperature, is:
(1) 0.020 (2) 0.025 (3) 0.010 (4) 0.015

Sol. (1)

$$\rho = \rho_0 (1 - \lambda \Delta t)$$

$$\frac{\Delta \rho}{\rho_0} = \gamma \Delta T = (5 \times 10^{-4})(40) = 0.02$$

Topic- Thermal physics

Concept-Thermodynamics

Subject concept- Compression of gas

Concept Field- Thermodynamic process

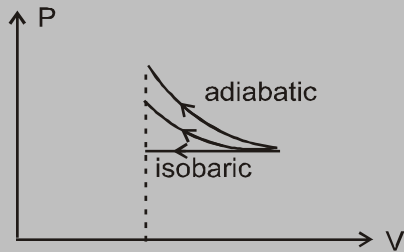
Question Level-Easy

Expected time to solve- 25 sec

9. An ideal gas is compressed to half its initial volume by means of several processes. Which of the process results in the maximum work a done on the gas?
(1) Isobaric (2) Isochoric (3) Isothermal (4) Adiabatic

Sol.

(4)



Since area under the curve is max for adiabatic process so work done on the gas will be max for adiabatic process.

Topic-Electrostatic

Concept-Alternating current

Subject concept- Electric circuit

Concept Field- Potential difference

Question Level-Moderate

Expected time to solve-30 sec

10. A series R-C circuit is connected to an alternating voltage source. Consider the two situations:

(a) When capacitor is air filled.

(b) When capacitor is mica filled.

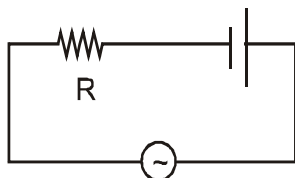
Current through resistor is i and voltage across capacitor is V then:

- (1) $V_a > V_b$ (2) $i_a > i_b$ (3) $V_a = V_b$ (4) $V_a < V_b$

Sol.

(1)

$$X_c = 1/c\omega$$



$$i = \frac{V}{\sqrt{R^2 + \left(\frac{1}{c\omega}\right)^2}}$$

$$V_c = \frac{v}{\sqrt{R^2 + \left(\frac{1}{c\omega}\right)^2}} \times \left(\frac{1}{c\omega}\right)$$

$$V_c = \frac{v}{\sqrt{(Rc\omega)^2 + 1}}$$

If we fill a di-electric material

$$c \uparrow \Rightarrow V_c \downarrow$$

Topic-Dual nature of radiation and matter

Concept-Wave nature of matter

Subject concept- De-Broglie's wavelength

Concept Field- Emission of electron

Question Level-Moderate

Expected time to solve- 35 sec

- 11.** Light of wavelength 500 nm is incident on a metal with work function 2.28 eV. The de Broglie wavelength of the emitted electron is:

(1) $< 2.8 \times 10^{-9} \text{ m}$ (2) $\geq 2.8 \times 10^{-9} \text{ m}$ (3) $\leq 2.8 \times 10^{-12} \text{ m}$ (4) $< 2.8 \times 10^{-10} \text{ m}$

Sol. (2)

$$KE_{\max} = \frac{hc}{\lambda} - \psi$$

$$KE_{\max} = \frac{1240}{500} - 2.82$$

$$KE_{\max} = 2.48 - 2.28 = 0.2 \text{ eV}$$

$$\lambda_{\max} = \frac{h}{\sqrt{2m(KE)_{\max}}} = \frac{\frac{20}{3} \times 10^{-34}}{\sqrt{2 \times 9 \times 10^{-31} \times 0.2 \times 1.6 \times 10^{-19}}}$$

$$\lambda_{\min} = \frac{25}{9} \times 10^{-9} = 2.80 \times 10^{-9} \text{ nm}$$

so $\lambda \geq 2.8 \times 10^{-9} \text{ m}$

Topic- Electrostatics

Concept-Conductivity

Subject concept- Series connection of metal wire

Concept Field- Conductivity of combination

Question Level-Easy

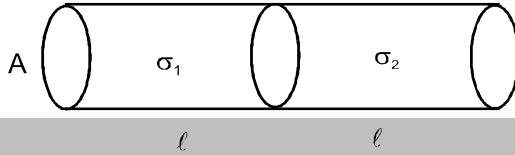
Expected time to solve- 25 sec

- 12.** Two metal wires of identical dimension are connected in series. If σ_1 and σ_2 are the

conductivities of the metal wires respectively, the effective conductivity of the combination is:

- (1) $\frac{\sigma_1 + \sigma_2}{2\sigma_1\sigma_2}$ (2) $\frac{\sigma_1 + \sigma_2}{\sigma_1\sigma_2}$ (3) $\frac{\sigma_1\sigma_2}{\sigma_1 + \sigma_2}$ (4) $\frac{2\sigma_1\sigma_2}{\sigma_1 + \sigma_2}$

Sol. (4)



$$R_{ec} = \frac{l}{\sigma_1 A} + \frac{l}{\sigma_2 A} = \frac{l_{eq}}{\sigma_{eq} A_{eq}}$$

$$\frac{2l}{\sigma_{eq} A} = \frac{l}{A} \left(\frac{\sigma_1 + \sigma_2}{\sigma_1 \sigma_2} \right)$$

$$\sigma_{eq} = \frac{2\sigma_1 \sigma_2}{\sigma_1 + \sigma_2}$$

Topic-System of particle and rotational motion

Concept-Rotational motion

Subject concept- MOI

Concept Field- Average torque

Question Level-Easy

Expected time to solve- 30 sec

- 13.** An automobile moves on a road with a speed of 54 km h^{-1} . The radius of its wheels is 0.45 m and the moment of inertia of the wheel about its axis of rotation is 3 kg m^2 . If the vehicle is brought to rest in 15 s , the magnitude of average torque transmitted by its brakes to the wheel is -

- (1) $8.58 \text{ kg m}^2 \text{ s}^{-2}$ (2) $10.86 \text{ kg m}^2 \text{ s}^{-2}$ (3) $2.86 \text{ kg m}^2 \text{ s}^{-2}$ (4) $6.66 \text{ kg m}^2 \text{ s}^{-2}$

Sol. (4)

$$\omega_i = \frac{15}{0.45} = \frac{100}{3} \quad \omega_f = 0$$

$$\omega_f = \omega_i + \alpha t$$

$$0 = \frac{100}{3} + (-\alpha)(15)$$

$$\alpha = \frac{100}{45}$$

$$\tau = (I)(\alpha) = 3 \times \frac{100}{45} = 6.66 \text{ N.m.}$$

Topic-Dual nature of radiation and matter

Concept-Sound waves

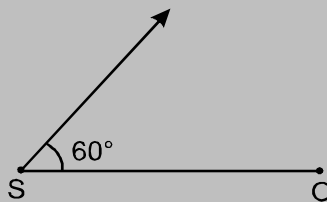
Subject concept- Amplitude

Concept Field- Apparent frequency

Question Level- Moderate

Expected time to solve- 30 sec

- 14.** A source of sound S emitting waves of frequency 100 Hz and an observer O are located at some distance from each other. The source is moving with a speed of 19.4 ms at an angle of 60° with the source observer line as shown in the figure. The observer is at rest. The apparent frequency observed by the observer (velocity of sound in air 330 ms^{-1}) is:



(1) 103 Hz

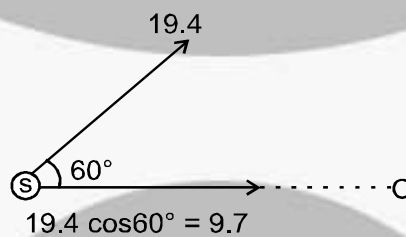
(2) 106 Hz

(3) 97 Hz

(4) 100 Hz

Sol.

(1)



$$f^1 = f_0 \left(\frac{v - v_o}{v - v_s} \right)$$

$$f^1 = 100 \left(\frac{v - 0}{v - (+9.7)} \right)$$

$$f^1 = 100 \frac{v}{v \left(\frac{9.7}{v} \right)}$$

$$f^1 = 100 \left(1 + \frac{9.7}{330} \right) = 103 \text{ Hz}$$

Topic-Work, energy and power

Concept-Collision

Subject concept- Elastic collision

Concept Field- Speed after collision

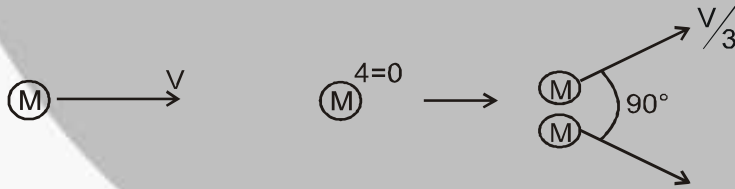
Question Level-Easy

Expected time to solve- 30 sec

15. On a frictionless surface a block of mass M moving at speed v collides elastically with another block of same mass M which is initially at rest. After collision the first block moves at an angle θ to its initial direction and has a speed $\frac{v}{3}$. The second block's speed after the collision is :

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

Sol. (4)



$$\vec{P}_i = \vec{P}_f$$

$$\Rightarrow |\vec{P}_i| = |\vec{P}_f| \Rightarrow mV = \sqrt{\left(m\frac{V}{3}\right)^2 + (mV_2)^2} \quad V_2 = \frac{2\sqrt{2}}{3}V$$

Topic-System of particle and rotation motion

Concept-Rotational motion

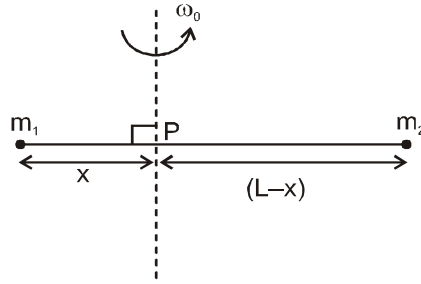
Subject concept- MOI

Concept Field- Angular velocity

Question Level-Easy

Expected time to solve- 25 sec

16. Point masses m_1 and m_2 are placed at the opposite ends of a rigid rod of length L , and negligible mass. The rod is to be set rotating about an axis perpendicular to it. The position of point P on this rod through which the axis should pass so that the work required to set the rod rotating with angular velocity ω_0 is minimum, is given by :



- (1) $x = \frac{m_1}{m_2} L$ (2) $x = \frac{m_2}{m_1} L$ (3) $x = \frac{m_2 L}{m_1 + m_2}$ (4) $x = \frac{m_1 L}{m_1 + m_2}$

Sol. (3)

$$\text{K.E.} = \frac{1}{2} I \omega^2$$

I is minimum about the centre of mass

$$\text{So, } (m_1)(x) = (m_2)(L - x)$$

$$x = \frac{m_2 L}{m_1 + m_2}$$

Topic-Work, energy and power

Concept-Energy

Subject concept- Loss in energy

Concept Field- Initial velocity

Question Level-Easy

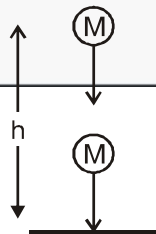
Expected time to solve- 30 sec

- 17.** A ball is thrown vertically downwards from a height of 20 m with an initial velocity v_0 . It collides with the ground loses 50 percent of its energy in collision and rebounds to the same height. The initial velocity v_0 is :

(Take $g = 10 \text{ ms}^{-2}$)

- (1) 20 ms^{-1} (2) 28 ms^{-1} (3) 10 ms^{-1} (4) 14 ms^{-1}

Sol. (1)



$$\frac{KE_f}{KE_i} = \frac{1}{2}$$

$$\frac{V_f}{V_i} = \frac{1}{\sqrt{2}}$$

$$\frac{\sqrt{2gh}}{\sqrt{V_0^2 + 2gh}} = \frac{1}{\sqrt{2}}$$

$$V_0 = 20 \text{ m/sec}$$

Topic-Modern physics

Concept-Nuclear physics

Subject concept- Nuclear decay

Concept Field- Kinetic energy and momentum

Question Level-Easy

Expected time to solve- 15 sec

- 18.** A nucleus of uranium decays at rest into nuclei of thorium and helium. Then:
- (1) The helium nucleus has less momentum than the thorium nucleus.
 - (2) The helium nucleus has more momentum than the thorium nucleus.
 - (3) The helium nucleus has less kinetic energy than the thorium nucleus.
 - (4) The helium nucleus has more kinetic energy than the thorium nucleus.

Sol. (4)



$$KE_{\text{Th}} = \frac{p^2}{2m_{\text{Th}}}, \quad KE_{\alpha} = \frac{p^2}{2m_{\alpha}}$$

since m_{α} is less so KE_{α} will be more.

Topic-Electrostatics

Concept- Electric field

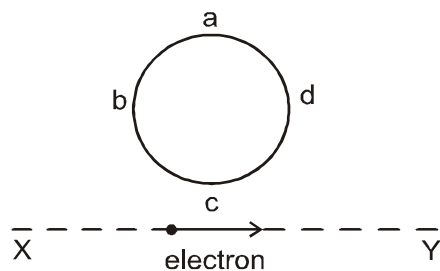
Subject concept- Motion of charge

Concept Field- Current induced

Question Level-Easy

Expected time to solve- 20 sec

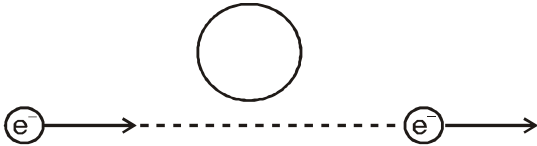
- 19.** An electron moves on a straight-line path XY as shown. The abcd is a coil adjacent to the path of electron. What will be the direction of current if any, induced in the coil?



- (1) adcb

- (2) The current will reverse its direction as the electron goes past the coil
 (3) No current induced
 (4) abcd

Sol. (2)



Where e^- comes closer the induced current will be anticlockwise
 When e^- comes farther induced current will be clockwise.

Topic-Mechanics

Concept-SHM

Subject concept-Maximum acceleration and minimum velocity

Concept Field-Time period

Question Level-Easy

Expected time to solve- 30 sec

- 20.** A particle is executing a simple harmonic motion. Its maximum acceleration is α and maximum velocity is β . Then its time period of vibration will be :

- (1) $\frac{\alpha}{\beta}$ (2) $\frac{\beta^2}{\alpha}$ (3) $\frac{2\pi\beta}{\alpha}$ (4) $\frac{\beta^2}{\alpha^2}$

Sol. (3)

$$\omega^2 A = \alpha$$

$$\omega A = \beta$$

$$\Rightarrow \omega = \frac{\alpha}{\beta}$$

$$\Rightarrow T = \frac{2\pi}{\omega} = \frac{2\pi\beta}{\alpha}$$

Topic-Optics

Concept-Wave optics

Subject concept- Young's experiment

Concept Field- Interference

Question Level-Easy

Expected time to solve- 25 sec

- 21.** Two slits in Youngs experiment have widths in the ratio 1 : 25. The ratio of intensity at the maximum and minima in the interference pattern, $\frac{I_{\max}}{I_{\min}}$ is:

(1) $\frac{121}{49}$

(2) $\frac{49}{121}$

(3) $\frac{4}{9}$

(4) $\frac{9}{4}$

Sol. (4)

$$\frac{l_1}{l_2} = \frac{25}{1} \Rightarrow \frac{A_1}{A_2} = \frac{5}{1}$$

$$\frac{A_{\max}}{A_{\min}} = \frac{5+1}{5-1} = \frac{6}{4} = \frac{3}{2}$$

$$\frac{l_{\max}}{l_{\min}} = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$$

Topic-Electrostatics

Concept-Electric field

Subject concept- Potential

Concept Field- Relation between potential and electric field

Question Level-Easy

Expected time to solve- 30 sec

22. If potential (in volts) in a region is expressed as $V(x, y, z) = 6xy - y + 2yz$, the electric field (in N/C) at point (1, 1, 0) is:

(1) $-(6\hat{i} + 5\hat{j} + 2\hat{k})$ (2) $-(2\hat{i} + 3\hat{j} + \hat{k})$ (3) $-(6\hat{i} + 9\hat{j} + \hat{k})$ (4) $-(3\hat{i} + 5\hat{j} + 3\hat{k})$

Sol. (1)

$$V = 6xy - y + 24z$$

$$\vec{E} = \left(\frac{\partial V}{\partial x} \hat{i} + \frac{\partial V}{\partial y} \hat{j} + \frac{\partial V}{\partial z} \hat{k} \right)$$

$$\vec{E} = [(6y)\hat{i} + (6x - 1 + 2z)\hat{j} + (2y)\hat{k}]$$

$$\vec{E}|_{(1,1,0)} = -(6\hat{i} + 5\hat{j} + 2\hat{k})$$

Topic-Capacitor and capacitance

Concept-Capacitor

Subject concept- Parallel plate capacitor

Concept Field- Attraction between plates of PPC

Question Level-Easy

Expected time to solve- 25 sec

23. A parallel plate air capacitor has capacity 'C' distance of separation between plates is 'd' and potential difference 'V' is applied between the plates. Force of attraction between the plates of the parallel plate air capacitor is:

$$(1) \frac{CV^2}{2d}$$

$$(2) \frac{CV^2}{d}$$

$$(3) \frac{C^2V^2}{2d^2}$$

$$(4) \frac{CV^2}{2d^2}$$

Sol. (1)

Attraction between the plates

$$F = \frac{q^2}{2A\epsilon_0} \text{ where } q = CV \text{ and } C = \frac{\epsilon_0 A}{d}$$

$$F = \frac{C^2V^2}{2Cd} = \frac{CV^2}{2d}$$

Topic-Kinematics

Concept-NLM

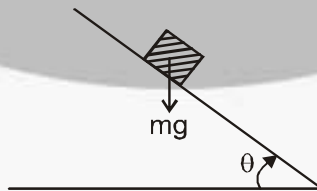
Subject concept- Motion on a rough inclined plane

Concept Field- Coefficient of friction

Question Level-Easy

Expected time to solve- 30 sec

- 24.** A plank with a box on it at one end is gradually raised about the other end. As the angle of inclination with the horizontal reaches 30° the box starts to slip and slides 4.0 m down the plank in 4.0s. The coefficients of static and kinetic friction between the box and the plank will be, respectively:



$$(1) 0.6 \text{ and } 0.5$$

$$(2) 0.5 \text{ and } 0.6$$

$$(3) 0.4 \text{ and } 0.3$$

$$(4) 0.6 \text{ and } 0.6$$

Sol. (1)

$$\mu = \tan 30^\circ = \frac{1}{\sqrt{3}} = 0.5$$

$$\mu_s = 0.57 = 0.6$$

$$S = ut + \frac{1}{2} a t^2$$

$$4 = \frac{1}{2} a (4)^2 \Rightarrow a = \frac{1}{2} = 0.5$$

$$a = g \sin \theta - \mu_k (g) \cos \theta$$

$$\Rightarrow \mu_k = \frac{0.9}{\sqrt{3}} = 0.5$$

Topic-Modern physics

Concept-Atomics physics

Subject concept- Line spectrum of hydrogen atom

Concept Field- Lyman and Balmer series

Question Level-Easy

Expected time to solve- 30 sec

25. In the spectrum of hydrogen, the ratio of the longest wavelength in the Lyman series to the longest wavelength in the Balmer series is:

- (1) $\frac{9}{4}$ (2) $\frac{27}{5}$ (3) $\frac{5}{27}$ (4) $\frac{4}{9}$

Sol. (3)

$$\frac{1}{\lambda_1} = R_e \left(\frac{1}{1^2} - \frac{1}{2^2} \right)$$

$$\frac{1}{\lambda_2} = R_e \left(\frac{1}{2^2} - \frac{1}{3^2} \right)$$

$$\frac{\lambda_1}{\lambda_2} = \frac{5}{27}$$

Topic-Electrostatics

Concept-Electric current

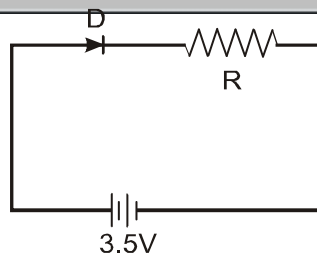
Subject concept- Electric circuit consisting of diode

Concept Field- Forward biasing of diode

Question Level-Easy

Expected time to solve- 25 sec

26. In the given figure, a diode D is connected to an external resistance $R = 100 \Omega$ and an e.m.f. of 3.5 V. If the barrier potential developed across the diode is 0.5V, the current in the circuit will be:



- (1) 40 mA (2) 20 mA (3) 35 mA (4) 30 mA

Sol. (4)

$$\begin{aligned}\text{Current} &= \frac{(3.5 - 0.5)}{100} \text{ A} \\ &= \frac{3}{100} \text{ A} = 30 \text{ mA}\end{aligned}$$

Topic-Gravitation

Concept-Gravitational force

Subject concept- Orbit of satellite

Concept Field-Linear momentum of satellite

Question Level-Easy

Expected time to solve- 30sec

- 27.** A satellite S is moving in an elliptical orbit around the earth. The mass of the satellite is very small compared to the mass of the earth. Then,
- (1) the total mechanical energy of S varies periodically with time.
 - (2) the linear momentum of S remains constant in magnitude.
 - (3) the acceleration of S is always directed towards the centre of the earth.
 - (4) the angular momentum of S about the centre of the earth changes in direction, but its magnitude remains constant.

Sol. (3)

The gravitation force on the satellite will be aiming toward the centre of earth so acceleration of the satellite will also be aiming toward the centre of earth.

Topic-System of particle and rotational motion

Concept-Rotational motion

Subject concept- Force on a point

Concept Field-Angular momentum

Question Level-Easy

Expected time to solve- 30 sec

- 28.** A force $\vec{F} = \alpha\hat{i} + 3\hat{j} + 6\hat{k}$ is acting at a point $\vec{r} = 2\hat{i} - 6\hat{j} - 12\hat{k}$. The value of α for which angular momentum about origin is conserved is:
- (1) 2
 - (2) zero
 - (3) 1
 - (4) -1

Sol. (4)

If $\vec{L} = \text{constant}$, then $\vec{\tau} = 0$

so $\vec{r} \times \vec{F} = 0 \Rightarrow \vec{F}$ should be parallel to \vec{r} so coefficient should be in same ratio. So

$$\frac{\alpha}{2} = \frac{3}{-6} = \frac{6}{-12}$$

So $\alpha = -1$.

Topic-Electrostatics

Concept-Measuring instruments

Subject concept-Potentiometer

Concept Field-EMF

Question Level-Easy

Expected time to solve- 25 sec

- 29.** A potentiometer wire of length L and a resistance r are connected in series with a battery of e.m.f. E_0 and a resistance r_1 . An unknown e.m.f. E is balanced at a length l of the potentiometer wire. The e.m.f. E will be given by:

(1) $\frac{E_0 r}{(r+r_1)} \cdot \frac{l}{L}$ (2) $\frac{E_0 l}{L}$ (3) $\frac{L E_0 r}{(r+r_1) l}$ (4) $\frac{L E_0 r}{l r_1}$

Sol. (1)

$$K = \text{potential gradient} = \left(\frac{E_0 r}{r+r_1} \right) \frac{1}{L}$$

$$\text{so } E = K l = \frac{E_0 r l}{(r+r_1) L}$$

Topic-Thermal physics

Concept-Thermodynamics

Subject concept-Specific heat capacity

Concept Field-Heat capacity at constant pressure

Question Level-Easy

Expected time to solve- 30 sec

- 30.** 4.0 g of a gas occupies 22.4 litres at NTP. The specific heat capacity of the gas at constant volume is 5.0 JK^{-1} . If the speed of sound in this gas at NTP is 952 ms^{-1} , then the heat capacity at constant pressure is (Take gas constant $R = 8.3 \text{ JK}^{-1} \text{ mol}^{-1}$)

(1) $7.5 \text{ JK}^{-1} \text{ mol}^{-1}$ (2) $7.0 \text{ JK}^{-1} \text{ mol}^{-1}$ (3) $8.5 \text{ JK}^{-1} \text{ mol}^{-1}$ (4) $8.0 \text{ JK}^{-1} \text{ mol}^{-1}$

Sol. (4)

Number of mole of gas = 1 so molar mass = 4 g/mole

$$v = \sqrt{\frac{\gamma R T}{m}} \Rightarrow 952 \times 952 = \frac{\gamma \times 3.3 \times 273}{4 \times 10^{-3}} \Rightarrow \gamma = 1.6 = \frac{16}{10} = \frac{8}{5}$$

$$\gamma = \frac{C_p}{C_v} = \frac{8}{5} \quad \text{and} \quad C_p = \frac{8 \times 5}{5} = 8 \text{ jk}^{-1} \text{ mole}^{-1}$$

Topic-Kinematics

Concept-NLM

Subject concept- Motion in a plane

Concept Field- Centripetal force

Question Level-Easy

Expected time to solve- 25 sec

- 31.** Two stones of masses m and $2m$ are whirled in horizontal circles the heavier one in radius $\frac{r}{2}$ and the lighter one in radius r . The tangential speed of lighter stone is n times that of the value of heavier stone when they experience same centripetal forces. The value of n is:

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

Sol. (4)

$$F_c = \frac{mv_1^2}{r} = \frac{2mv_2^2}{(1/2)r} = \frac{4mv_2^2}{r}$$

so, $v_1 = 2v_2$

Topic-Gravitation

Concept-Gravitational force

Subject concept-Revolution of satellite

Concept Field-Orbital speed of satellite

Question Level-Easy

Expected time to solve- 30 sec

- 32.** A remote - sensing satellite of earth revolves in a circular orbit at a height of 0.25×10^6 m above the surface of earth. If earth's radius is 6.38×10^6 m and $g = 9.8 \text{ ms}^{-2}$, then the orbital speed of the satellite is:

- (1) 8.56 km s^{-1} (2) 9.13 km s^{-1} (3) 6.67 km s^{-1} (4) 7.76 km s^{-1}

Sol. (4)

$$V_0 = \sqrt{\frac{GM}{r}} = \sqrt{\frac{GM}{R^2} \cdot \frac{R^2}{r}}$$

$$= \sqrt{\frac{9.8 \times 6.38 \times 6.38}{6.63 \times 10^6}} = \sqrt{60 \times 10^6} \text{ m/sec}$$

$$= 7.76 \text{ km/sec}$$

Topic- Waves and acoustics

Concept-Vibration in a string

Subject concept- Resonant frequency

Concept Field- Lowest resonant frequency

Question Level-Easy

Expected time to solve- 15 sec

33. A string is stretched between fixed points separated by 75.0 cm. It is observed to have resonant frequencies of 420 Hz and 315 Hz. There are no other resonant frequencies between these two. The lowest resonant frequency for this string is:

- (1) 2.5 Hz (2) 10.5 Hz (3) 105 Hz (4) 155 Hz

Sol. (3)

Fundamental frequency = highest common factor = 105 Hz

Topic-Thermal physics

Concept-Kinetic theory of gas

Subject concept- Refrigerator

Concept Field- Heat ejection

Question Level-Easy

Expected time to solve- 25 sec

34. The coefficient of performance of a refrigerator is 5 if the temperature inside freezer is -20°C , is temperature of the surroundings to which it rejects heat is

- (1) 41°C (2) 11°C (3) 21°C (4) 31°C

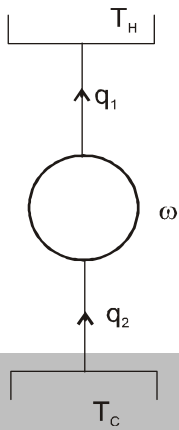
Sol. (4)

$$\text{cop} = \frac{q_1}{w} = \frac{q_2}{q_1 - q_2} = \frac{T_c}{T_H - T_c} = 5$$

$$T_c = 5T - 5T_c$$

$$6T_c = 5T_H$$

$$T_H = \frac{6}{5} \times 253\text{k} = 303.6\text{k} = 30.6^{\circ}\text{C} = 31^{\circ}\text{C}$$



Topic-Mechanics

Concept-Fluid mechanics

Subject concept- Capillary tube

Concept Field- Radius of curvature

Question Level-Easy

Expected time to solve- 15 sec

- 35.** Water rises to a height 'h' in capillary tube. If the length of capillary tube above the surface of water is made less than 'h' then:
- (1) water rises up to the top of capillary tube and stays there without overflowing
 - (2) water rises up to a point a little below the top and stays there
 - (3) water does not rise at all
 - (4) water rises up to the tip of capillary tube and then starts overflowing like fountain.

Sol.

(1)

Water will not overflow but will change its radius of curvature.

Topic-Thermal physics

Concept-Thermodynamics

Subject concept-Ideal gas

Concept Field- Density and pressure of gas

Question Level-Easy

Expected time to solve- 30 sec

- 36.** Two vessels separately contain two ideal gases A and B at the same temperature the pressure of A being twice that of B. Under such conditions, the density of A is found to be 1.5 times the density of B. The ratio of molecular weight of A and B is:

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

(2) 2

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

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

Sol.

(1)

$$P_A = \frac{\rho_A M_A}{RT}, P_B = \frac{\rho_B M_B}{RT} = \frac{3}{2} \Rightarrow \frac{P_A}{P_B} = \frac{\rho_A}{\rho_B} \frac{M_A}{M_B} = 2 \frac{M_A}{M_B} = \frac{3}{2}$$

$$\text{so, } \frac{M_A}{M_B} = \frac{3}{4}$$

Topic-Mechanical properties of solids

Concept-Elasticity

Subject concept-Young's modulus constant

Concept Field- Increase in the length of wire

Question Level-Easy

Expected time to solve- 25 sec

- 37.** Two Young's modulus of steel is twice that of brass. Two wires of same length and of same area of cross section, one of steel and another of brass are suspended from the same roof. If we want the lower ends of the wires to be at the same level, then the weights added to the steel and brass wires must be in the ratio of:

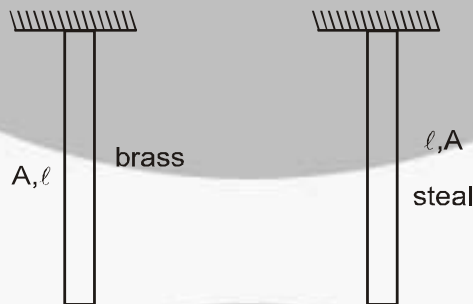
(1) 2 : 1

(2) 4 : 1

(3) 1 : 1

(4) 1 : 2

Sol. (1)



$$Y = \frac{W}{A} \cdot \frac{l}{\Delta l}$$

$$\text{so } \Delta l = \frac{wl}{AY}$$

$$\Delta e_1 = \Delta e_2 \quad \frac{w_1 l}{AY_1} = \frac{w_2 l}{AY_2}$$

$$\frac{w_1}{w_2} = \frac{Y_1}{Y_2} = 2$$

Topic-Semiconductor and digital electronics

Concept- Amplifier

Subject concept- CE amplifier
 Concept Field- Phase difference
 Question Level-Easy
 Expected time to solve- 30 sec

38. The input signal given to a Ce amplifier having a voltage gain of 150 is $V_i = 2 \cos\left(15t + \frac{\pi}{3}\right)$. The corresponding output signal will be:

- (1) $75 \cos\left(15t + \frac{2\pi}{3}\right)$ (2) $2 \cos\left(15t + \frac{5\pi}{6}\right)$
 (3) $300 \cos\left(15t + \frac{4\pi}{3}\right)$ (4) $300 \cos\left(15t + \frac{\pi}{3}\right)$

Sol. (3)

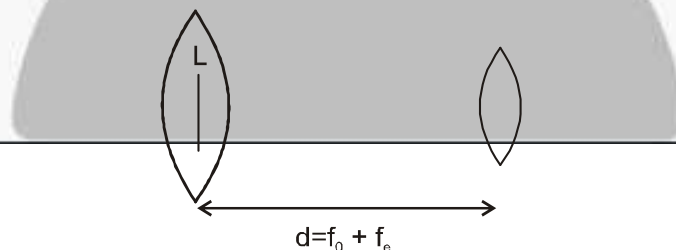
Ce amplifier causes phase difference of $\pi (= 180^\circ)$ so $V_{out} = 300 \cos\left(15t + \frac{\pi}{3} + \pi\right)$

Topic-Optics
 Concept-Ray optics
 Subject concept- Lens
 Concept Field- Magnification
 Question Level-Easy
 Expected time to solve- 25 sec

39. In an astronomical telescope in normal adjustment a straight black line of length L is drawn on inside part of objective lens. The eyepiece form a real image of this line. The length of this image is l. The magnification of the telescope is:

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

Sol. (3)



Magnification by eyepiece

$$m = \frac{f}{f + u}$$

$$-\frac{l}{L} = \frac{f_e}{f_e + (-(f_o + f_e))} \quad \Rightarrow \quad \frac{l}{L} = \frac{f_e}{f_o}$$

$$m.p. = \frac{f_o}{f_e} = \frac{L}{l}$$

Topic-Mechanics

Concept-Fluid mechanics

Subject concept- Density of blood

Concept Field- Pressure

Question Level-Easy

Expected time to solve- 25 sec

- 40.** The heart of man pumps 5 litres of through the arteries per minutes at a pressure of 150 mm of mercury. If the density of mercury be $13.6 \times 10^3 \text{ kg/m}^3$ and $g = 10 \text{ m/s}^2$ then the power of heart in watt is:

- (1) 2.35 (2) 3.0 (3) 1.50 (4) 1.70

Sol. (4)

$$\begin{aligned} \text{Power} &= \vec{F} \cdot \vec{V} = PAV = \rho ghAV \\ &= 13.6 \times 10^3 \times 10 \times 150 \times 10^{-3} \times 0.5 \times 10^{-3} / 60 \text{ watt} = 1.76 \text{ watt} \end{aligned}$$

Topic- Unit and dimensions

Concept-Dimensions

Subject concept- Viscosity, density

Concept Field- Comparison of dimensions

Question Level-Easy

Expected time to solve- 30 sec

- 41.** If dimensions of critical velocity v_c of a liquid flowing through a tube are expressed as $[\eta^x \rho^y r^z]$, where η, ρ and r are the coefficient of viscosity of liquid, density of liquid and radius of the tube respectively, then the values of x, y and z are given by:

- (1) -1, -1, 1 (2) -1, -1, -1 (3) 1, 1, 1 (4) 1, -1, -1

Sol. (4)

$$V_c = \eta^x \rho^y r^z$$

critical velocity is given by $V_c = \frac{R\eta}{2\rho r}$

so, $x = 1$

$y = -1$ $z = -1$

Topic-Dual nature of radiation and matter

Concept-Photoelectric effect

Subject concept- Photo electron

Concept Field- Kinetic energy

Question Level-Easy

Expected time to solve- 30sec

- 42.** A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and $\frac{\lambda}{2}$. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function of the surface of the material is:

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

Sol. (4)

$$k_1 = \frac{hc}{\lambda} - \psi \quad k_2 = 2k_1 = \frac{2hc}{\lambda} - \psi = \frac{3hc}{\lambda} - 3\psi$$

$$\text{so, } 2\psi = \frac{hc}{\lambda} \quad \text{so } \psi = \frac{hc}{2\lambda}$$

Topic-Mechanics

Concept-Fluid mechanics

Subject concept- Flow of fluid through non uniform area

Concept Field- Equation of continuity

Question Level-Easy

Expected time to solve- 25 sec

- 43.** The cylindrical tube of a spray pump has radius, R, one end of which has n fine

- (1) $\frac{VR^2}{nr^2}$ (2) $\frac{VR^2}{n^3r^2}$ (3) $\frac{V^2R}{nr}$ (4) $\frac{VR^2}{n^2r^2}$

Sol. (1)

Volume inflow rate = volume inflow rate

$$\pi R^2 V = n\pi r^2 (v) \Rightarrow v = \frac{\pi R^2 V}{n\pi r^2} = \frac{VR^2}{nr^2}$$

Topic-Basic mathematic

Concept-Vectors

Subject concept-Dot product

Concept Field- Condition for orthogonal

Question Level-Easy

Expected time to solve- 30 sec

44. In vectors $\vec{A} = \cos \omega t \hat{i} + \sin \omega t \hat{j}$ and $\vec{B} = \cos \frac{\omega t}{2} \hat{i} + \sin \frac{\omega t}{2} \hat{j}$ are functions of time, then the value of t at which they are orthogonal to each other is:

- (1) $t = \frac{\pi}{2\omega}$ (2) $t = \frac{\pi}{\omega}$ (3) $t = 0$ (4) $t = \frac{\pi}{4\omega}$

Sol. (2)

$$\vec{A} = \cos \omega t \hat{i} + \sin \omega t \hat{j}$$

$$\vec{B} = \cos \frac{\omega t}{2} \hat{i} + \sin \frac{\omega t}{2} \hat{j}$$

for $\vec{A} \cdot \vec{B} = 0 = \cos \omega t \cdot \cos \frac{\omega t}{2} + \sin \omega t \cdot \sin \frac{\omega t}{2}$

$$= \cos \left(\omega t - \frac{\omega t}{2} \right) = \cos \left(\frac{\omega t}{2} \right)$$

so $\frac{\omega t}{2} = \frac{\pi}{2} \Rightarrow t = \frac{\pi}{\omega}$

Topic- Electromagnetism

Concept-EMI

Subject concept- Electric field and magnetic field

Concept Field- Torque required for equilibrium

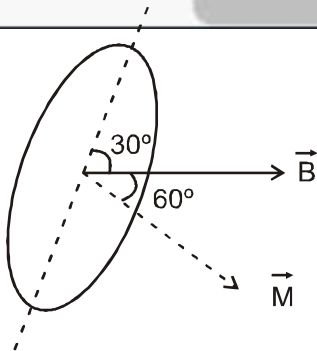
Question Level-Easy

Expected time to solve- 30sec

45. A rectangular coil of length 0.12m and width 0.1m having 50 turns of wire is suspended vertically in a uniform magnetic field of strength 0.2 Weber/m². The coil carries a current of 2A. If the plane of the coil is inclined at an angle of 30° with the direction of the field, the torque required to keep the coil in stable equilibrium will be:

- (1) 0.20 Nm (2) 0.24 Nm (3) 0.12 Nm (4) 0.15 Nm

Sol. (1)



$$\begin{aligned}\vec{\tau} &= \vec{M} \times \vec{B} = MB \sin 60^\circ \\ &= Ni AB \sin 60^\circ \\ &= 50 \times 2 \times 0.12 \times 0.1 \times 0.2 \times \frac{\sqrt{3}}{2} \\ &= 12\sqrt{3} \times 10^{-2} \text{ Nm} = 0.20784 \text{ Nm}\end{aligned}$$

NEET UG 2015 May 3 Chemistry

Question Type: NEET

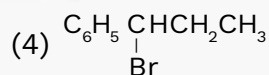
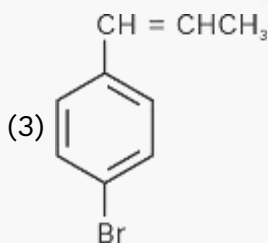
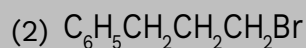
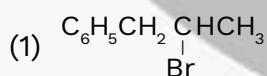
Difficulty of question : Moderate

Expected time to solve : 35 sec.

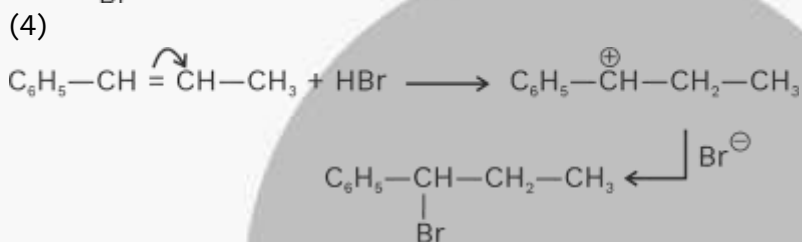
Topic: Organic Chemistry

Concept : Haloalkenes & Haloarenes

1. The reaction of $\text{C}_6\text{H}_5\text{CH}=\text{CHCH}_3$ with HBr produces :-



Sol.



Question Type : NEET

Difficulty of question : Hard

Expected time to solve : 45 sec.

Topic : Physical Chemistry

Concept : Mole Concept

	O_2^-	O_2^+	O_2^{2+}
NO. of e^-	17	15	14
Bond order	1.5	2.5	3.0

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Inorganic Chemistry

Concept : Periodic Table

7. The species Ar, K^+ and Ca^{2+} contain the same number of electrons. In which order do their radii increase ?

(1) $Ca^{2+} < Ar < K^+$

(2) $Ca^{2+} < K^+ < Ar$

(3) $K^+ < Ar < Ca^{2+}$

(4) $Ar < K^+ < Ca^{2+}$

Sol.

(2)

In isoelectronic species

$$\text{Atomic radius} \propto \frac{1}{Z_{\text{eff}}}$$

hence increasing order of radius is $Ca^{2+} < K^+ < Ar$.

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Physical Chemistry

Concept : Chemical Kinetics

8. The activation energy of a reaction can be determined from the slope of which of the following graphs?

(1) $\frac{\ln K}{T}$ vs. T

(2) $\ln K$ vs. $\frac{1}{T}$

(3) $\frac{T}{\ln K}$ vs. $\frac{1}{T}$

(4) $\ln K$ vs. T

Sol.

(2)

Arrhenius equation

$$K = A.e^{-E_a/RT} \Rightarrow \ln K = \ln A - \frac{E_a}{RT}$$

so, activation energy of reaction can be determined from the slope of $\ln K$ vs. $\frac{1}{T}$

Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Inorganic Chemistry

Concept : Chemical Bonding

9. Which of the following pairs of ions are isoelectronic and isostructural?

- (1) ClO_3^- , CO_3^{2-} (2) SO_3^{2-} , CO_3^{2-} (3) ClO_3^- , SO_3^{2-} (4) CO_3^{2-} , SO_3^{2-}

Sol. (3)

	ClO_3^-	SO_3^{2-}
NO. of e^-	42	42
hybridization	sp^3	sp^3

Question Type : NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

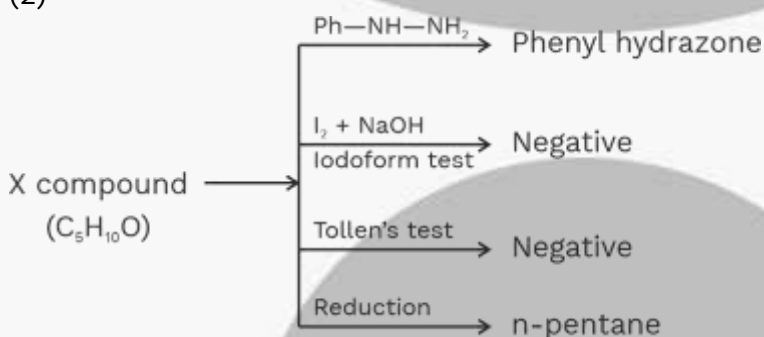
Topic : Organic Chemistry

Concept : Aldehyde Ketones & Carboxylic Acids

10. An organic compound 'X' having molecular formula $\text{C}_5\text{H}_{10}\text{O}$ yields phenyl hydrazone and gives negative response to the Iodoform test and Tollen's test. It produces n-pentane on reduction. 'X' could be :-

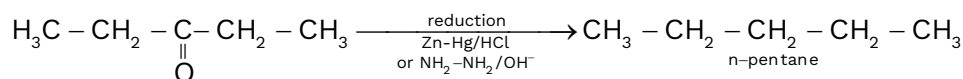
- (1) 2-pentanone (2) 3-pentanone
(3) n-amyl alcohol (4) pentanal

Sol. (2)



According to questions $\text{CH}_3 - \text{CH}_2 - \underset{\text{O}}{\underset{\parallel}{\text{C}}} - \text{CH}_2 - \text{CH}_3$

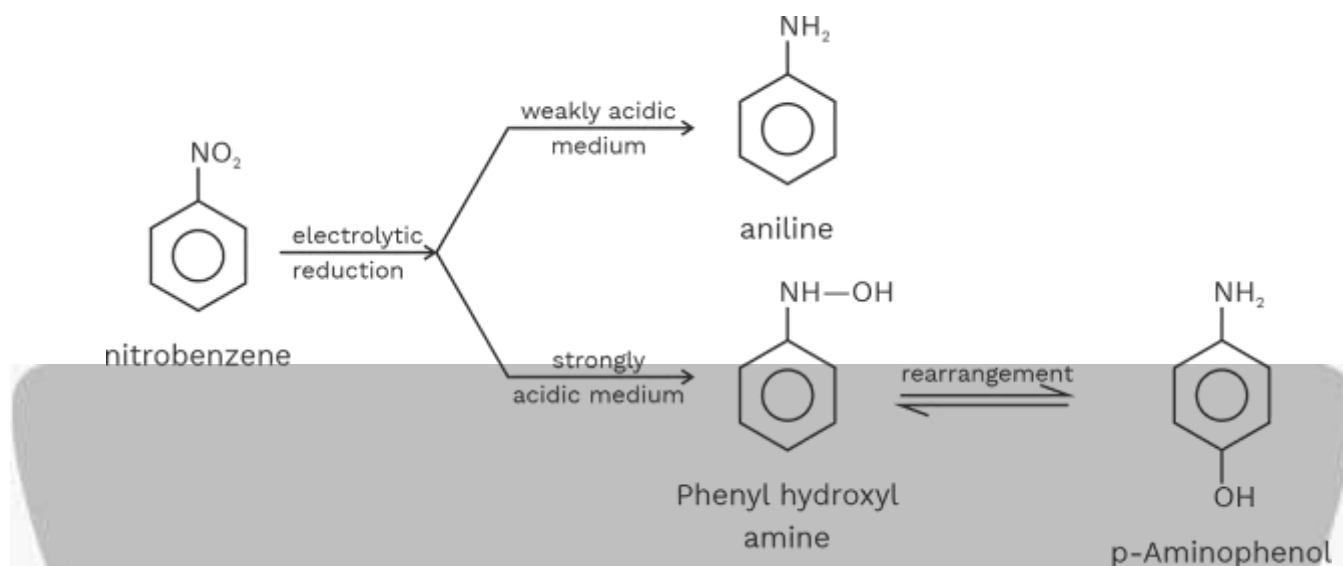
does not give iodoform as well as Tollen's test



Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.



Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Inorganic Chemistry

Concept : d & f-block

14. Magnetic moment 2.84 B.M. is given by :-

(At. no, Ni = 28, Ti = 22, Cr = 24, Co = 27)

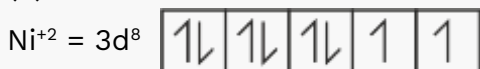
(1) Ti^{3+}

(2) Cr^{2+}

(3) Co^{2+}

(4) Ni^{2+}

Sol. (4)



number of unpaired electrons (n) = 2

$$\therefore \mu = \sqrt{n(n+2)}$$

hence $\mu = 2.8 \text{ B.M.}$, paramagnetic

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Physical Chemistry

Concept : Solid State

15. A given metal crystallizes out with a cubic structure having edge length of 361 pm. If there are four metal atoms in one unit cell, what is the radius of one atom?

(1) 127 pm

(2) 80 pm

(3) 108 pm

(4) 40 pm

Sol. (1)

$$\text{FCC : } r = \frac{a}{2\sqrt{2}} = \frac{361}{2 \times 1.4141} = 127 \text{ pm}$$

Question Type: NEET

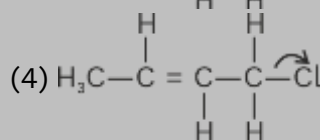
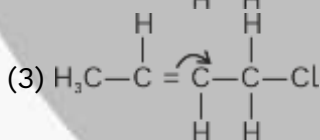
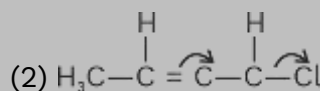
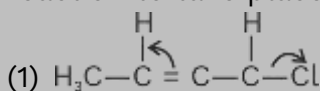
Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Organic Chemistry

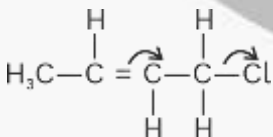
Concept : Hydrocarbon

16. Which of the following is the most correct electron displacement for a nucleophilic reaction to take place?



Sol. (2)

After leaving Cl^- , due to resonance, π bond is also transferred



Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 35 sec.

Topic : Physical Chemistry

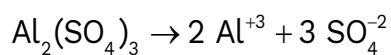
Concept: Liquid Solution

17. Which one of the following electrolytes has the same value of van't Hoff's factor (i) as that of the $\text{Al}_2(\text{SO}_4)_3$ (if all are 100% ionized)?

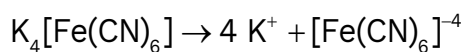


Sol. (3)

van't Hoff factor of



so $n = 5$



so $n = 5 \Rightarrow i = n = 5$

Question Type: NEET

Difficulty of question: Easy

Expected time to solve: 25 sec.

Topic: Inorganic Chemistry

Concept: p-block

18. Nitrogen dioxide and sulphur dioxide have some properties in common. Which property is shown by one of these compounds, but not by the other ?

- (1) is a reducing agent (2) is soluble in water
(3) is used as a food-preservative (4) forms 'acid-rain'

Sol. (3)

NO_2 is not used as food preservative.

Question Type: NEET

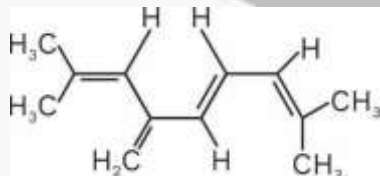
Difficulty of question: Moderate

Expected time to solve: 30 sec.

Topic : Inorganic Chemistry

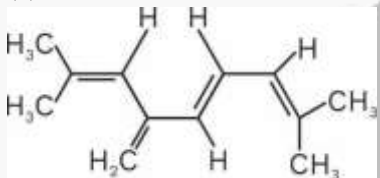
Concept : Chemical Bonding & Molecular Structure

19. The total number of π -bond electrons in the following structure is :-



- (1) 8 (2) 12 (3) 16 (4) 4

Sol. (1)



Total π bonds = 4

Total π electrons = 8

Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Inorganic Chemistry

Concept : s-block

- 20.** Solubility of the alkaline earth's metal sulphates in water decreases in the sequence:-
(1) $\text{Ca} > \text{Sr} > \text{Ba} > \text{Mg}$ (2) $\text{Sr} > \text{Ca} > \text{Mg} > \text{Ba}$
(3) $\text{Ba} > \text{Mg} > \text{Sr} > \text{Ca}$ (4) $\text{Mg} > \text{Ca} > \text{Sr} > \text{Ba}$

Sol. (4)

Due to very small size of Mg^{+2} , Mg^{+2} shows maximum hydration energy.

$\text{MgSO}_4 > \text{CaSO}_4 > \text{SrSO}_4 > \text{BaSO}_4$

Hydration energy ↓

Solubility ↓

Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Inorganic Chemistry

Concept : Chemical Bond

- 21.** Maximum bond angle at nitrogen is present in which of the following?

(1) NO_2^- (2) NO_2^+ (3) NO_3^- (4) NO_2

Sol. (2)

NO_2^+ : sp-hybridisation (bond angle = 180°)

$\text{NO}_2^- < \text{NO}_3^- < \text{NO}_2 < \text{NO}_2^+$

bond angle ↑

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Physical Chemistry

Concept : Chemical Equilibrium

- 22.** If the value of an equilibrium constant for a particular reaction is 1.6×10^{12} , then at equilibrium the system will contain:-

(1) mostly reactants
(2) mostly products
(3) similar amounts of reactants products
(4) all reactants

Sol. (2)

The value of equilibrium constant for reaction

$K = 1.6 \times 10^{12}$

The value of K is very high so the system will contain mostly products at equilibrium.

Question Type : NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Inorganic Chemistry

Concept : d & f-block

23. The number of d-electrons in Fe^{2+} ($Z = 26$) is not equal to the number of electrons in which one of the following?

- (1) p-electrons in Cl ($Z = 17$)
- (2) d-electrons in Fe ($Z = 26$)
- (3) p-electrons in Ne ($Z = 10$)
- (4) s-electrons in Mg ($Z = 12$)

Sol.

(1)

$\text{Fe}^{+2} = 3d^6$ (number of 'd' electrons = 6)

in Cl = $1s^2 2s^2 2p^6 3s^2 3p^5$

total p electrons = 11, which are not equal to number of 'd' electrons in Fe^{+2}

Question Type: NEET

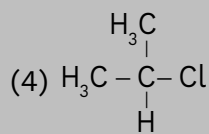
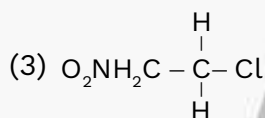
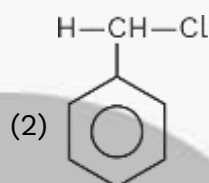
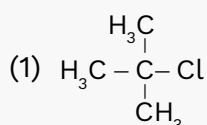
Difficulty of question : Hard

Expected time to solve: 50 sec.

Topic: Organic Chemistry

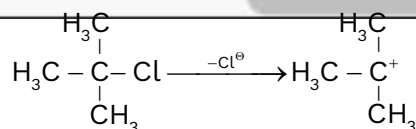
Concept : Reaction Mechanism

24. In which of the following compounds, then C-Cl bond ionization shall give most stable carbonium ion?



Sol.

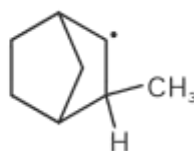
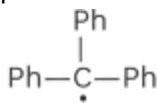
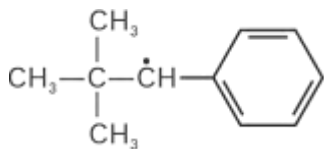
(1)



t-butyl carbonium ion

Concept : GOC

26. Consider that following compound



Hyperconjugation occurs in :-

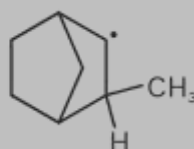
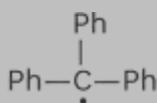
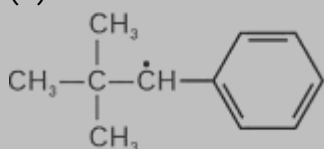
(1) II only

(2) III only

(3) I and III

(4) I only

Sol.



Only (III) has H in conjugation with free radical.

Question Type: NEET

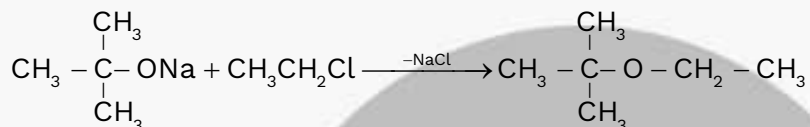
Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Organic Chemistry

Concept : Alkyl Halide

27. The reaction



is called :-

(1) Williamson continuous etherification process

(2) Etard reaction

(3) Gatterman - Koch reaction

(4) Williamson Synthesis

Sol. (4)

Given reaction is an important laboratory method for the preparation of symmetrical and unsymmetrical ethers. In this method, an alkyl halide is allowed to react with sodium alkoxide.

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

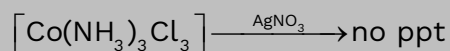
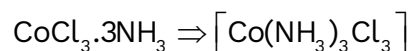
Topic : Inorganic Chemistry

Concept : Coordination Compounds

28. Cobalt (III) chloride forms several octahedral complexes with ammonia. Which of the following will not give test of chloride ions with silver nitrate at 25°C?

- (1) $\text{CoCl}_3 \cdot 4\text{NH}_3$ (2) $\text{CoCl}_3 \cdot 5\text{NH}_3$ (3) $\text{CoCl}_3 \cdot 6\text{NH}_3$ (4) $\text{CoCl}_3 \cdot 3\text{NH}_3$

Sol. (4)



Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Physical Chemistry

Concept : States of Matter

29. A mixture of gases contains H_2 and O_2 gases in the ratio of 1 : 4 (w/w). What is the molar ratio of the two gases in the mixture?

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

Sol. (1)

$$\frac{w_{\text{H}_2}}{w_{\text{O}_2}} = \frac{1}{4} \Rightarrow \frac{n_{\text{H}_2}}{n_{\text{O}_2}} = \frac{1/2}{4/32} = \frac{4}{1}$$

Question Type: NEET

Difficulty of question: Easy

Expected time to solve: 25 sec.

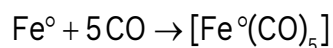
Topic: Inorganic Chemistry

Concept: d & f-block

30. Which of the following processes does not involve oxidation of iron?

- (1) Decolorization of blue CuSO_4 solution by iron
(2) Formation of $\text{Fe}(\text{CO})_5$ from Fe
(3) Liberation of H_2 from steam by iron at high temperature
(4) Rusting of iron sheets

Sol. (3)



No change in the oxidation state of iron.

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Inorganic Chemistry

Concept : d & f-block

31. Because of lanthanoid contraction, which of the following pairs of elements have nearly same atomic radii ? (Numbers in the parenthesis are atomic numbers).

(1) Zr (40) and Nb (41)

(2) Zr (40) and Hf (72)

(3) Zr (40) and Ta (73)

(4) Ti (22) and Zr (40)

Sol. (2)

Due to lanthanide contraction
atomic radii of Zr and Hf is almost similar.

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Physical Chemistry

Concept : Chemical Equilibrium

32. Which of the following statements is correct for a reversible process in a state of equilibrium?

(1) $\Delta G = 2.30 RT \log K$

(2) $\Delta G^\circ = -2.30 RT \log K$

(3) $\Delta G^\circ = 2.30 RT \log K$

(4) $\Delta G = -2.30 RT \log K$

Sol. (2)

$\Delta G^\circ = -2.30RT \log K$
because at equilibrium $\Delta G = 0$

Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Physical Chemistry

Concept : Atomic Structure

33. The angular momentum of electron in 'd' orbital is equal to :-

(1) $\sqrt{2} \hbar$

(2) $2\sqrt{3} \hbar$

(3) $0 \hbar$

(4) $\sqrt{6} \hbar$

Sol. (4)

Orbital angular momentum = $\sqrt{l(l+1)} \cdot \hbar$

for d-orbital $l = 2$

so orbital angular momentum = $\sqrt{2(2+1)} \hbar = \sqrt{6} \hbar$

Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 35 sec.

Topic : Physical Chemistry

Concept : Liquid Solution

34. The boiling point of 0.2 mol kg⁻¹ solution of X in water is greater than equimolar solution of Y in water. Which one of the following statements is true in this case ?

- (1) Molecular mass of X is greater than the molecular mass of Y.
- (2) Molecular mass of X is less than the molecular mass of Y.
- (3) Y is undergoing dissociation in water while X undergoes no change.
- (4) X is undergoing dissociation in water.

Sol.

(4)

$$(\Delta T_b)_x > (\Delta T_b)_y$$

same solvent so, K_b is same

m is same (given)

$$i_x \cdot k_b \cdot m > i_y \cdot k_b \cdot m \Rightarrow i_x > i_y$$

so, x is undergoing dissociation in water.

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Organic Chemistry

Concept : s-block

35. The function of "Sodium pump" is a biological process operating in each and every cell of all animals. Which of the following biologically important ions is also a constituent of this pump :-

(1) Mg^{2+}

(2) K^+

(3) Fe^{2+}

(4) Ca^{2+}

Sol.

(2)

K^+ ion is a constituent of sodium pump

Question Type: NEET

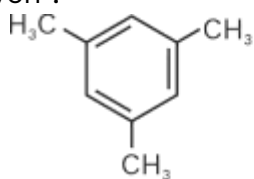
Difficulty of question : Moderate

Expected time to solve : 30 sec.

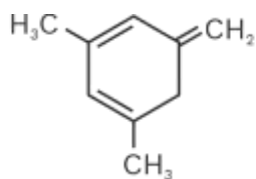
Topic : Organic Chemistry

Concept : Hydrocarbon

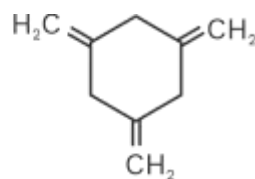
36. Given :-



(I)



(II)

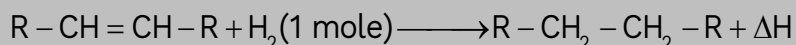


(III)

The enthalpy of the hydrogenation of these compound will be in the order as :-

- (1) III > II > I (2) II > III > I (3) II > I > III (4) I > II > III

Sol. (1)



$$\text{enthalpy of hydrogenation} \propto \frac{1}{\text{stability of alkene}}$$

Question Type: NEET

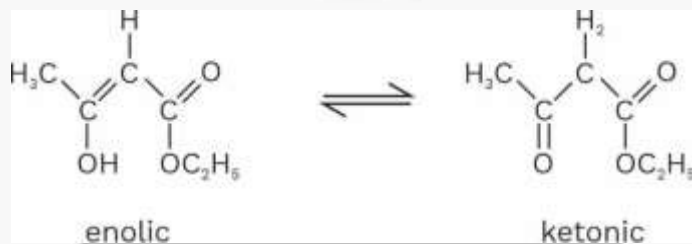
Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Organic Chemistry

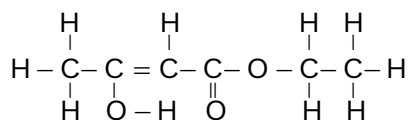
Concept : GOC

37. The enolic form of ethyl acetoacetate as shown below has :-



- (1) 16 sigma bonds and 1 pi bond
 (2) 9 sigma bonds and 2 pi bonds
 (3) 9 sigma bonds and 1 pi bond
 (4) 18 sigma bonds and 2 pi bonds

Sol. (4)



$$18\sigma + 2\pi$$

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic : Organic Chemistry

Concept : Polymers

38. Biodegradable polymer which can be produced from glycine and aminocaproic acid is:-
(1) PHBV (2) Buna - N (3) Nylon 6, 6 (4) Nylon 2- nylon 6

Sol. (4)

Nylon 2-Nylon-6 is an alternating polyamide copolymer of glycine ($\text{NH}_2\text{-CH}_2\text{-COOH}$) and amino caproic acid [$\text{NH}_2\text{-(CH}_2\text{)}_5\text{COOH}$] and is biodegradable.

Question Type: NEET

Difficulty of question: Moderate

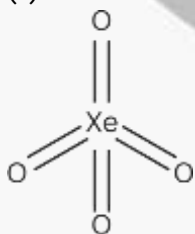
Expected time to solve: 30 sec.

Topic: Inorganic Chemistry

Concept: Chemical Bonding

39. Which of the following species contains equal number of σ - and π - bonds :-
(1) XeO_4 (2) $(\text{CN})_2$ (3) $\text{CH}_2(\text{CN})_2$ (4) HCO_3^-

Sol. (1)



number of σ bonds = 4

number of π bonds = 4

Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

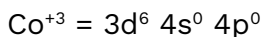
Topic : Inorganic Chemistry

Concept : Coordination Compound

40. Which of these statements about $[\text{Co}(\text{CN})_6]^{3-}$ is true:-

- (1) $[\text{Co}(\text{CN})_6]^{3-}$ has four unpaired electrons and will be in a low-spin configuration.
(2) $[\text{Co}(\text{CN})_6]^{3-}$ has four unpaired electrons and will be in a high spin configuration.
(3) $[\text{Co}(\text{CN})_6]^{3-}$ has no unpaired electrons and will be in a high-spin configuration.
(4) $[\text{Co}(\text{CN})_6]^{3-}$ has no unpaired electrons and will be in a low-spin configuration.

Sol. (4)



∴ in presence of strong field ligand, pairing of electrons occurs so in this complex no unpaired electron is present and it is low spin complex.

Question Type: NEET

Difficulty of question : Easy

Expected time to solve : 25 sec.

Topic: Physical Chemistry

Concept: States of Matter

41. Which one is not equal to zero for an ideal solution:-

- (1) ΔS_{mix} (2) ΔV_{mix} (3) $\Delta P = P_{\text{observed}} - P_{\text{Raoult}}$ (4) ΔH_{mix}

Sol. (1)

For an ideal solution $\Delta S_{\text{mix}} > 0$

Question Type: NEET

Difficulty of question : Easy

Expected time to solve: 25 sec.

Topic: Physical Chemistry

Concept: Surface Chemistry

42. Which property of colloidal solution is independent of charge on the colloidal particles:-

- (1) Electrophoresis (2) Electro-osmosis
(3) Tyndall effect (4) Coagulation

Sol. (3)

Tyndall effect is an optical property, so it is independent of charge.

Question Type: NEET

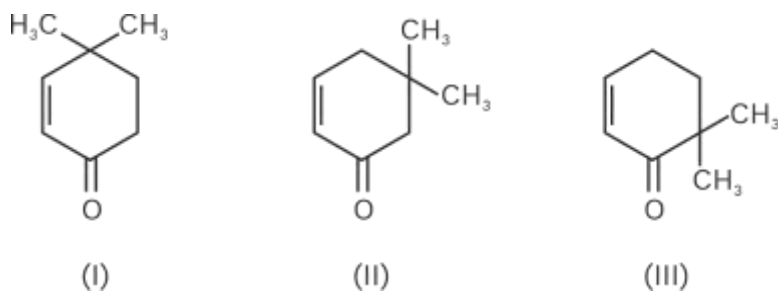
Difficulty of question: Hard

Expected time to solve: 40 sec.

Topic: Organic Chemistry

Concept: GOC

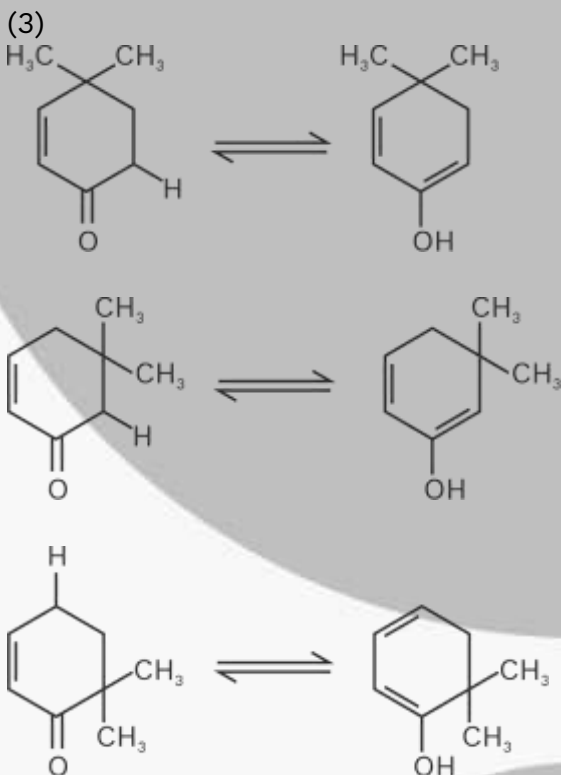
43. Given :



Which of the given compounds can exhibit tautomerism?

- (1) I and III (2) II and III (3) I, II and III (4) I and II

Sol.



Question Type: NEET

Difficulty of question : Moderate

Expected time to solve : 30 sec.

Topic : Physical Chemistry

Concept : Chemical Kinetics

44. When initial concentration of a reactant is doubled in a reaction, its half-life period is not affected. The order of the reaction is :-

- (1) First (2) Second
 (3) More than zero but less than first (4) Zero

Sol.

(1)

$$t_{1/2} = \frac{0.693}{K} \text{ for first order } t_{1/2} \text{ is independent of concentration.}$$

Question Type: NEET

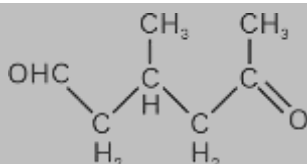
Difficulty of question : Moderate

Expected time to solve : 30 sec.

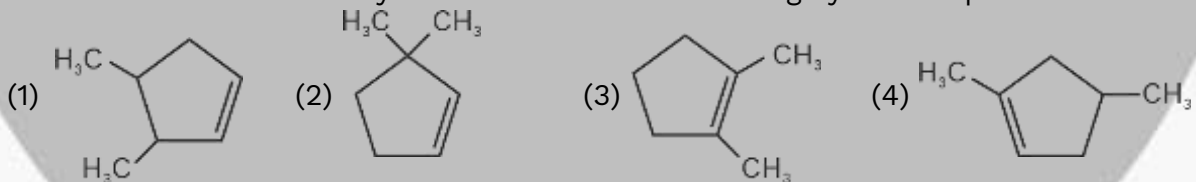
Topic: Organic Chemistry

Concept: Aldehyde Ketones & Carboxylic Acid

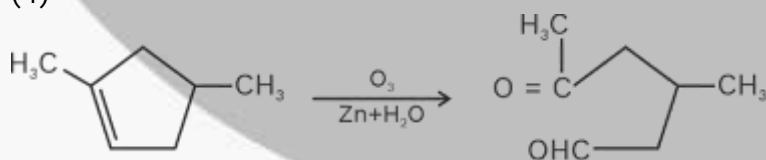
45. A single compound of the structure :-



is obtainable from ozonolysis of which of the following cyclic compounds ?



Sol. (4)



Biology

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Animal Kingdom

Concept: Phylum Aschelminthes

Sub-concept: Parasitic Nematodes

Concept field: Endoparasites: *Trichinella spiralis*

1. Which of the following endoparasites of humans does show viviparity?

- (1) *Enterobius vermicularis*
- (2) *Trichinella spiralis*
- (3) *Ascaris lumbricoides*
- (4) *Ancylostoma duodenale*

Answer (2)

Sol. *Trichinella spiralis* is a nematode parasite that infects the human intestine, and the female produces larvae that enters the blood circulation. *Enterobius*, *Ascaris* and *Ancylostoma* are oviparous.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Biodiversity and Conservation

Concept: Biodiversity Conservation

Sub-concept: How do we conserve biodiversity?

Concept field: In-situ and Ex-situ Conservation

2. Cryopreservation of gametes of threatened species in viable and fertile conditions can be referred to as
- (1) Advanced ex-situ conservation of biodiversity
 - (2) In-situ conservation by sacred groves
 - (3) In-situ cryopreservation of biodiversity
 - (4) In-situ conservation of biodiversity

Answer (1)

Sol. Gametes of threatened species are preserved in viable and fertile conditions for long periods using cryopreservation. Cryopreservation is an advanced ex-situ conservation technique.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 40 secs

Topic: Biological Classification

Concept: 5 Kingdom Classification

Sub-concept: Kingdom Fungi

Concept field: Reproduction in Fungi

3. Which one of the following matches is correct?

(1)	<i>Alternaria</i>	Sexual reproduction absent	Deuteromycetes
(2)	<i>Mucor</i>	Reproduction by Conjugation	Ascomycetes
(3)	<i>Agaricus</i>	Parasitic fungus	Basidiomycetes
(4)	<i>Phytophthora</i>	Aseptate mycelium	Basidiomycetes

Answer (1)

Sol. Sexual reproduction is absent in Deuteromycetes (imperfect fungi).

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Mineral Nutrition

Concept: Essential Mineral Elements

Sub-concept: Criteria for Essentiality

Concept field: Macronutrients

4. Minerals known to be required in large amounts for plant growth include
- (1) calcium, magnesium, manganese, copper
 - (2) potassium, phosphorus, selenium, boron
 - (3) magnesium, sulphur, iron, zinc
 - (4) phosphorus, potassium, sulphur, calcium

Answer (4)

Sol. Minerals required in large amounts for plant growth are known as macronutrients, e.g., carbon, hydrogen, phosphorous, potassium, sulphur and calcium, etc.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Strategies for Enhancement in Food Production

Concept: Plant Breeding and Tissue Culture

Sub-concept: Tissue Culture

Concept field: Steps of Tissue Culture

5. Which of the following enhances or induces fusion of protoplasts?

- (1) Polyethylene glycol and sodium nitrate
- (2) IAA and kinetin
- (3) IAA and gibberellins
- (4) Sodium chloride and potassium chloride

Answer (1)

Sol. Polyethylene glycol and sodium nitrate induces fusion of protoplasts.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Human Reproduction

Concept: Parturition and Lactation

Sub-concept: Hormone Regulation During Parturition

Concept field: Hormone Regulation During Parturition

6. Which of these is not an important component of initiation of parturition in humans?

- (1) Synthesis of prostaglandins
- (2) Release of oxytocin
- (3) Release of prolactin
- (4) Increase in estrogen and progesterone ratio

Answer (3)

Sol. Prolactin is required for lactation and the development of mammary glands.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Plant Kingdom

Concept: Divisions in Plant Kingdom

Sub-concept: Gymnosperms

Concept field: Gymnosperms

7. In which of the following gametophyte is not independent free living?

- (1) *Marchantia*
- (2) *Pteris*
- (3) *Pinus*
- (4) *Funaria*

Answer (3)

Sol. Gametophyte is not independent free living in gymnosperms and angiosperms.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Reproductive Health

Concept: Sexually Transmitted Infections

Sub-concept: STDs

Concept field: STDs

-
8. Which of the following is not a sexually transmitted disease?
(1) Acquired Immuno Deficiency Syndrome (AIDS)
(2) Trichomoniasis
(3) Encephalitis
(4) Syphilis

Answer (3)

Sol. Encephalitis is a viral disease that is transmitted by the culex mosquitoes – *culex tritaeniorhynchus*.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 20 secs

Topic: Morphology of Flowering Plants

Concept: The Leaf

Sub-concept: Modifications of Leaf

Concept field: Modifications of Leaf

9. Leaves become modified into spines in
(1) *Pea*
(2) *Onion*
(3) *Silk Cotton*
(4) *Opuntia*

Answer (4)

Sol. In *Opuntia*, leaves are modified into spines.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Transportation in Plants

Concept: Transpiration

Sub-concept: Transpiration

Concept field: Stomatal Movements

10. Which one gives the most valid and recent explanation for stomatal movements?
(1) Potassium influx and efflux
(2) Starch hydrolysis
(3) Guard cell photosynthesis
(4) Transpiration

Answer (1)

Sol. Stomatal movement is well explained by potassium influx and efflux.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 20 secs

Topic: Evolution

Concept: Origin and Evolution of Man

Sub-concept: Human Evolution

Concept field: Human Evolution

11. Which of the following had the smallest brain capacity?
(1) *Homo sapiens*
(2) *Homo neanderthalensis*
(3) *Homo habilis*
(4) *Homo erectus*

Answer (3)

Sol. *Homo habilis* has the smallest brain capacity, i.e., 650–800 cc.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Environmental Issues

Concept: Water Pollution

Sub-concept: Water Pollution and its Control

Concept field: Domestic Sewage and Industrial Effluents

12. High value of BOD (Biochemical Oxygen Demand) indicates that

- (1) Water is highly polluted.
- (2) Water is less polluted.
- (3) Consumption of organic matter in the water is higher by the microbes.
- (4) Water is pure.

Answer (1)

Sol. High BOD indicates that the water is highly polluted.

Question type: AIPMT

Difficulty of question: Difficult

Expected time to solve: 30 secs

Topic: Locomotion and Movement

Concept: Muscle

Sub-concept: Mechanism of Muscle Contraction

Concept field: Sliding Filament Theory

13. Sliding filament theory can be best explained as

- (1) Actin and myosin filaments shorten and slide pass each other.
- (2) Actin and myosin filaments do not shorten but rather slide pass each other.
- (3) When myofilaments slide pass each other, myosin filaments shorten while actin filaments do not shorten.
- (4) When myofilaments slide pass each other actin filaments shorten while myosin filament does not shorten.

Answer (2)

Sol. Actin and myosin filaments slide over each other during muscle contraction as shown by stages in cross bridge formation.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Neural Control and Coordination

Concept: Sensory Reception and Processing

Sub-concept: The Ear

Concept field: Components of Ear

14. A gymnast is able to balance his body upside down even in the total darkness because of

- (1) Vestibular apparatus
- (2) Tectorial membrane
- (3) Organ of Corti
- (4) Cochlea

Answer (1)

Sol. Primary function of the vestibular apparatus is balancing.

Question type: AIPMT

Difficulty of question: Difficult
Expected time to solve: 35 secs
Topic: Principles of Inheritance and Variation
Concept: Inheritance of One Gene
Sub-concept: Law of Segregation
Concept field: Co-dominance

15. A man with blood group 'A' marries a woman with blood group 'B'. What are all the possible blood groups of their offsprings?
- (1) A, B and AB only
 - (2) A, B, AB and O
 - (3) O only
 - (4) A and B only

Answer (2)

Sol. Thus, all four types of blood groups are possible.

Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 20 secs
Topic: Plant Growth and Development
Concept: Growth
Sub-concept: Growth Rate in Plants
Concept field: Growth Curve in Plants

16. Typical growth curve in plants is
- (1) Linear
 - (2) Stair-steps shaped
 - (3) Parabolic
 - (4) Sigmoid

Answer (4)

Sol. Growth curve in plants is sigmoid involving lag phase, exponential phase and stationary phase.

Question type: AIPMT
Difficulty of question: Moderate
Expected time to solve: 20 secs
Topic: Environmental Issues
Concept: Climate Change
Sub-concept: UN Conference on Climate Change
Concept field: UN Conference on Climate Change

17. The UN Conference of Parties on climate change in the year 2011 was held in
- (1) South Africa
 - (2) Peru
 - (3) Qatar
 - (4) Poland

Answer (1)

Sol. The 2011 UN conference of parties on climate change was held in South Africa.

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: Micropropagation

Concept field: Techniques of Micropropagation

18. A technique of micropropagation is
- (1) Somatic embryogenesis
 - (2) Protoplast fusion
 - (3) Embryo rescue
 - (4) Somatic hybridization

Answer (1)

Sol. Somatic embryogenesis is a technique of raising somatic embryos in laboratory conditions by culturing somatic cells.

Question type: AIPMT

Difficulty of question: Easy

Expected time to solve: 20 secs

Topic: Principles of Inheritance and Variation

Concept: Mendel's Experiment

Sub-concept: Characters of Pea Plant used in Mendel's Experiment

Concept field: Characters of Pea Plant used in Mendel's Experiment

19. How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments?
- (1) Six
 - (2) Eight
 - (3) Seven
 - (4) Five

Answer (3)

Sol. Mendel used 7 contrasting characters in pea plants like seed colour, seed shape, pod shape, flower colour, flower position, stem height, pod colour.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 20 secs

Topic: Morphology of Flowering Plants

Concept: The Flower

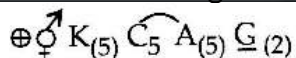
Sub-concept: Floral Formula

Concept field: Floral Formula of Solanaceae

20. $\oplus \overset{\uparrow}{\ominus} K_{(5)} \overset{\curvearrowright}{C}_5 A_{(5)} \underline{G}_{(2)}$ is the floral formula of
- (1) *Sesbania*
 - (2) *Petunia*
 - (3) *Brassica*
 - (4) *Allium*

Answer (2)

Sol. Petunia belongs to the Family Solanaceae that has floral formula as:



Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Biotechnology and its Applications

Concept: Biotechnological Applications in Agriculture

Sub-concept: Pest Resistant Plants

Concept field: Pest Resistant Plants

-
21. The crops engineered for glyphosate are resistant/ tolerant to
- (1) Bacteria
 - (2) Insects
 - (3) Herbicides
 - (4) Fungi

Answer (3)

Sol. Crops engineered for glyphosate are tolerant to herbicides.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Digestion and Absorption

Concept: Digestive System

Sub-concept: Alimentary Canal

Concept field: T.S. of Gut

22. Which of the following statements is not correct?
- (1) Goblet cells are present in the mucosa of the intestine and secrete mucus.
 - (2) Oxyntic cells are present in the mucosa of the stomach and secrete HCL.
 - (3) Acini are present in the pancreas and secrete carboxypeptidase.
 - (4) Brunner's glands are present in the submucosa of the stomach and secrete pepsinogen.

Answer (4)

Sol. Brunner's glands are predominantly located in the duodenal submucosa.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 40 secs

Topic: Molecular Basis of Inheritance

Concept: The DNA

Sub-concept: Structure of Polynucleotide Chain

Concept field: Chargaff's Rule

23. In sea urchin DNA, which is double-stranded, 17% of the bases were shown to be cytosine. The percentages of the other three bases expected to be present in this DNA are

- (1) G 17%, A 16.5%, T 32.5%
- (2) G 17%, A 33%, T 33%
- (3) G 8.5%, A 50%, T 24.5%
- (4) G 34%, A 24.5%, T 24.5%

Answer (2)

Sol. According to Chargaff's rule, the percentage of guanine, adenine and thymine must be 17%, 33% and 33% respectively.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Biotechnology and its Applications

Concept: Biotechnological Applications in Agriculture

Sub-concept: Bt Cotton

Concept field: Bt Toxin Genes

24. In Bt cotton, the Bt toxin present in plant tissue as pro-toxin is converted into active toxin due to

- (1) Acidic pH of the insect gut.

-
- (2) Action of gut micro-organisms.
 - (3) Presence of conversion factors in insect gut.
 - (4) Alkaline pH of the insect gut.

Answer (4)

Sol. Bt toxin is present in the plants as pro-toxin that is converted into active toxin due to alkaline pH of insect gut.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Cell: The Unit of Life

Concept: Eukaryotic Cell Organelles

Sub-concept: Mitochondria

Concept field: Cristae of Mitochondria

- 25.** Cytochromes are found in
- (1) Outer wall of mitochondria
 - (2) Cristae of mitochondria
 - (3) Lysosomes
 - (4) Matrix of mitochondria

Answer (2)

Sol. Cytochromes are found in cristae of mitochondria.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 40 secs

Topic: Plant Kingdom

Concept: Divisions in Plant Kingdom

Sub-concept: Algae, Bryophytes and Pteridophytes

Concept field: Algae, Bryophytes and Pteridophytes

- 26.** Read the following five statements (A to E) and select the option with all correct statements.
- (A) Mosses and Lichens are the first organisms to colonise bare rock.
 - (B) *Selaginella* is a homosporous pteridophyte.
 - (C) Coralloid roots in *Cycas* have VAM.
 - (D) Main plant body in bryophytes is gametophytic, whereas in pteridophytes it is sporophytic.
 - (E) In gymnosperms, male and female gametophytes are present within sporangia located on sporophyte.
- (1) (B), (C) and (D)
 - (2) (A), (D) and (E)
 - (3) (B), (C) and (E)
 - (4) (A), (C) and (D)

Answer (2)

Sol.

- *Selaginella* is a heterosporous pteridophyte.
- *Cycas* have small, specialized roots called coralloid roots that are associated with N₂-fixing cyanobacteria.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Body Fluids and Circulation

Concept: Components of Blood
Sub-concept: Components of Blood
Concept field: Components of Blood

27. Which one of the following is correct?
- (1) Serum = Blood + Fibrinogen
 - (2) Lymph = Plasma + RBC + WBC
 - (3) Blood = Plasma + RBC + WBC
 - (4) Plasma = Blood + Lymphocytes

Answer (3)

Sol. Blood is made up of plasma, RBCs and WBCs.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Principles of Inheritance and Variation

Concept: Mutation

Sub-concept: Chromosomal Aberrations

Concept field: Chromosomal Aberrations

28. The movement of a gene from one linkage group to another is called
- (1) Duplication
 - (2) Translocation
 - (3) Crossing over
 - (4) Inversion

Answer (2)

Sol. Translocation is the movement of a gene from one linkage group to another.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Biotechnology and its Applications

Concept: Biotechnology Regulations

Sub-concept: Genetic Engineering Approval Committee

Concept field: Regulation of Genetic Engineering Approval Committee

29. Which body of the Government of India regulates GM research and safety of introducing GM organisms for public services?
- (1) Indian Council of Agricultural Research
 - (2) Genetic Engineering Approval Committee
 - (3) Research Committee on Genetic Manipulation
 - (4) Bio-safety Committee

Answer (2)

Sol. GEAC (Genetic Engineering Approval Committee) regulates GM research and safety of its introduction for public services.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Environmental Issues

Concept: Agrochemicals and their Effects

Sub-concept: Silent Spring Book

Concept field: Silent Spring Book

30. Rachel Carson's famous book 'Silent Spring' is related to
- (1) Noise pollution

-
- (2) Population explosion
 - (3) Ecosystem management
 - (4) Pesticide pollution

Answer (4)

Sol. Rachel Carson is the author of the book 'Silent Spring' which is based on environmental science.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Digestion and Absorption

Concept: Digestion of Food

Sub-concept: Gastric Juice

Concept field: Gastric Juice of Infants

- 31.** Gastric juice of infants contains
- (1) nuclease, pepsinogen, lipase
 - (2) pepsinogen, lipase, rennin
 - (3) amylase, rennin, pepsinogen
 - (4) maltase, pepsinogen, rennin

Answer (2)

Sol. Gastric juice of infants contains lipase, rennin and pepsinogen.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Environmental Issues

Concept: Ozone Depletion in Stratosphere

Sub-concept: Harmful Effects of Ozone Depletion

Concept field: Harmful Effects of Ozone Depletion

- 32.** Which of the following is not one of the prime health risks associated with greater UV radiation through the atmosphere due to depletion of stratospheric ozone?
- (1) Reduced Immune System
 - (2) Damage to eyes
 - (3) Increased liver cancer
 - (4) Increased skin cancer

Answer (3)

Sol. Ozone depletion causes harmful radiation exposure that ultimately leads to increased skin cancer, damage to the eyes, and reduced immune system.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Human Reproduction

Concept: Male Reproductive System

Sub-concept: Pre-fertilisation Events

Concept field: Capacitation

- 33.** Capacitation refers to changes in the
- (1) Ovum before fertilization
 - (2) Ovum after fertilization
 - (3) Sperm after fertilization
 - (4) Sperm before fertilization

Answer (4)

Sol. Capacitation is a penultimate step in the maturation of sperm that includes changes in sperms required to render them competent to fertilize an ovum.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Ecosystem

Concept: Ecosystem — Structure and Function

Sub-concept: Interaction of Biotic and Abiotic Components

Concept field: Stratification

34. Most animals are tree-dwellers in a

- (1) Thorn woodland
- (2) Temperate deciduous forest
- (3) Tropical rainforest
- (4) Coniferous forest

Answer (3)

Sol. Vegetation in tropical rain forest is stratified, i.e., each stratum has different fauna because of which most of the animals in this biome are tree dwellers.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Biological Classification

Concept: Classification of Five Kingdoms

Sub-concept: Kingdom Monera

Concept field: Characteristic Features of Kingdom Monera

35. True nucleus is absent in

- (1) *Mucor*
- (2) *Vaucheria*
- (3) *Volvox*
- (4) *Anabaena*

Answer (4)

Sol. *Anabaena* is a prokaryotic organism that belongs to the Kingdom Monera and lacks a nucleus and other organelles.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Locomotion and Movement

Concept: Skeletal System

Sub-concept: Pectoral Girdle

Concept field: Articulation of Humerus with Scapula

36. Glenoid cavity articulates

- (1) Scapula with acromion
- (2) Clavicle with scapula
- (3) Humerus with scapula
- (4) Clavicle with acromion

Answer (3)

Sol. In the pectoral girdle below the acromion is a depression called the glenoid cavity which articulates with the head of the humerus to form the shoulder joint.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 20 secs

Topic: Sexual Reproduction in Flowering Plants

Concept: Pre-fertilisation: Structures and Events

Sub-concept: Pollination

Concept field: Pollination

37. Transmission tissue is the characteristic feature of

- (1) Solid style
- (2) Dry stigma
- (3) Wet stigma
- (4) Hollow style

Answer (1)

Sol. Pollen tube traverses the style in two types — hollow and solid type. Solid style has a core of transmitting tissue through which pollen tube moves.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Cell: The Unit of Life

Concept: Eukaryotic Cell Organelles

Sub-concept: Ribosome

Concept field: Ribosome

38. DNA is not present in

- (1) Ribosomes
- (2) Nucleus
- (3) Mitochondria
- (4) Chloroplast

Answer (1)

Sol. Ribosomes do not have their own DNA. They contain RNA and protein.

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: Lac Operon of *E. coli*

39. Gene regulation governing lactose operon of *E.coli* that involves the lac I gene product is

- (1) Negative and inducible because repressor protein prevents transcription.
- (2) Negative and repressible because repressor protein prevents transcription.
- (3) Feedback inhibition because excess of β -galactosidase can switch off transcription.
- (4) Positive and inducible because it can be induced by lactose.

Answer (1)

Sol. Gene regulation governing lactose operon of *E. coli* is negative and inducible.

Question type: AIPMT

Difficulty of question: Difficult

Expected time to solve: 30 secs

Topic: Excretory Products and their Elimination

Concept: Regulation of Kidney Function

Sub-concept: Hormonal Feedback on Kidneys
Concept field: Renin

40. Which of the following does not favour the formation of large quantities of dilute urine?
- (1) Caffeine
 - (2) Renin
 - (3) Atrial-natriuretic factor
 - (4) Alcohol

Answer (2)

Sol. Renin regulates aldosterone that causes reabsorption of Na^+ and water from DCT. This results in the removal of concentrated urine.

Question type: AIPMT

Difficulty of question: Difficult

Expected time to solve: 35 secs

Topic: Plant Growth and Development

Concept: Plant Growth Regulators

Sub-concept: Auxin

Concept field: Functions of Auxin

41. What causes a green plant exposed to the light on only one side, to bend toward the source of light as it grows?
- (1) Green plants seek light because they are phototropic.
 - (2) Light stimulates plant cells on the lighted side to grow faster.
 - (3) Auxin accumulates on the shaded side, stimulating greater cell elongation there.
 - (4) Green plants need light to perform photosynthesis.

Answer (3)

Sol. Auxin accumulates on the shaded side and stimulates cell elongation. This results in the bending of the plant towards the source of light.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Cell: The Unit of Life

Concept: Eukaryotic Cell Organelles

Sub-concept: Nucleus

Concept field: Nuclear Envelope/Membrane

42. Nuclear envelope is a derivative of
- (1) Membrane of Golgi complex
 - (2) Microtubules
 - (3) Rough endoplasmic reticulum
 - (4) Smooth endoplasmic reticulum

Answer (3)

Sol. Rough ER resembles the nuclear envelope after the completion of cell division.

Question type: AIPMT

Difficulty of question: Difficult

Expected time to solve: 40 secs

Topic: Cell Cycle and Cell Divisions

Concept: Cell Cycle

Sub-concept: Phases of Cell Cycle

Concept field: T Phase and Meiosis Phase

43. Select the correct option.

	I		II
(a)	Synapsis aligns homologous chromosomes	(i)	Anaphase-II
(b)	Synthesis of RNA and protein	(ii)	Zygotene
(c)	Action of enzyme recombinase	(iii)	G ₂ phase
(d)	Centromeres do not separate but chromatids move towards opposite poles	(iv)	Anaphase-I
		(v)	Pachytene

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

Answer (1)

Sol. Zygotene involves the formation of the synaptonemal complex. G₂ phase includes the synthesis of RNA and protein. Enzyme recombinase acts in the pachytene stage. Chromatids separate in Anaphase I.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Morphology of Flowering Plants

Concept: Description of Some Important Families

Sub-concept: Family Papilionaceae

Concept field: Characteristic Features of Papilionaceae

44. Keel is the characteristic feature of a flower of

- (1) Indigofera
- (2) Aloe
- (3) Tomato
- (4) Tulip

Answer (1)

Sol. Keel is a characteristic feature of the flowers of Family Papilionaceae.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 15 secs

Topic: Morphology of Flowering Plants

Concept: The Flower

Sub-concept: Position of Floral Parts on Thalamus

Concept field: Perigynous

45. Perigynous flowers are found in

- (1) Cucumber
- (2) China rose
- (3) Rose
- (4) Guava

Answer (3)

Sol. Perigynous flowers have half-superior and half-inferior ovary, e.g., plum, peach, rose.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Chemical Coordination and Integration

Concept: Human Endocrine System

Sub-concept: Adrenal Gland

Concept field: Hormones of Adrenal Medulla

46. A chemical signal that has both endocrine and neural roles is

- (1) Calcitonin
- (2) Epinephrine
- (3) Cortisol
- (4) Melatonin

Answer (2)

Sol. Adrenaline or epinephrine has both endocrine and neural roles to play.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Biodiversity and Conservation

Concept: Biodiversity Conservation

Sub-concept: How do we Conserve Biodiversity?

Concept field: In-situ and Ex-situ Conservation

47. In which of the following both pairs have correct combination?

- (1) In-situ Conservation: Cryopreservation
Ex-situ Conservation: Wildlife Sanctuary
- (2) In-situ Conservation: Seed Bank
Ex-situ Conservation: National Park
- (3) In-situ Conservation: Tissue culture
Ex-situ Conservation: Sacred groves
- (4) In-situ Conservation: National Park
Ex-situ Conservation: Botanical Garden

Answer (4)

Sol. In-situ conservation is done within the natural habitat of organisms and ex-situ conservation is done outside the natural habitat of organisms.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Human Health and Disease

Concept: AIDS

Sub-concept: Replication of Retrovirus

Concept field: Action of Retrovirus

48. HIV that causes AIDS first starts destroying

- (1) Leucocytes
- (2) Helper T Lymphocytes
- (3) Thrombocytes
- (4) B Lymphocytes

Answer (2)

Sol. HIV first destroys the helper T-lymphocytes and thus reducing immunity.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Reproductive Health

Concept: Population Stabilisation and Birth Control

Sub-concept: Surgical Methods for Birth Control

Concept field: Hysterectomy

49. Hysterectomy is the surgical removal of

- (1) Prostate gland
- (2) Vas-deference
- (3) Mammary glands
- (4) Uterus

Answer (4)

Sol. Hysterectomy is the surgical removal of the uterus. This operation is usually performed to treat cancer.

Question type: AIPMT

Difficulty of question: Difficulty

Expected time to solve: 30 secs

Topic: Excretory Products and their Elimination

Concept: Human Excretory System

Sub-concept: Urine Formation

Concept field: Functions of the Tubules

50. Removal of proximal convoluted tubule from the nephron will result in

- (1) More concentrated urine
- (2) No change in quality and quantity of urine
- (3) No urine formation
- (4) More diluted urine

Answer (4)

Sol. PCT reabsorbs 70–80% of electrolytes and water. Thus, its removal will result in more dilution of urine.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Anatomy of Flowering Plants

Concept: Anatomy of Dicot and Monocot Plants

Sub-concept: Anatomy of Monocot Root

Concept field: Anatomy of Monocot Root

51. A major characteristic of the monocot root is the presence of

- (1) Scattered vascular bundles
- (2) Vasculature without cambium
- (3) Cambium sandwiched between phloem and xylem along the radius
- (4) Open vascular bundles

Answer (2)

Sol. Vascular bundles in monocots are closed type, i.e., without cambium.

Question type: AIPMT

Difficulty of question: Difficult

Expected time to solve: 30 secs

Topic: Animal Kingdom

Concept: Phylum Arthropoda

Sub-concept: Class Insecta

Concept field: Characteristic Features of Class Insecta

52. Which of the following characteristics is mainly responsible for the diversification of insects on land?

- (1) Bilateral symmetry

- (2) Exoskeleton
- (3) Eyes
- (4) Segmentation

Answer (2)

Sol. Exoskeleton is responsible for the diversification of insects on land.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Human Reproduction

Concept: Male Reproductive System

Sub-concept: Gametogenesis

Concept field: Gametogenesis

53. Which of the following cells during gametogenesis is normally diploid?

- (1) Spermatid
- (2) Spermatogonia
- (3) Secondary polar body
- (4) Primary polar body

Answer (2)

Sol. Spermatogonia is diploid (2n). Rest all are haploid structures.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Cell: The Unit of Life

Concept: Eukaryotic Cell Organelles

Sub-concept: Chloroplast

Concept field: Components of Chloroplast

54. The structures that are formed by stacking of organised flattened membranous sacs in the chloroplasts are

- (1) Grana
- (2) Stroma lamellae
- (3) Stroma
- (4) Cristae

Answer (1)

Sol. Grana in chloroplast are formed by stacking of organised flattened membranous sac called thylakoids.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Cell: The Unit of Life

Concept: Eukaryotic Cell Organelles

Sub-concept: Nucleus

Concept field: Types of Chromosomes on the Basis of Position of Centromere

55. The chromosomes in which the centromere is situated close to one end are

- (1) Acrocentric
- (2) Telocentric
- (3) Sub-metacentric
- (4) Metacentric

Answer (1)

Sol. In the case of the acrocentric chromosome, the centromere is situated close to its ends forming one extremely short and one very long arm.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Anatomy of Flowering Plants

Concept: Secondary Growth

Sub-concept: Secondary Growth in Roots

Concept field: Secondary Growth in Roots

- 56.** In a ring girdled plant:
- (1) The root dies first
 - (2) The shoot and root die together
 - (3) Neither root nor shoot will die
 - (4) The shoot dies first

Answer (1)

Sol. The roots die first in a ring-girdled plant.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Ecosystem

Concept: Ecosystem — Structure and Functions

Sub-concept: Biotic and Abiotic Interactions

Concept field: Stratification

- 57.** Vertical distribution of different species occupying different levels in a biotic community is known as
- (1) Stratification
 - (2) Zonation
 - (3) Pyramid
 - (4) Divergence

Answer (1)

Sol. Vertical distribution of different species occupying different levels is called stratification.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Principles of Inheritance and Variation

Concept: Inheritance of One Gene

Sub-concept: Law of Segregation

Concept field: Co-dominance: Multiple Alleles

- 58.** Multiple alleles are present
- (1) At different loci on the same chromosome
 - (2) At the same locus of the chromosome
 - (3) On non-sister chromatids
 - (4) On different chromosomes

Answer (2)

Sol. Multiple alleles are found at the same locus of the chromosome.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Ecosystem

Concept: Energy Flow

Sub-concept: Trophic Levels

Concept field: Standing Crop

59. The mass of living material at a trophic level at a particular time is called

- (1) Standing state
- (2) Net primary productivity
- (3) Standing crop
- (4) Gross primary productivity

Answer (3)

Sol. The mass of living material at a trophic level at a particular time is called a standing crop.

Question type: AIPMT

Difficulty of question: Easy

Expected time to solve: 25 secs

Topic: Animal Kingdom

Concept: Phylum Chordata

Sub-concept: Subphylum Vertebrata

Concept field: Class — Mammalia

60. Which of the following animals is not viviparous?

- (1) Elephant
- (2) Platypus
- (3) Whale
- (4) Flying-fox (Bat)

Answer (2)

Sol. *Ornithorhynchus* (duck-billed platypus) is the only egg-laying mammal.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Ecosystem

Concept: Productivity

Sub-concept: Gross Primary Productivity

Concept field: Gross Primary Productivity

61. In an ecosystem, the rate of production of organic matter during photosynthesis is termed as

- (1) Gross primary productivity
- (2) Secondary productivity
- (3) Net productivity
- (4) Net primary productivity

Answer (1)

Sol. Gross primary productivity of an ecosystem is the rate of production of organic matter during photosynthesis.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Body Fluids and Circulation

Concept: Formal Elements

Sub-concept: Erythrocytes

Concept field: Erythropoiesis

-
62. Erythropoiesis starts in
(1) Liver
(2) Spleen
(3) Red bone marrow
(4) Kidney

Answer (3)

Sol. Erythropoiesis starts in the red bone marrow.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Evolution

Concept: Variation

Sub-concept: Causes of Variation

Concept field: Causes of Variation

63. Which is the most common mechanism of genetic variation in the population of sexually reproducing organisms?
(1) Chromosomal aberrations
(2) Genetic drift
(3) Recombination
(4) Transduction

Answer (3)

Sol. Recombination is the most common method for variation.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Body Fluids and Circulation

Concept: Circulatory Pathways

Sub-concept: Cardiac Cycle

Concept field: Blood Pressure

64. Blood pressure in the mammalian aorta is maximum during
(1) Diastole of the right ventricle
(2) Systole of the left ventricle
(3) Diastole of the right atrium
(4) Systole of the left atrium

Answer (2)

Sol. Left ventricle has the thickest wall and thus, it applies great pressure on blood during its systole.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Breathing and Exchange of Gases

Concept: Respiratory Organs

Sub-concept: Human Respiratory System

Concept field: Human Respiratory System

65. When you hold your breath, which of the following gas changes in blood would first lead to the urge to breathe?
(1) rising CO₂ concentration
(2) falling CO₂ concentration

-
- (3) rising CO₂ and falling O₂ concentration
 - (4) falling O₂ concentration

Answer (1)

Sol. The rising CO₂ concentration in blood leads to the urge to breathe while holding our breath.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Anatomy of Flowering Plants

Concept: The Tissue System

Sub-concept: Vascular Tissue System

Concept field: Vascular Tissue System

- 66.** Vascular bundles in monocotyledons are considered closed because
- (1) Cambium is absent.
 - (2) There are no vessels with perforations.
 - (3) Xylem is surrounded all around by phloem.
 - (4) A bundle sheath surrounds each bundle.

Answer (1)

Sol. In monocots vascular bundle is closed type due to the absence of cambium.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Plant Kingdom

Concept: Algae

Sub-concept: Reproduction in Algae

Concept field: Reproduction in Algae

- 67.** Male gametes are flagellated in
- (1) *Anabaena*
 - (2) *Ectocarpus*
 - (3) *Spirogyra*
 - (4) *Polysiphonia*

Answer (2)

Sol. Male gametes are flagellated in *Ectocarpus*.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Sexual Reproduction in Flowering Plants

Concept: Pre-Fertilisation: Structures and Events

Sub-concept: Pollination

Concept field: Types of Pollination

- 68.** Which one of the following may require pollinators, but is genetically similar to autogamy?
- (1) Xenogamy
 - (2) Apogamy
 - (3) Cleistogamy
 - (4) Geitonogamy

Answer (4)

Sol. Geitonogamy is genetically similar to autogamy.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Reproduction in Organisms

Concept: Asexual Reproduction

Sub-concept: Vegetative Propagation in Plants

Concept field: Unit of Vegetative Propagation

69. In ginger vegetative propagation occurs through

- (1) Offsets
- (2) Bulbils
- (3) Runners
- (4) Rhizome

Answer (4)

Sol. In ginger, rhizomes are the vegetative unit that is capable of giving rise to new offspring.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Cell: The Unit of Life

Concept: Cell Envelope and its Modifications

Sub-concept: Ribosomes and Inclusion Bodies

Concept field: Inclusion Bodies

70. Which one of the following is not an inclusion body found in prokaryotes?

- (1) Cyanophycean granule
- (2) Glycogen granule
- (3) Polysome
- (4) Phosphate granule

Answer (3)

Sol. Phosphate, glycogen and cyanophycean granules are the inclusion bodies of prokaryotes.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Cell Cycle and Cell Division

Concept: Cell Cycle

Sub-concept: Phases of Cell Cycle

Concept field: Interphase: S-Phase

71. A somatic cell that has just completed the S-phase of its cell cycle, as compared to gamete of the same species, has

- (1) same number of chromosomes but twice the amount of DNA.
- (2) twice the number of chromosomes and four times the amount of DNA.
- (3) four times the number of chromosomes and twice the amount of DNA.
- (4) twice the number of chromosomes and twice the amount of DNA.

Answer (2)

Sol. During S-phase, the amount of DNA doubles per cell.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Principles of Inheritance and Variation

Concept: Inheritance of One Gene

Sub-concept: Alleles

Concept field: Alleles

- 72.** Alleles are
- (1) true breeding homozygotes
 - (2) different molecular forms of a gene
 - (3) heterozygotes
 - (4) different phenotype

Answer (2)

Sol. Alleles are the alternate forms of a gene.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Cell: The Unit of Life

Concept: Eukaryotic Cell

Sub-concept: Eukaryotic Cell Organelles

Concept field: Functions of Organelles

- 73.** Select the correct matching in the following pairs
- (1) Smooth ER — Synthesis of lipids
 - (2) Rough ER — Synthesis of glycogen
 - (3) Rough ER — Oxidation of fatty acids
 - (4) Smooth ER — Oxidation of phospholipids

Answer (1)

Sol. Lipids are synthesised in smooth ER.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Structural Organisation of Animals

Concept: Cockroach

Sub-concept: External Features of Cockroach

Concept field: Exoskeleton of Cockroach

- 74.** The terga, sterna and pleura of the cockroach body are joined by
- (1) Muscular tissue
 - (2) Arthroal membrane
 - (3) Cartilage
 - (4) Cementing glue

Answer (2)

Sol. Arthroal membrane joins terga, sterna and pleura in the cockroach.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 40 secs

Topic: Animal Kingdom

Concept: Phylum Chordata

Sub-concept: Subphylum Vertebrata

Concept field: Class — Chondrichthyes, Cyclostomata, Aves, Mammalia

- 75.** Which of the following represents the correct combination without any exception?

Characteristics	Class
(1) Mouth ventral, gills without operculum; skin with placoid scales; persistent notochord	Chondrichthyes
(2) Sucking and circular mouth; jaws absent, integument without scales; paired appendages	Cyclostomata

-
- (3) Body covered with feathers; skin moist and glandular; fore-limbs form wings; lungs with air sacs Aves
- (4) Mammary gland; hair on body; pinnae; two pairs of limbs Mammalia

Answer (1)

Sol. Ventral mouth, gills without operculum, placoid scales and persistent notochord are some characteristic features of Chondrichthyes.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Biomolecules

Concept: Enzymes

Sub-concept: Factors Affecting Enzyme Activity

Concept field: Inhibitors

76. Which one of the following statements is incorrect?

- (1) In competitive inhibition, the inhibitor molecule is not chemically changed by the enzyme.
- (2) The competitive inhibitor does not affect the rate of breakdown of the enzyme-substrate complex.
- (3) The presence of the competitive inhibitor decreases the K_m of the enzyme for the substrate.
- (4) A competitive inhibitor reacts reversibly with the enzyme to form an enzyme-inhibitor complex.

Answer (3)

Sol. The presence of competitive inhibitor increases the K_m and V_{max} is unchanged.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 25 secs

Topic: Neural Control and Coordination

Concept: Central Nervous System

Sub-concept: Hind Brain

Concept field: Function of Cerebellum

77. Which of the following regions of the brain is incorrectly paired with its function?

- (1) Cerebellum — language comprehension
- (2) Corpus callosum — communication between the left and right cerebral cortices
- (3) Cerebrum — calculation and contemplation
- (4) Medulla oblongata — homeostatic control

Answer (1)

Sol. Coordination of body movements is controlled by cerebellum.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 40 secs

Topic: Sexual Reproduction in Flowering Plants

Concept: Pre-Fertilisation: Structures and Events

Sub-concept: Pollination

Concept field: Agents of Pollination

78. Which one of the following statements is not true?

-
- (1) Pollen grains of some plants cause severe allergies and bronchial afflictions in some people.
 - (2) The flowers pollinated by flies and bats secrete foul odour to attract them.
 - (3) Honey is made by bees by digesting pollen collected from flowers.
 - (4) Pollen grains are rich in nutrients, and they are used in the form of tablets and syrups.

Answer (3)

Sol. Honeybee regurgitates the nectar and thus, it converts the carbohydrate into honey. After several regurgitation and evaporation, honey is formed.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Human Health and Disease

Concept: Common Diseases in Humans

Sub-concept: Amoebiasis

Concept field: Life Cycle of *Entamoeba Histolytica*

79. The active form of *Entamoeba histolytica* feeds upon:

- (1) mucosa and submucosa of the colon only
- (2) food in the intestine
- (3) blood only
- (4) erythrocytes; mucosa and submucosa of the colon

Answer (4)

Sol. *Entamoeba histolytica* feeds on erythrocytes, mucosa and submucosa of colon in its active form.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Reproductive Health

Concept: STDs

Sub-concept: STDs

Concept field: Vectors for Sexually Transmitted Diseases

80. Which of the following viruses is not transferred through the semen of an infected male?

- (1) Human immunodeficiency virus
- (2) Chikungunya virus
- (3) Ebola virus
- (4) Hepatitis B virus

Answer (2)

Sol. *Aedes aegypti* is the vector for transmitting the Chikungunya virus.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Evolution

Concept: Hardy-Weinberg Principle

Sub-concept: Factors Affecting Hardy-Weinberg Equilibrium

Concept field: Factors Affecting Hardy-Weinberg Equilibrium

81. A population will not exist in Hardy-Weinberg equilibrium if

- (1) There are no mutations.
- (2) There is no migration.
- (3) The population is large.

(4) Individuals mate selectively.

Answer (4)

Sol. For maintaining Hardy-Weinberg equilibrium, a population must be randomly mating.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 20 secs

Topic: Microbes in Human Welfare

Concept: Microbes in Production of Biogas

Sub-concept: Microbes in Production of Biogas

Concept field: Methanogens

82. The guts of cow and buffalo possess

(1) *Chlorella* spp.

(2) Methanogens

(3) Cyanobacteria

(4) *Fucus* spp.

Answer (2)

Sol. The guts of cows and buffalos possess methanogens that help in the breakdown of cellulose.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Sexual Reproduction in Flowering Plants

Concept: Pre-Fertilisation: Structures and Events

Sub-concept: Ovule and Embryo Sac

Concept field: Megasporangium: Structure

83. The hilum is a scar on the

(1) Fruit, where it was attached to pedicel.

(2) Fruit, where style was present.

(3) Seed, where micropyle was present.

(4) Seed, where funicle was attached.

Answer (4)

Sol. The body of the ovule fuses with the funicle in the region called hilum.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Ecosystem

Concept: Ecological Succession

Sub-concept: Succession

Concept field: Types of Succession

84. Secondary Succession takes place on/in

(1) Degraded forest

(2) Newly created pond

(3) Newly cooled lava

(4) Bare rock

Answer (1)

Sol. Secondary succession takes place in areas where biotic communities have been destroyed e.g., degraded forests, burned forests etc.

Question type: AIPMT

Difficulty of question: Moderate
Expected time to solve: 30 secs
Topic: Plant Kingdom

Concept: Algae

Sub-concept: Types of Algae

Concept field: Stored Food in Different Algae

85. Which one of the following statements is wrong?
- (1) Agar-agar is obtained from *Gelidium* and *Gracilaria*.
 - (2) *Chlorella* and *Spirulina* are used as space food.
 - (3) Mannitol has stored food in Rhodophyceae.
 - (4) Algin and carrageen are products of algae.

Answer (3)

Sol. Mannitol and laminarin are stored food in Phaeophyceae. Floridean starch is stored food in Rhodophyceae.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 35 secs

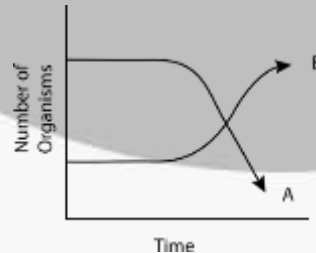
Topic: Organism and Population

Concept: Population

Sub-concept: Population Growth

Concept field: Population Growth

86. The following graph depicts changes in two populations (A and B) of herbivores in a grassy field. A possible reason for these changes is that



- (1) Population B competed more successfully for food than Population A.
- (2) Population A produced more offspring than Population B.
- (3) Population A consumed the members of Population B.
- (4) Both the plant populations in this habitat decreased.

Answer (1)

Sol. From the graph, Population B is well adapted and hence it continues to grow whereas Population A declines in competition with Population B.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 35 secs

Topic: Human Health and Disease

Concept: Common Diseases in Humans

Sub-concept: Immunity

Concept field: Vaccination and Immunisation

87. Match each disease with its correct type of vaccine.
- | | |
|--------------------|------------------------|
| (a) tuberculosis | (i) harmless virus |
| (b) whooping cough | (ii) inactivated toxin |
| (c) diphtheria | (iii) killed bacteria |
| (d) polio | (iv) harmless bacteria |

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

Answer (2)

Sol. Disarmed bacteria and viruses are used as vaccines in the case of tuberculosis and polio, respectively.

Killed bacteria are used as a vaccine in whooping cough. Inactivated toxin is used in diphtheria.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Sexual Reproduction in Flowering Plants

Concept: Pre-Fertilisation: Structures and Events

Sub-concept: Pollination

Concept field: Agents of Pollination: Entomophily

88. Which of the following are the important floral rewards to the animal pollinators?

- (1) Nectar and pollen grains
- (2) Floral fragrance and calcium crystals
- (3) Protein pellicle and stigmatic exudates
- (4) Colour and large size flower

Answer (1)

Sol. Nectar and pollen grains are important floral rewards to animal pollinators.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 35 secs

Topic: Principles of Inheritance and Variation

Concept: Genetic Disorders

Sub-concept: Chromosomal Disorders

Concept field: Chromosomal Disorders

89. An abnormal human baby with 'XXX' sex chromosomes was born due to

- (1) formation of abnormal ova in the mother
- (2) fusion of two ova and one sperm
- (3) fusion of two sperms and one ovum
- (4) formation of abnormal sperms in the father

Answer (1)

Sol. 'XXX' sex chromosomes are a result of the formation of abnormal ova in the mother.

Question type: AIPMT

Difficulty of question: Moderate

Expected time to solve: 30 secs

Topic: Transportation in Plants

Concept: Long Distance Transportation of Water

Sub-concept: Water Movement up a Plant

Concept field: Water Movement up a Plant: Root Pressure

90. Transpiration and root pressure cause water to rise in plants by

- (1) Pulling and pushing it, respectively
- (2) Pushing it upward

-
- (3) Pushing and pulling it, respectively
(4) Pushing it upward

Answer (1)

- Sol.**
- Root pressure is responsible for pushing up water to a small height in the stem.
 - Transpiration causes water to rise by pulling it.

