Question no. 1

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

(1) 0.65 eV (2) 1.0 eV

(3) 1.3 eV (4) 1.5 eV

$E = \phi + K$

$E = \phi + 0.5$ — (1)

$E + \frac{E \times 20}{100} = \phi + 0.8$

$\frac{E\,120}{100} = \phi + 0.8$

$1.2E = \phi + 0.8$

$1.2(\phi + 0.5) = \phi + 0.8$

$1.2\phi + 0.6 = \phi + 0.8$

$1.2\phi - \phi = 0.2$

$0.2\phi = 0.2$

$\phi = 1\,(eV)$

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Question no. 2

In a young double slit experiment. The fringe width found to be 0.4 mm. If the whole apparatus is dipped in water of refractive index 4/3 without disturbing the arrangement. The new fringe width will be:

(1) 0.30 mm (2) 0.40 mm

(3) 0.53 mm (4) 0.2 mm

$\beta = \frac{\lambda D}{d} \rightarrow$ const

$\beta \propto \lambda$

$\lambda \propto \frac{1}{\mu}$

$\mu \propto \frac{1}{\lambda}$

$\beta \propto \frac{1}{\mu}$

$\beta \mu = \text{const}$

$\beta_1 \mu_1 = \beta_2 \mu_2$

$0.4 \times 1 = \frac{4}{3} \times \beta_2$

$\frac{4}{10} = \frac{4}{3} \times \beta_2$

$\beta_2 = \frac{3}{10}$

$\beta_2 = 0.3\ mm$

Question no. 3

In a diffraction pattern due to a single slit of width 'a', the first minimum is observed at an angle 30° when light of wavelength 5000 $\mathring{A}$ is incident on the slit. The first secondary maximum is observed at an angle of :

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

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

$a\sin\theta = n\lambda$

$a\sin 30 = 1\times\lambda$

$a\times\frac{1}{2} = \lambda$

$a = 2\lambda$ — (1)

$a\sin\theta = \left(n+\frac{1}{2}\right)\lambda$

$a\sin\theta = \left(1+\frac{1}{2}\right)\lambda$

$2\lambda\sin\theta = \frac{3\lambda}{2}$

$\sin\theta = \frac{3}{4}$

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

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Question no. 4

The critical angle for the material of a prism is 45° and its refracting angle is 30°. A monochromatic ray goes out perpendicular to the surface of emergence from the prism, then the angle of incidence on the prism will be:

(1) 60°
(2) 75°
(3) 45°
(4) 30°

$\mu = \frac{1}{\sin c}$

$\mu \sin c = 1$

$\mu \sin 45 = 1$

$\mu = \sqrt{2}$

$A = r_1 + r_2$

$r_1 = A$

$\mu = \frac{\sin i}{\sin r_1}$

$\mu = \frac{\sin i}{\sin A}$, $A = 30$

$\sqrt{2} = \frac{\sin i}{\sin 30}$

$\sin i = \sqrt{2} \sin 30$

$\sin i = \sqrt{2} \times \frac{1}{2}$

$\sin i = \frac{1}{\sqrt{2}}$

$\sin i = \sin 45$

$i = 45$

Question no. 5

A black body at 1227°C emits radiations with maximum intensity at a wavelength of 5000 Å. If the temperature of the body is increased by 1000°C, the maximum intensity will be observed at

(1) 3000 Å (2) 8000 Å

(3) 4000 Å (4) 6000 Å

$\lambda T = \text{const}$

$\lambda_1 T_1 = \lambda_2 T_2$

$3 \times 5000 = 5 \lambda_2$

$\frac{3 \times 5000}{5} = \lambda_2$

$\lambda_2 = 3000 \text{ Å}$

$T_1 = 1227 + 273$

$T_1 = 1500 \text{ Kelvin}$

$\lambda_1 = 5000 \text{ Å}$

$T_2 = (1000 + 1227)^\circ$

$T = 2500 \text{ Kelvin}$

$\lambda_2 = ?$

Question no. 6

Stopping potential required to reduce the photoelectric current to zero:

(1) Is directly proportional to wavelength of the incident radiation.

(2) Increases uniformly with wavelength of the incident radiation.

(3) Is directly proportional to frequency of the incident radiation.

(4) Decreases uniformly with the frequency of the incident radiation.

$K = eV_{ST}$.

$E = eV_{sp}$

$h\nu = eV_{sp}$

$V_{sp} \propto \nu$

Question no. 7

Two point charges repel each other with a force of 100 N. Magnitude of one of the charge is increased by 10% and other is reduced by 10%. The new force of repulsion at the same distance would be:

(1) 100 N

(2) 121 N

(3) 99 N

(4) 80 N

$$F = \frac{Kq_1q_2}{r^2}$$

$$100 = \frac{Kq_1q_2}{r^2} \quad -(1)$$

$$q_1' = q_1 + \frac{q_1 \times 10}{100}$$

$$q_1' = q_1 + \frac{q_1}{10}$$

$$q_1' = \frac{11q_1}{10}$$

$$q_2' = q_2 - \frac{q_2 \times 10}{100}$$

$$q_2' = q_2 - \frac{q_2}{10}$$

$$q_2' = \frac{9q_2}{10}$$

$$F' = \frac{Kq_1'q_2'}{r^2}$$

$$F' = \frac{K\,11q_1}{10} \times \frac{9q_2}{10r^2}$$

$$F' = \left(\frac{Kq_1q_2}{r^2}\right)\frac{99}{100}$$

$$F' = \frac{100 \times 99}{100}$$

$$F' = 99\ N$$

Question no. 8

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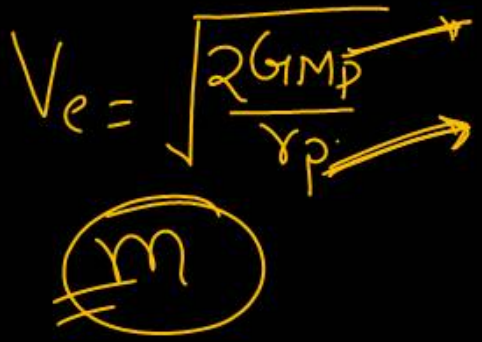
Gas escapes from the surface of a planet because it acquires an escape velocity. The escape velocity will not depend on which of the following factors.

I. Mass of the planet.

II. Mass of the particle escaping.

III. Temperature of the planet.

IV. Radius of the planet.



(1) I and II

(2) II and III

(3) I and IV

(4) I, II and IV

Question no. 9

A particle oscillation simple harmonically from its equilibrium position with time period T. Determine ratio of Kinetic and Potential energies of the particle at time $t = \frac{T}{12}$.

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

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

$K = \frac{1}{2} m \cdot a^2 \omega^2 \cos^2 \omega t$

$U = \frac{1}{2} m \cdot \omega^2 a^2 \sin^2 \omega t$

$\frac{K}{U} = \frac{\cos^2 \omega t}{\sin^2 \omega t}$

$\frac{K}{U} = \cot^2 \omega t$

$= \cot^2 \frac{2\pi}{T} t$

$= \cot^2 \frac{2\pi}{T} \times \frac{T}{12}$

$= \cot^2 \frac{\pi}{6}$

$= (\sqrt{3})^2 = 3$

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Question no. 10

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A series AC circuit has a resistance of 4Ω and a reactance of 3Ω. The impedance of the circuit is:

(1) 5Ω (2) 7Ω

(3) 12 / 7Ω (4) 7 / 12Ω

$$Z = \sqrt{R^2 + X^2}$$

$$Z = \sqrt{(4)^2 + (3)^2}$$

$$= 5\Omega$$

Question no. 11

The inductance of a closed-packed coil of 400 turns is 8 mH. A current of 5 mA is passed through it. The magnetic flux through each turn of the coil is :

(1) $\frac{1}{4\pi}\mu_0$ Wb

(2) $\frac{1}{2\pi}\mu_0$ Wb

(3) $\frac{1}{3\pi}\mu_0$ Wb

(4) $0.4\mu_0$ Wb

$N\phi = Li$

$\phi = \frac{Li}{N}$

$\phi = \frac{8\times10^{-3}\times5\times10^{-3}}{400}$

$\phi = \frac{40\times10^{-6}}{400}$

$\phi = \frac{1}{10}\times10^{-6}$

$\phi = 10^{-7}$

$\phi = \frac{\mu_0}{4\pi}(Wb)$

$\frac{\mu_0}{4\pi} = 10^{-7}$

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Question no. 12

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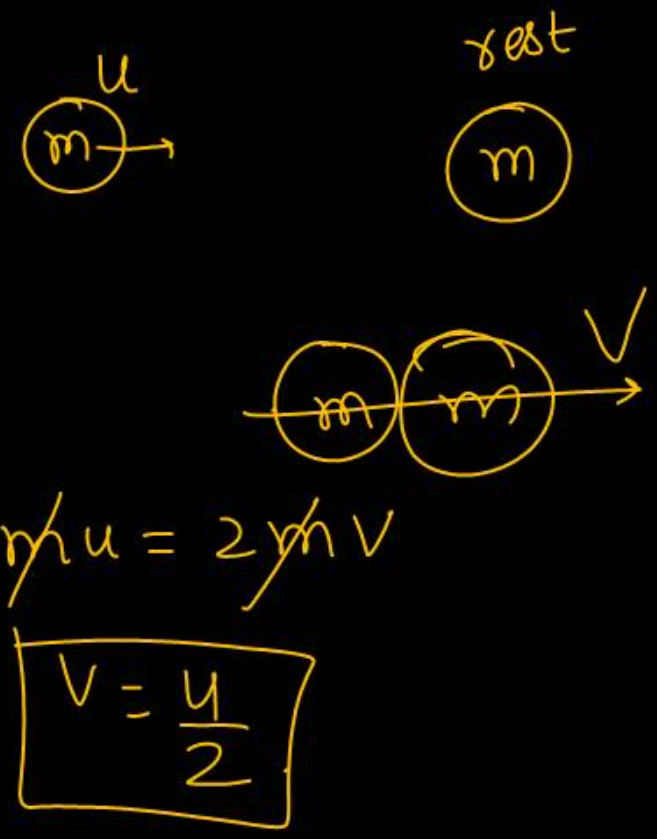
A body of mass m moving with a constant velocity u hits another body of the same mass at rest and sticks to it. The velocity of the compound body after collision is :

(1) u / 2
(2) 2u
(3) u
(4) Zero



Question no. 13

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If light of wavelength λ_1 is allowed to fall on a metal, then kinetic energy of photoelectrons emitted is E_1. If wavelength of light changes to λ_2 then kinetic energy of electrons changes to E_2. Then work function of the metal is :

(1) $\frac{E_1E_2(\lambda_1-\lambda_2)}{\lambda_1\lambda_2}$ (2) $\frac{E_1\lambda_1-E_2\lambda_2}{(\lambda_1-\lambda_2)}$

(3) $\frac{E_1\lambda_1-E_2\lambda_2}{(\lambda_2-\lambda_1)}$ (4) $\frac{\lambda_1\lambda_2-E_1E_2}{(\lambda_2-\lambda_1)}$

$E = \phi + K_{max}$

$\frac{hc}{\lambda_1} = \phi + E_1$ — (1)

$\frac{hc}{\lambda_2} = \phi + E_2$ — (2)

$\frac{\frac{hc}{\lambda_1}}{\frac{hc}{\lambda_2}} = \frac{\phi+E_1}{\phi+E_2}$

$\frac{hc}{\lambda_1} \times \frac{\lambda_2}{hc} = \frac{\phi+E_1}{\phi+E_2}$

$\lambda_2(\phi+E_2) = \lambda_1(\phi+E_1)$

$\lambda_2\phi + \lambda_2E_2 = \lambda_1\phi + E_1\lambda_1$

$\lambda_2\phi - \lambda_1\phi = E_1\lambda_1 - E_2\lambda_2$

$\phi = \frac{E_1\lambda_1 - E_2\lambda_2}{\lambda_2-\lambda_1}$

Question no. 14

$0.1\ m^3$ of water at $80^\circ C$ is mixed with $0.3\ m^3$ of water at $60^\circ C$. If 10% heat is loose to surroundings. The final temperature of the mixture is

(1) $65^\circ C$ (2) $64.4^\circ C$

(3) $65.6^\circ C$ (4) $62.0^\circ C$

$\rho = \frac{m}{V}$ $Q = \frac{90}{100} \times m s_w (T_i - T_f)$

$m = \rho V$ $= \frac{90}{100} \times \rho \times 0.1 (80 - T) \times s_w$

$Q_1 = \frac{9}{100} \rho (80 - T) \times s_w$

$Q_2 = m s_w (T - 60)$

$= \rho \times 0.3 \times s_w (T - 60)$

$Q_1 = Q_2$

$\frac{9}{100} \rho (80 - T) = \rho \times 0.3 \times s_w (T - 60)$

$3 \rho (80 - T) = 30 (T - 60)$

$3 (80 - T) = 10 (T - 60)$

$240 - 3T = 10T - 600$

$240 + 600 = 13T$

$840 = 13T$

$T = \frac{840}{13} = 64.4^\circ C$

Question no. 15

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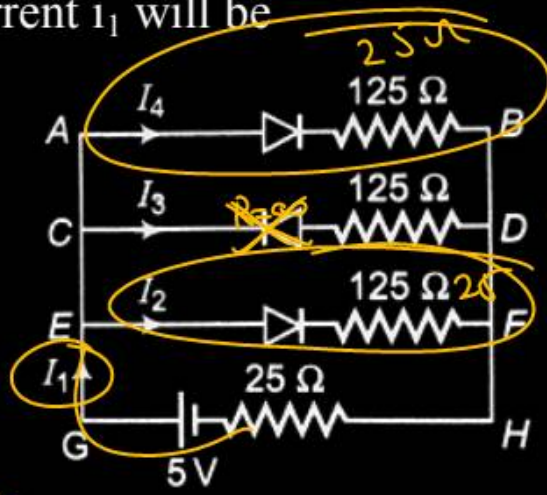
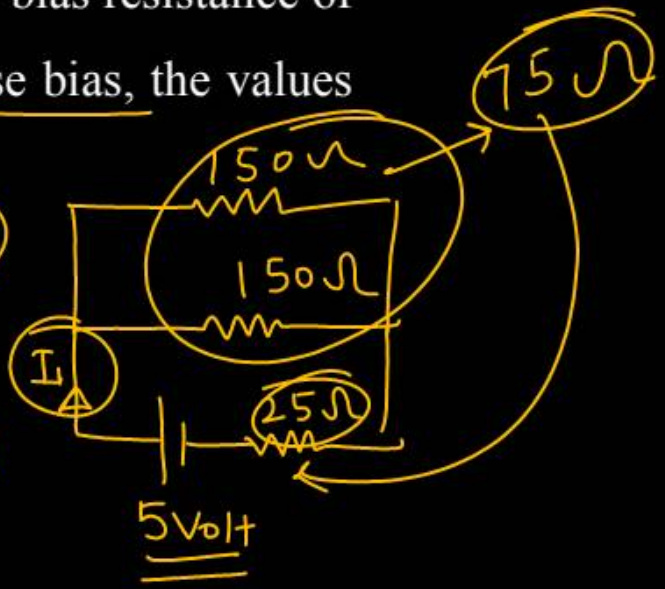
If each diode in figure has a forward bias resistance of 25Ω and infinite resistance in reverse bias, the values of the current i_1 will be



(1) 50 mA (2) 5 mA

(3) 0.5 A (4) 50 A



$V_{cell} = I_{cell} R_{eq}$

$5 = I_1 100$

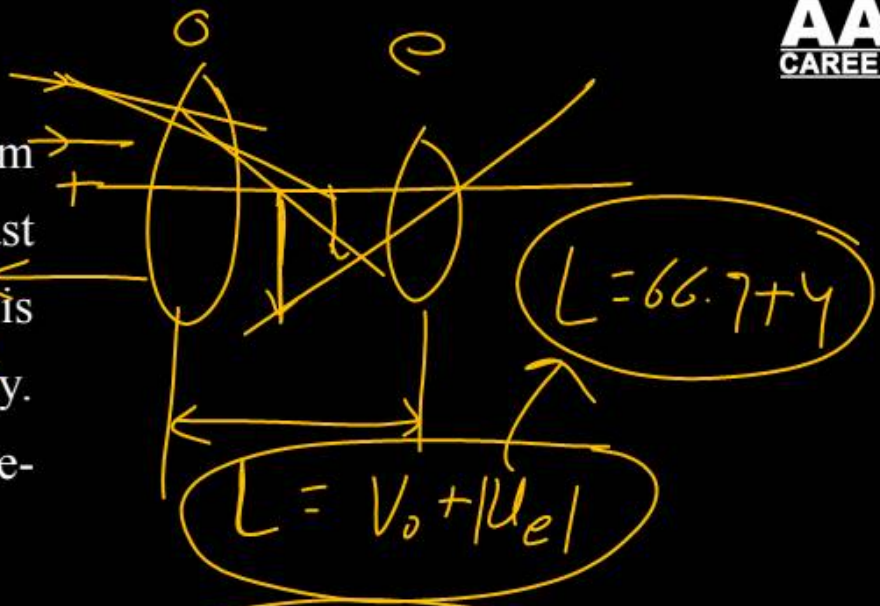
$I_1 = \frac{5}{100}$ A

$I_1 = \frac{5}{100} \times 1000$ (mA)

$I_1 = 50$ (mA)

A telescope has an objective of focal length 50 cm and an eye piece of focal length 5 cm. The least distance of distinct vision is 25 cm. The telescope is focussed for distinct vision on a scale 200 cm away. The separation between the objective and the eye-piece is :

(1) 75 cm
(2) 60 cm
(3) 71 cm
(4) 74 cm



$\frac{1}{v_o} - \frac{1}{u_o} = \frac{1}{f_o}$

$\frac{1}{v_o} + \frac{1}{200} = \frac{1}{50}$

$\frac{1}{v_o} = \frac{1}{50} - \frac{1}{200}$

$\frac{1}{v_o} = \frac{4-1}{200}$

$v_o = \frac{200}{3} = 66.7$

$u_e = -4$

$\frac{1}{v_e} - \frac{1}{u_e} = \frac{1}{f_e}$

$-\frac{1}{25} - \frac{1}{u_e} = \frac{1}{5}$

Question no. 17

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Match Column – I with Column – II and select the correct option from the codes given below:

	Column-I (Type of collision)		Column-II (Value of coefficient of restitution)
A.	Perfectly elastic	i.	$0 < e < 1$
B.	Inelastic	ii.	$e = 0$
C.	Perfectly inelastic	iii.	$e = 1$

(1) A – ii, B – i, C – iii (2) A – i, B – ii, C – iii

(3) A – ii, B – i, C – iii (4) A – iii, B – i, C – ii

Question no. 18

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Two solid spheres A and B are made up of materials having density ρ and 2ρ. Find ratio of their moment of inertia if their radius is 2R and R. About the diameter.

(1) 1 / 16 (2) 16

(3) 1 / 8 (4) 8

$I \propto \frac{4}{3} \times \pi R^3 \times \rho R^2$

$I \propto \rho R^5$

$I = \frac{2}{5} MR^2$

$I \propto MR^2$

$\frac{I_A}{I_B} = \frac{\rho}{2\rho} \times \frac{32 \times R^5}{R^5} = \frac{16}{1}$

Question no. 19

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A cube of side x has a charge q at each of its vertices. The potential due to this charge array at the centre of the cube is

(1) $\frac{4q}{3\pi\varepsilon_0 x}$

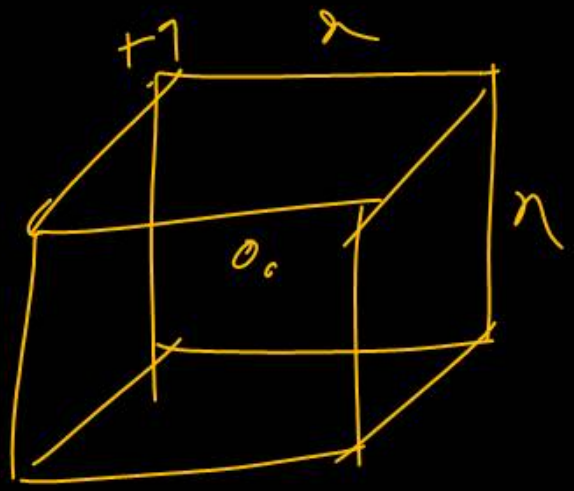
(2) $\frac{4q}{\sqrt{3}\pi\varepsilon_0 x}$

(3) $\frac{3q}{4\pi\varepsilon_0 x}$

(4) $\frac{2q}{\sqrt{3}\pi\varepsilon_0 x}$

$d = \frac{\sqrt{3}x}{2}$

$V_0 = \frac{8 \times k \times q \times 2}{\sqrt{3}x}$



$V_0 = q$

$V_0 = \frac{8 \times 2}{\sqrt{3}x} \times \frac{1}{4\pi\varepsilon_0} \times q \times 2$

$V_0 = \frac{4q}{\sqrt{3}\pi\varepsilon_0 x}$

Question no. 20

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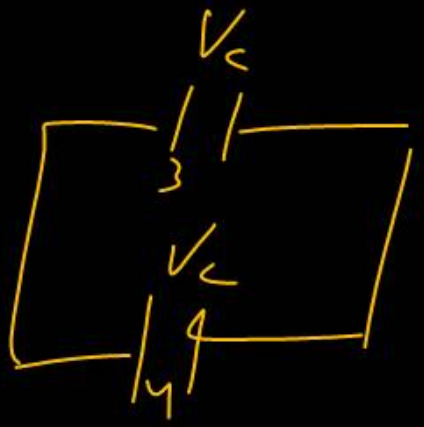
Two capacitors 3μF and 4μF are individually charge through a 6V battery. After being disconnected from the battery, they are connected together with the negative plate of one attached to the positive plate of the other. What is the final total energy stored :

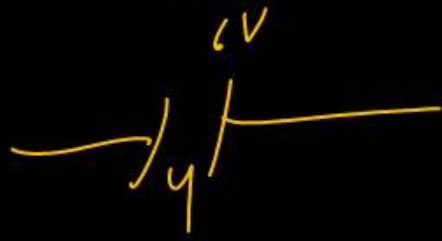
(1) 1.26×10^{-4} J (2) 2.57×10^{-4} J

(3) 1.26×10^{-6} J (4) 2.57×10^{-6} J



$V_c = \frac{24-18}{C_1+C_2} = \frac{6}{7}$

$q_1 = 18C$



$q_2 = 24C$

$U_T = \frac{1}{2} C_1 V_c^2 + \frac{1}{2} \times C_2 V_c^2$

$U_T = \frac{V_c^2}{2}(C_1+C_2) = \frac{1}{2} \times \frac{36}{49} \times 7$

$U_T = \frac{36}{14} \times 10^{-6}$ J

Question no. 21

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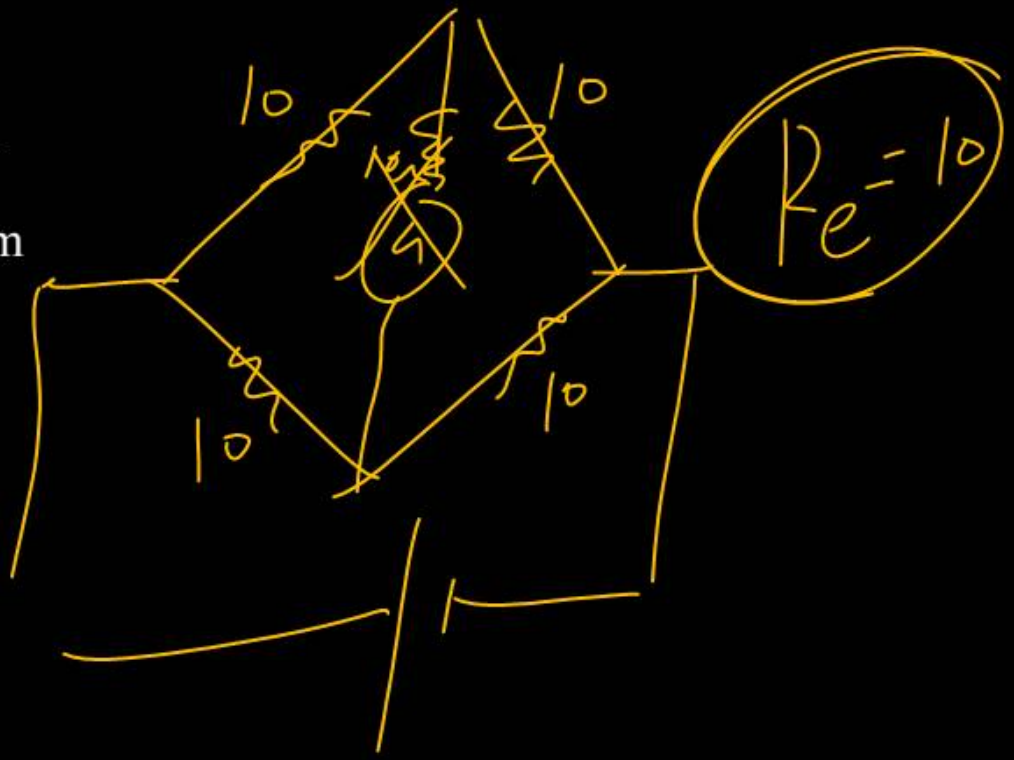
The resistance of each arm of the Wheatstone's bridge is 10 ohm. A resistance of 10 ohm is connected in series with a galvanometer then the equivalent resistance across the battery will be.

(1) 10 ohm

(2) 0 ohm

(3) 20 ohm

(4) 40 ohm



A prism of refractive index μ and angle A is placed in the minimum deviation position. If the angle of minimum deviation is A_m, then the value of A in terms of μ is

(1) $\sin^{-1}\left(\frac{\mu}{2}\right)$

(2) $\sin^{-1}\sqrt{\frac{\mu-1}{2}}$

(3) $2\cos^{-1}\left(\frac{\mu}{2}\right)$

(4) $\cos^{-1}\left(\frac{\mu}{2}\right)$

δ_{min}

$$\mu = \frac{\sin\left(\frac{A+\delta_{min}}{2}\right)}{\sin\frac{A}{2}}$$

$$\mu = \frac{\sin(A)}{\sin\frac{A}{2}} = \frac{2\sin\frac{A}{2}\cos A/2}{\sin A/2}$$

$$\mu = \frac{2\cos A/2}{1}$$

$$\frac{\mu}{2} = \cos A/2$$

$$\frac{A}{2} = \cos^{-1}\left(\frac{\mu}{2}\right)$$

$$A = 2\cos^{-1}\left(\frac{\mu}{2}\right)$$

Question no. 23

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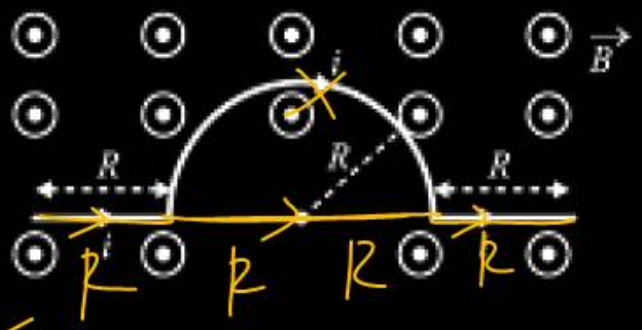
A bent wire shown in figure carries a current I and is placed in a uniform magnetic field B that emerges outward from the plane of the figure. Calculate the magnitude of force acting on the wire.



(1) 4 BiR

(2) 2 BiR

(3) 3 BiR

(4) BiR

$F = BIl$

$F = 4BiR$

Question no. 24

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An inductor and a resistor are connected to an ac source of 200 V, 50 Hz. If current in the circuit is 2A and power consumed 100 W, resistance in the circuit is :

I_0

(1) 50 Ω (2) 25 Ω

(3) 75 Ω (4) 100 Ω

$\langle P \rangle = I_0 V_0 (\cos\phi$

$\langle P \rangle = I_0 \times I_0 \times \frac{R}{2}$

$\langle P \rangle = I_0^2 \times R$

$100 = 4 \times R$

$R = 25\Omega$

Question no. 25

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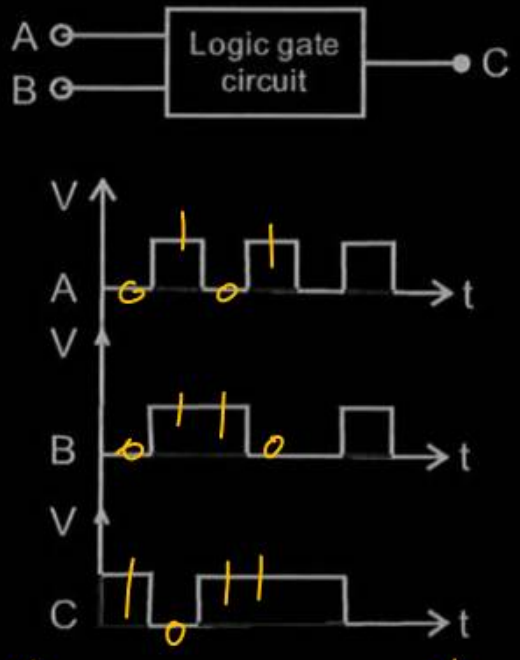
Figure shows a logic gate circuit with two input A and B and the output C. The voltage wave form of A, B and C are as shown in figure. The logic gate circuit is:



A	B	C
0	0	1
1	1	0
0	1	1
1	0	1

(1) OR gate

(2) AND gate

(3) NOR gate

(4) NAND gate

Question no. 26

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The width of depletion region in p-n junction diode is 500 nm and an intrinsic electric field of $6 \times 10^5\ Vm^{-1}$ is also found to exist in it. What is the kinetic energy which a conduction electron must have in order to diffuse from the n-side to p-side?

(1) 0.03 eV (2) 0.30 eV

(3) 0.45 eV (4) 0.60 eV

$V = Ed$

$U = ?$

$U = e \times V$

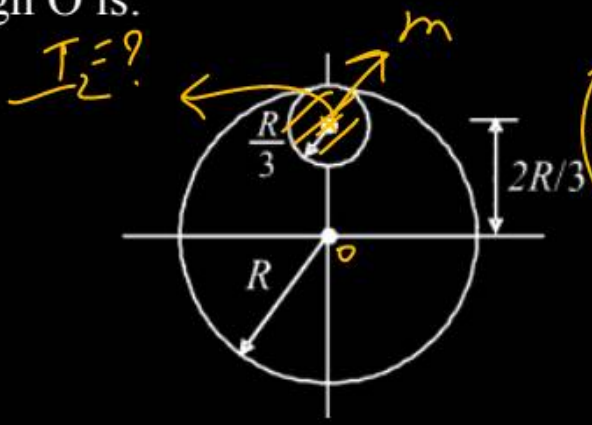
$U = e \times Ed$

$U = e \times 6 \times 10^5 \times 500 \times 10^{-9}$

$= 30e \times 10^{-2} = 0.30e$ V

Question no. 27

From a circular disc of radius R and mass 9 M, a small disc of radius R/3 is removed from the disc. The moment of inertia of the remaining disc about an axis perpendicular to the plane of the disc and passing through O is:

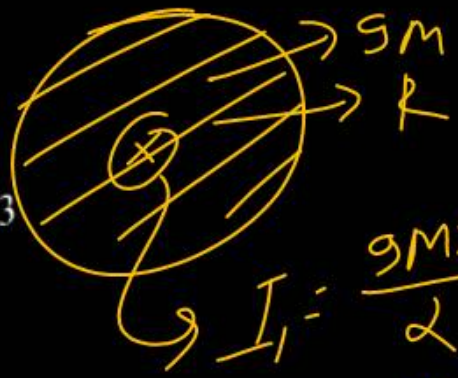


(1) $\frac{40}{9}MR^2$

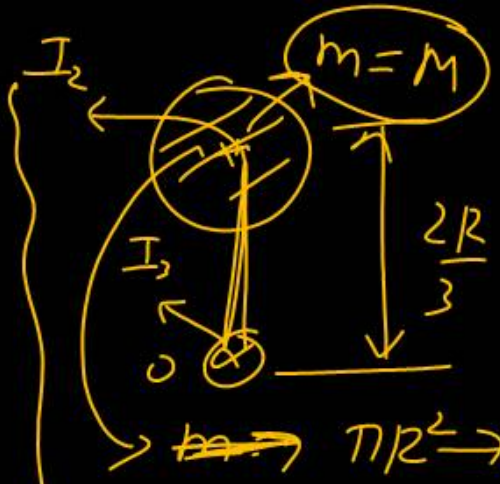
(2) $10\,MR^2$

(3) $\frac{37}{9}MR^2$

(4) $4\,MR^2$



$I_1 = \frac{9M \times R^2}{2}$



$\pi R^2 \rightarrow M \times 9$

$\frac{\pi R^2}{9} \rightarrow \frac{9M}{9} \rightarrow M$

$I_2 = \frac{M \times R^2}{9 \times 2}$

$I_3 = I_1 - I_2$

$I_3 = 4.5MR^2 - 0.5MR^2$

$= 4MR^2$

$I_3 = \frac{MR^2}{18} + \frac{M \times 4R^2}{9}$

$I_3 = \frac{9MR^2}{18} = \frac{MR^2}{2}$

Question no. 28

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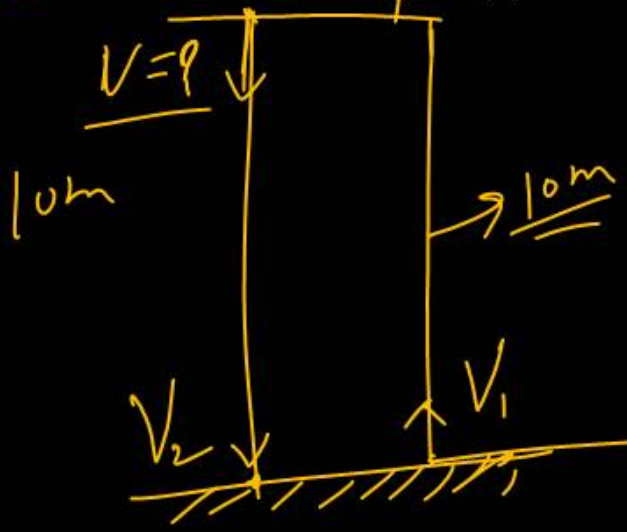
A ball is allowed to fall down with initial speed v = 9 from a height of 10 m. It loses 50% kinetic energy after striking the floor. It reaches to the same height after collision. What is the value of v?

(1) 28 m/s (2) 7 m/s

(3) 14 m/s (4) It is never possible



$mgh = \frac{1}{2}mv^2$

$V_1 = \sqrt{200}$

$K_1 = \frac{1}{2}m \times 200$

$u - v = ?$

$v_2 = -20$

$g = -10$

$a = -10$

$v^2 = u^2 + 2as$

$400 = v^2 - 2 \times 100 \times 10$

$v = \sqrt{200}$

$\frac{1}{2}mv_2^2 = 2 \times \frac{1}{2}m \times 200$

$V_2 = 20 m/s$

$$\frac{k\times10^{-3}\times10^{-6}}{1}+0=\frac{k\times10^{-3}\times10^{-6}}{10}+\frac{1}{2}\times2\times10^{-3}\times v^2$$

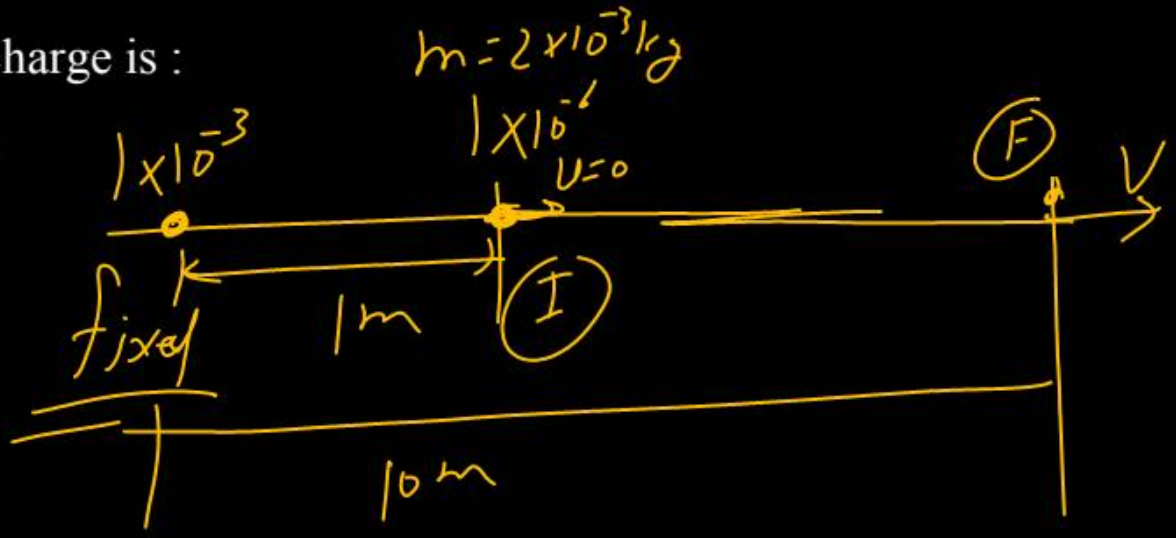
A particle of mass 2g and charge 1μC is held at a distance of 1 meter from a fixed charge of 1 mC. If the particle is released it will be repelled. The speed of the particle when it is at a distance of 10 meters from the fixed charge is :

(1) 100 m/sec

(2) 90 m/sec

(3) 60 m/sec

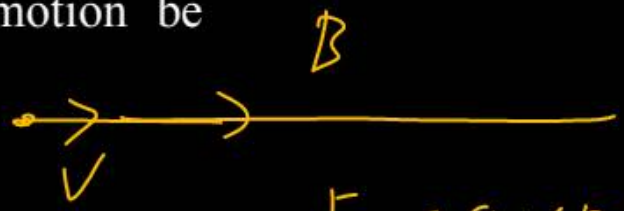
(4) 45 m/sec



Question no. 30

AAYAM CAREER INSTITUTE

An electron is projected in a uniform magnetic field along the lines of force. How will its motion be affected.



$F_m = qVB\sin\theta$

$F_m = 0$

(1) There will be no effect on its motion.

(2) The electron will travel along a circle and its speed will remain unchanged.

(3) The electron will follow the path of a parabola and its speed will increase.

(4) The velocity will increase in magnitude but its direction will not change.

Question no. 31

AAYAM CAREER INSTITUTE

In an a.c. circuit, the reactance is equal to the resistance. The power factor of the circuit will be:

(1) 1

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

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

(4) Zero

3

$\tan\phi = \frac{\text{React}}{\text{Res.}} = 1$

$\phi = \pi/4$

$Pf = \cos\phi = \cos\pi/4 = 1/\sqrt{2}$

Question no. 32

AAYAM CAREER INSTITUTE

The ratio of speed of sound in nitrogen gas to that in helium gas at 300 K is :

(1) $\left(\frac{2}{7}\right)^{\frac{1}{2}}$

(2) $\left(\frac{1}{7}\right)^{\frac{1}{2}}$

(3) $\frac{\sqrt{3}}{5}$

(4) $\frac{\sqrt{6}}{5}$

$v \propto \sqrt{\frac{\gamma RT}{M}}$

$\frac{V_{N_2}}{V_{He}} = \sqrt{\frac{\gamma_{N_2}}{\gamma_{He}} \times \frac{M_{He}}{M_{N_2}}}$

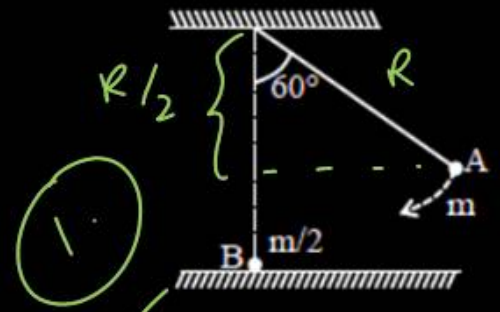
$= \sqrt{\frac{7/5}{5/3} \times \frac{4}{28}}$

$= \sqrt{\frac{21}{25} \times \frac{4}{28} \times \frac{1}{1}}$

$\sqrt{3}/5$ ← (3)

Question no. 33

As shown below, bob A of a pendulum having massless string of length 'R' is released from 60° to the vertical. It hits another bob B of half the mass that is at rest on a frictionless table in the centre. Assuming elastic collision, the magnitude of the velocity of bob A after the collision will be (take g as acceleration due to gravity)



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

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

$mg\frac{R}{2} = \frac{1}{2}mv^2$ ✓

$v = \sqrt{gR}$

BC ⟲ B ← ⟲ $\sqrt{gR}$

AC v_B ← ⟲ B v_A ← ⟲

Momen. Cor. ✓

$0 + m\sqrt{gR} = \frac{m}{2}v_B + mv_A$

$v_A + \frac{v_B}{2} = \sqrt{gR}$ — (1)

$e = \frac{v_B - v_A}{\sqrt{gR}} = 1$

$v_B - v_A = \sqrt{gR}$ — (2)

$v_B - v_A = v_A + v_B/2$

$v_B/2 = 2v_A$

$v_B = 4v_A$

$3v_A = \sqrt{gR}$

$v_A = \sqrt{gR}/3$

Question no. 34

AAYAM CAREER INSTITUTE

Which of the following statement is true :

(1) De-broglie wave length of a particle is proportional to its charge.

(2) Slope of the graph between maximum kinetic energy and frequency of light in photoelectric experiment is different for different metals.

(3) Density of nucleus is almost same for every nucleus.

(4) Bohr's model can be applied for hydrogen as well as helium atom.

$\lambda = h/p$

$h\nu - \phi = KE_{max}$

$mx + c \quad y$

3.

2

Question no. 35

AAYAM CAREER INSTITUTE

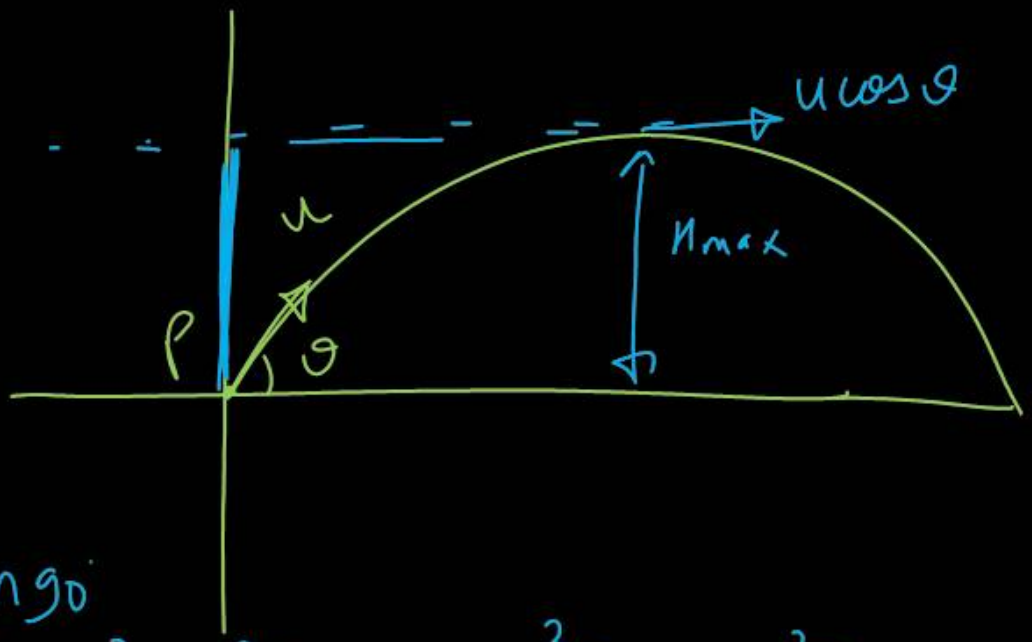
A particle of mass 'm' is projected from point P on the ground with initial speed u at an angle 'θ' with horizontal. Find the angular momentum of particle w.r.t. point P when it is at highest point of its trajectory :

(1) $\frac{mu^3 \sin^2\theta\cos\theta}{2g}$

(2) $\frac{mu^3 \cos\theta\sin\theta}{g}$

(3) $\frac{mu^3 \cos\theta\sin^2\theta}{g}$

(4) $\frac{mu^3 \cos^2\theta\sin\theta}{2g}$



$L_p = mvr\sin 90^\circ$

$= m(u\cos\theta)\frac{u^2\sin^2\theta}{2g} = \frac{mu^3\cos\theta\sin^2\theta}{2g}$

Question no. 36

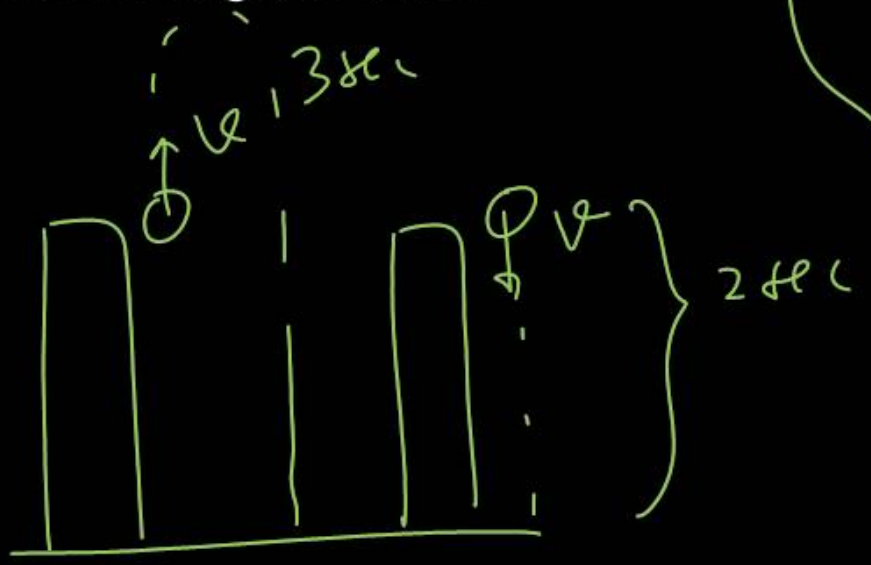
Two balls are projected from a tower with same speed, one vertically upward and other vertically downward. If they take 3 and 2 seconds respectively to reach the ground. Find the height of tower.

(1) 25 m

(2) 50 m

(3) 30 m

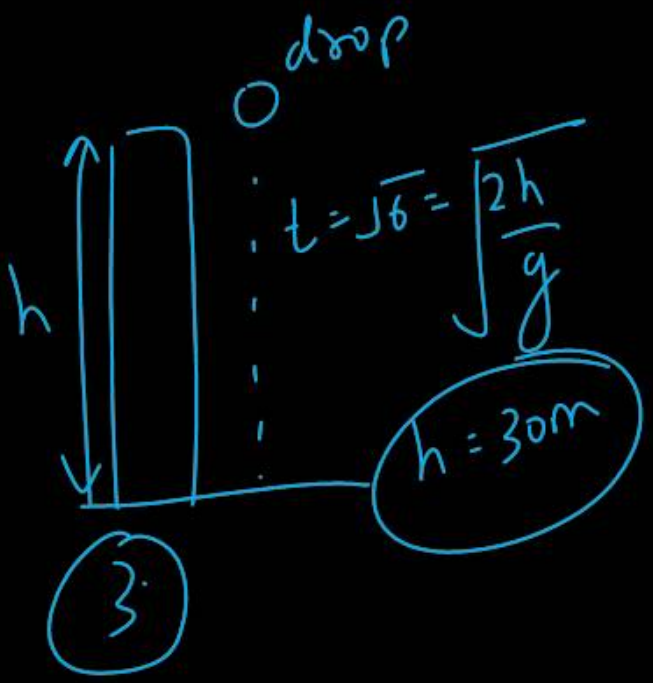
(4) 100 m



Drop

$t = \sqrt{t_1 t_2}$ *

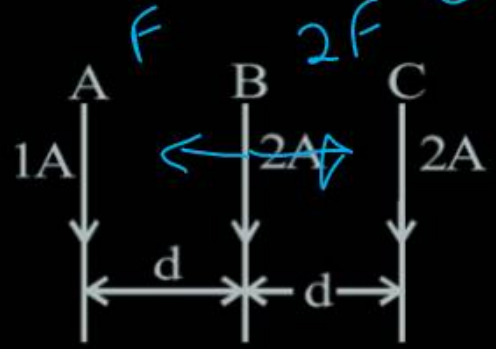
$t = \sqrt{3 \times 2} = \sqrt{6}$



Question no. 37

AAYAM CAREER INSTITUTE

Three long straight wires. A, B and C are carrying current as shown in figure. Resultant force on B is directed :



$F = \frac{\mu_0 i_1 i_2}{2\pi d}$

(1) Towards A

(2) Towards C

(3) Perpendicular to the plane of paper and inward.

(4) Perpendicular to the plane of paper and outward.

Question no. 38

AAYAM CAREER INSTITUTE

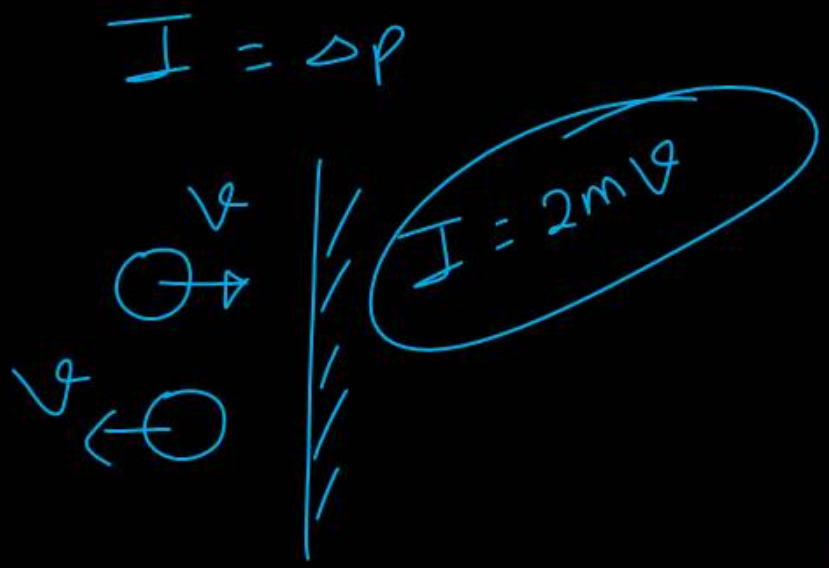
Find the ratio of the impulse transferred to the wall by a ball incident normally and then at 45° with normal?

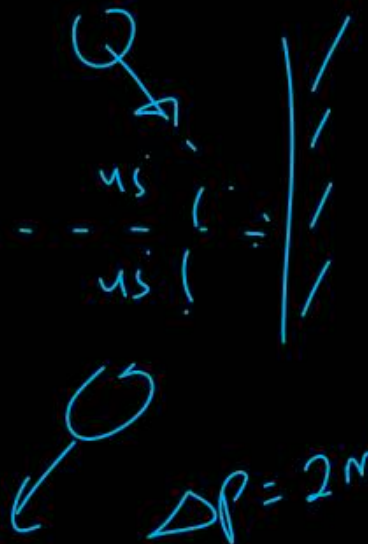
(1) 1 : 2

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

(3) $1:\sqrt{2}$

(4) 2 : 1





$\Delta p = 2mv\cos 45$

$J = \frac{2mv}{\sqrt{2}} = \sqrt{2}mv$

$\frac{2mv}{\sqrt{2}mv} = \sqrt{2}/1$ (2)

Question no. 39

AAYAM CAREER INSTITUTE

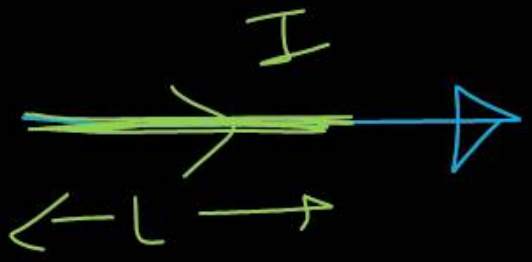
A wire carrying a current I along the positive x-axis has length L. It is kept in a magnetic field $\vec{B} = \left(2\hat{i} + 3\hat{j} - 4\hat{k}\right)$ T. The magnitude of the magnetic force acting on the wire is :

(1) $\sqrt{5}$ IL

(2) 5 IL

(3) $\sqrt{3}$ IL

(4) 3 IL



$\vec{F}_m = i(\vec{\ell} \times \vec{B})$

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

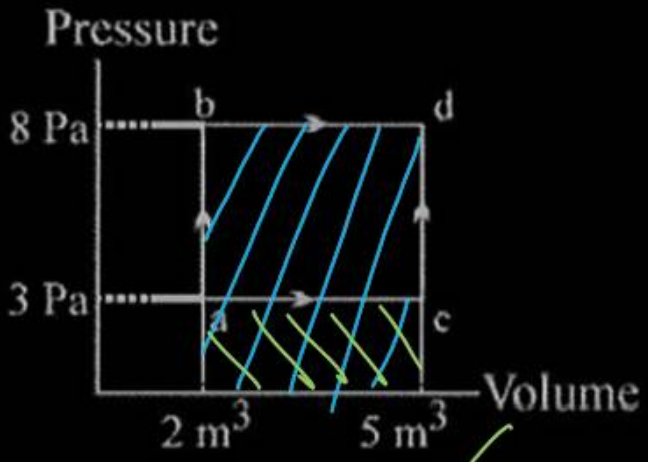
$= I(0 + 3L\hat{k} - 4L(-\hat{j}))$

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

$= 5IL$

Question no. 40

In the pressure versus volume graph shown, in the process a → b 60 J of heat is added, and in the process of b → d 20 J of heat is added. In the process a → c → d, what is the total heat added?



(1) 80 J (2) 65 J

(3) 60 J (4) 56 J

J^st Law abd

$Q = \Delta U + W$

$80 = \Delta U + (8 \times 3)$

$\Delta U = 80 - 24$

$\Delta U = 56\ J$

J^st Law

a c d

$Q = \Delta U + W$

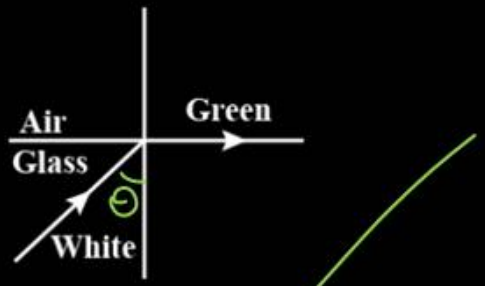
$Q = 56 + 9$

$Q = 65\ J$

2.

Question no. 41

White light is incident on the interface of glass and air as shown in the figure. If green light is just totally internally reflected then the emerging ray in air contains.



(1) Yellow, orange, red

(2) Violet, indigo, blue

(3) All colors

(4) All colors except green

Question no. 42

AAYAM CAREER INSTITUTE

A stone of mass 1 kg is tied to end of a massless string of length 1 m. If the breaking tension of the string is 400 N, then maximum linear velocity, the stone can have without breaking the string, while rotating in horizontal plane, is :

(1) $40\ ms^{-1}$

(2) $400\ ms^{-1}$

(3) $20\ ms^{-1}$

(4) $10\ ms^{-1}$

3.

$$T = \frac{mv^2}{R}$$

$$v_{max} = \sqrt{\frac{R(T)_{max}}{m}}$$

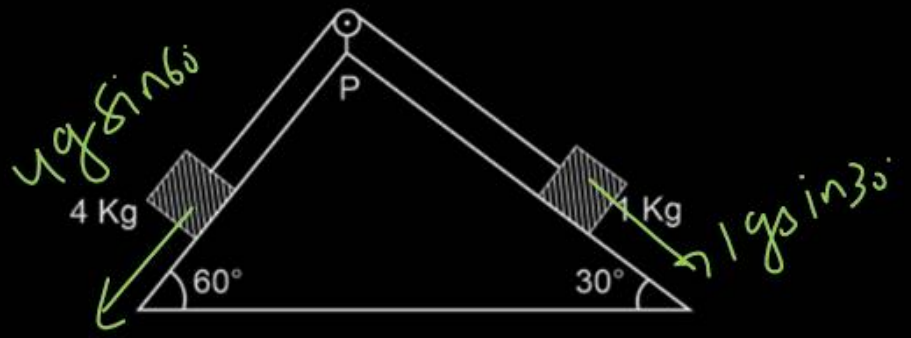
$$= \sqrt{\frac{1 \times 400}{1}}$$

$$= 20\ m/s$$

Question no. 43

AAYAM CAREER INSTITUTE

As per given figure, a weightless pulley P is attached on a double inclined frictionless surface. The tension in the string (massless) will be (if $g = 10\ m/s^2$)



(1) $\left(4\sqrt{3}+1\right)N$

(2) $4\times\left(\sqrt{3}+1\right)N$

(3) $4\times\left(\sqrt{3}-1\right)N$

(4) $\left(4\sqrt{3}-1\right)N$

$4g\sin60$ $1g\sin30$

$a = \dfrac{4g\sin60 - 1g\sin30}{5}$

$a = 2\left(4\times\sqrt{3}/2 - 1/2\right)$

$a = (4\sqrt{3}-1)\ m/s^2$

$4g\sin60 - T = 4a$

$4\times10\times\sqrt{3}/2 - T = 16\sqrt{3} - 4$

$20\sqrt{3} - T = 16\sqrt{3} - 4$ → $4(\sqrt{3}+1)$

$4\sqrt{3} + 4 = T$

$4g\sin60$ a T T

Question no. 44

According to kinetic theory of gases.

A. The motion of the gas molecules freezes at $0^{\circ}C$.

B. The mean free path of gas molecules decrease if the density of molecules is increased.

C. The mean free path of gas molecules increases if temperature is increased keeping pressure constant.

D. Average kinetic energy per molecule per degree of freedom is $\frac{3}{2} k_B T$ (for monoatomic gases).

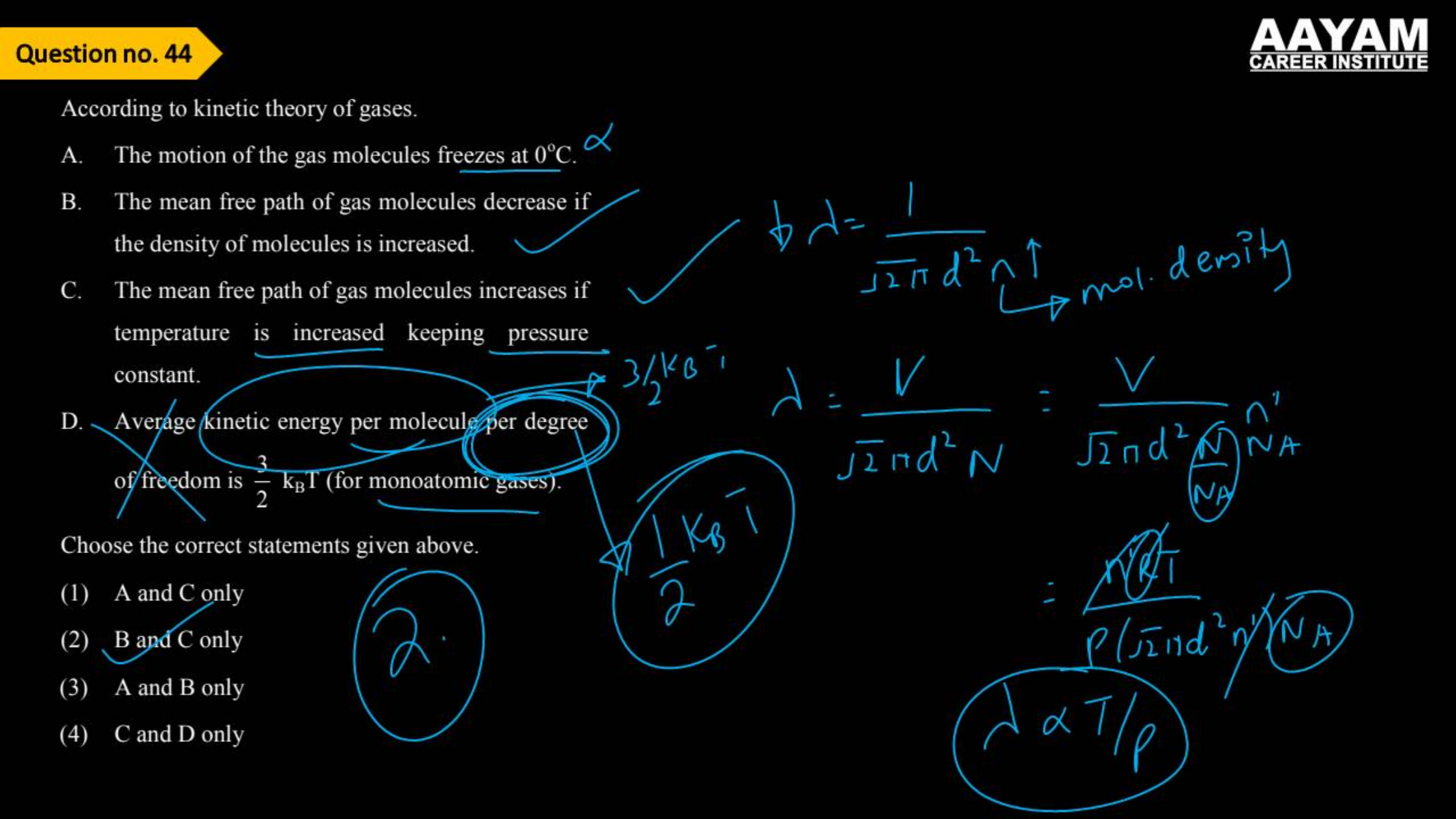
Choose the correct statements given above.

(1) A and C only

(2) B and C only

(3) A and B only

(4) C and D only



Question no. 45

For steel, the breaking stress is 6×10^6 N/m^2 and the density is 8×10^3 kg/m^3. The maximum length of steel wire which can be suspended without breaking under its own weight is [g = 10 m/s^2]

(1) 140 m (2) 120 m

(3) 75 m (4) 200 m

$\frac{6 \times 10^6}{8 \times 10^3 \times 10} = 75\,m$

$\sigma = \frac{T_{max}}{A} = \frac{mg}{A}$

$\sigma \le \sigma_{breaking}$

$\frac{mg}{A} \le 6 \times 10^6$

$\frac{\rho A \ell g}{A} \le 6 \times 10^6$

$\ell \le \frac{6 \times 10^6}{\rho g}$

Question no. 46

AAYAM CAREER INSTITUTE

Rate of SN_2 reaction will be maximum in which of the following solvent :

→ Polar aprotic solvent

DMF / DMSO

(1) H_2O

(2) DMSO

(3) Phenol

(4) CH_3OH

2

Question no. 47

AAYAM CAREER INSTITUTE

Match Column-I with Column-II.

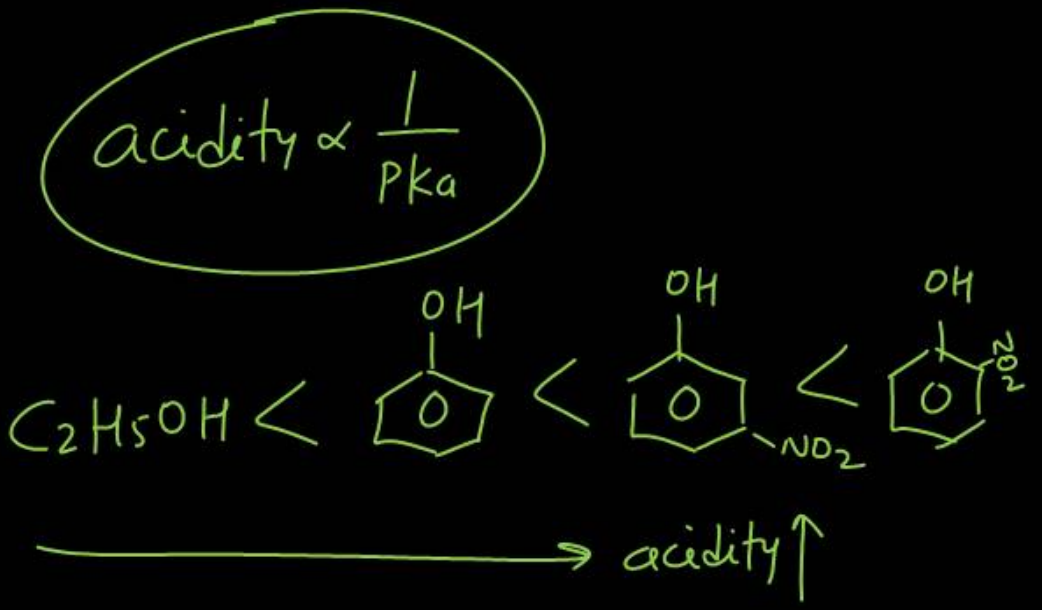
	Column-I (Compound)		Column-II (pK_a)
A.	Ethanol	i.	7.2
B.	Phenol	ii.	15.9
C.	m-Nitrophenol	iii.	10.0
D.	o-Nitrophenol	iv.	8.3

(1) A – ii, B – iii, C – iv, D – i

(2) A – ii, B – iv, C – iii, D – i

(3) A – i, B – iii, C – iv, D – ii

(4) A – ii, B – iii, C – i, D – iv



Question no. 48

AAYAM CAREER INSTITUTE

Match Column-I with Column-II.

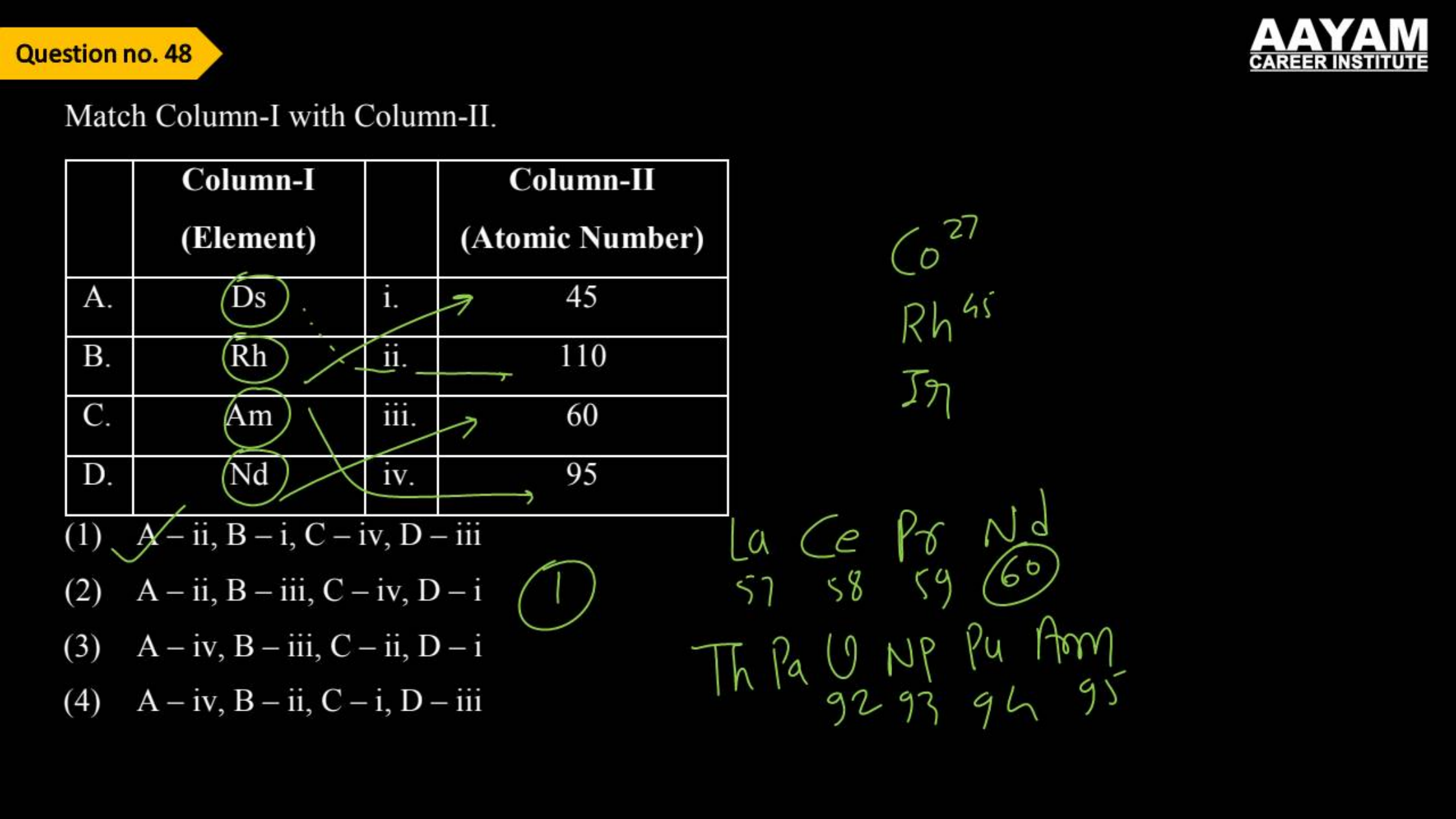
	Column-I (Element)		Column-II (Atomic Number)
A.	Ds	i.	45
B.	Rh	ii.	110
C.	Am	iii.	60
D.	Nd	iv.	95

(1) A – ii, B – i, C – iv, D – iii

(2) A – ii, B – iii, C – iv, D – i

(3) A – iv, B – iii, C – ii, D – i

(4) A – iv, B – ii, C – i, D – iii



Question no. 49

AAYAM CAREER INSTITUTE

A non-ideal solution was prepared by mixing 30 mL chloroform and 50 mL acetone. The volume of mixture will be :

(1) > 80 mL

(2) < 80 mL

(3) $= 80$ mL ✗

(4) ≥ 80 mL ✗

+ve & -ve

Chlor = -ve deviation

Question no. 50

AAYAM CAREER INSTITUTE

Assertion : Bond energy of F_2 is less than Cl_2.

Reason : Bond length of F_2 is smaller than Cl_2.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

2

$Cl_2 > Br_2 > F_2$ (BE)

Bl.

$F_2 < Cl_2 < Br_2$

Size ↑ Bl ↑

Question no. 51

AAYAM CAREER INSTITUTE

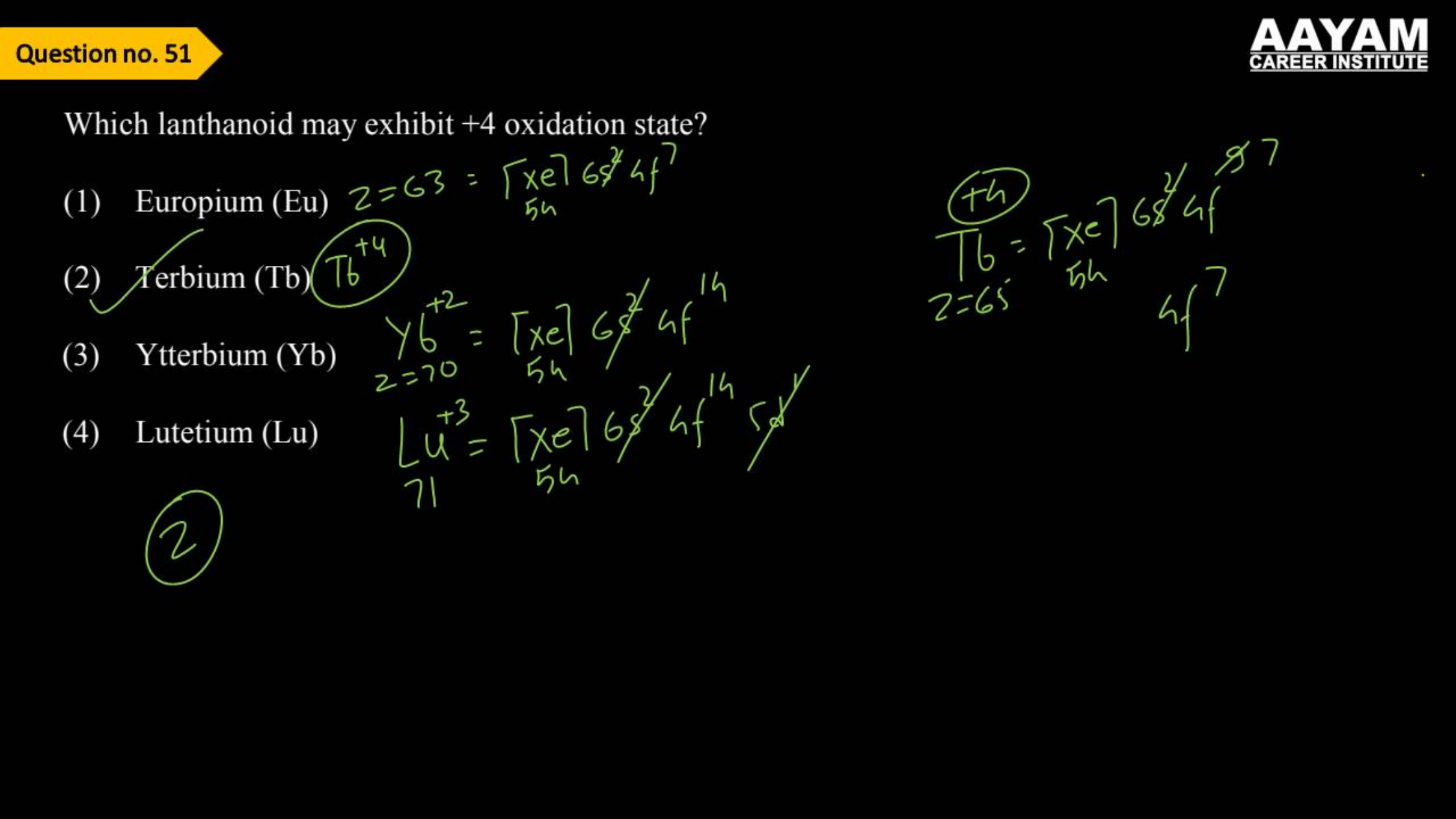
Which lanthanoid may exhibit +4 oxidation state?

(1) Europium (Eu)

(2) Terbium (Tb)

(3) Ytterbium (Yb)

(4) Lutetium (Lu)



Question no. 52

Rate of formation of SO_3 in the following reaction is 40 g min^{-1}. Hence rate of disappearance of O_2 is :

$$2SO_2 + O_2 \rightarrow 2SO_3$$

(1) 32 g min^{-1}

(2) 8 g min^{-1}

(3) 20 g min^{-1}

(4) 16 g min^{-1}

g/min = mol/min

mole = $\frac{40}{80} = \frac{1}{2}$ mol

0.5 mol/min

$ROR = -\frac{1}{2}\frac{d[SO_2]}{dt} = -\frac{d[O_2]}{dt} = +\frac{1}{2}\frac{d[SO_3]}{dt}$

$-\frac{d[O_2]}{dt} = \frac{1}{2} \times 0.5 = 0.25$ mol/min

g/min = 0.25×32

= 8 gm/min

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Question no. 53

AAYAM CAREER INSTITUTE

Which of the following complex ions violates the EAN rule?

$EAN = Z_{CMI} - O.No + (2 \times Co.ND)$

(1) $[Fe(CO)_5]$ $26 - 0 + 10 = 36$ [Kr]

(2) $[Cr(NH_3)_6]^{3+}$ $24 - 3 + 12 = 33$

(3) $[Fe(CN)_6]^{4-}$ $26 - 2 + 12 = 36$

(4) $[Co(NH_3)_6]^{3+}$ $27 - 3 + 12 = 36$

2

Question no. 54

AAYAM CAREER INSTITUTE

Pair of smallest and largest radius of species among Mg, Al, Mg^{+2}, Al^{+3}, is :

(1) Mg, Mg^{+2}

(2) Mg^{+2}, Al^{+3}

(3) Al^{+3}, Mg

(4) Mg, Al^{+3}

3

$Mg > Mg^{+2}$

$Al > Al^{+3}$

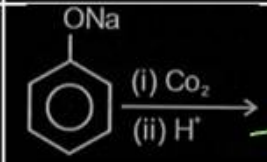
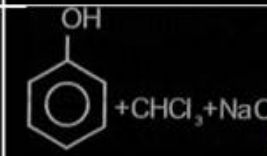
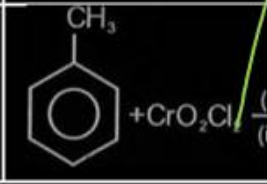
Mg^{+2} (10e) $> Al^{+3}$ (10e)

$Mg > Al$

Question no. 55

AAYAM CAREER INSTITUTE

Match List-I with List-II.

	List-I		List-II
A.	$R-CH_2-COOH \xrightarrow[(ii)\ H_2O]{(i)\ X_2/Red\ P}$	i.	Etard reaction
B.	 $\xrightarrow[(ii)\ H^+]{(i)\ Co_2}$	ii	Kolbe's reaction
C.	 $+CHCl_3+NaOH \xrightarrow{(ii)\ H^{\oplus}}$	iii.	Hell volhard Zelinsky reaction
D.	 $+CrO_2Cl_2 \xrightarrow[(ii)\ H^+/H_2O]{(i)\ CS_2}$	iv.	Reimer Tiemann reaction

Choose the correct answer :

(1) A – iii, B – iv, C – ii, D – i

(2) A – iii, B – ii, C – iv, D – i

(3) A – iv, B – i, C – iii, D – ii

(4) A – i, B – iii, C – ii, D – iv

2

Question no. 56

$E^{\circ}_{Ni^{+2}/Ni}$ and $E^{\circ}_{Au^{3+}/Au}$ are –0.25V and 1.50V respectively. The E_{cell} of the following reaction will be -

$Ni(s)|Ni^{+2}_{(aq)}(0.01\ M)\|Au^{+3}_{(aq)}(0.1\ M)|Au(s)$

(A) 1.79 V (2) –1.79 V

(3) 1.29 V (4) –1.29 V

$E^{\circ}_{cell} = E^{\circ}_{C} - E^{\circ}_{A} =$

$= 1.5 - (-0.25) = 1.75$

$3Ni + 2Au^{+3} \rightarrow 3Ni^{+2} + 2Au$

$n = 6$ $\quad$ $n = 6$

$E_{cell} = E^{\circ}_{cell} - \frac{0.059}{n} \log \frac{[P]}{[R]}$

$E_{cell} = 1.75 - \frac{0.06}{6} \log \frac{[10^{-2}]^3}{[10^{-1}]^2}$

$= 1.75 - 0.01 \log 10^{-4}$

$= 1.75 - 0.01 \times (-4) \log 10$

$= 1.75 + 0.04$

$= 1.79$

(1) option

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Question no. 57

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Concentrated nitric acid used in laboratory work is 63% nitric acid (HNO_3) by mass. If the density of this solution is 1.5 g/mL, then find molarity of this aqueous solution.

(1) 10 M
(2) 11 M
(3) 15 M
(4) 5 M

$$M = \frac{10 \times \%\,w/w \times d}{M_B}$$

$$= \frac{10 \times 63 \times 1.5}{63}$$

$$= 15$$

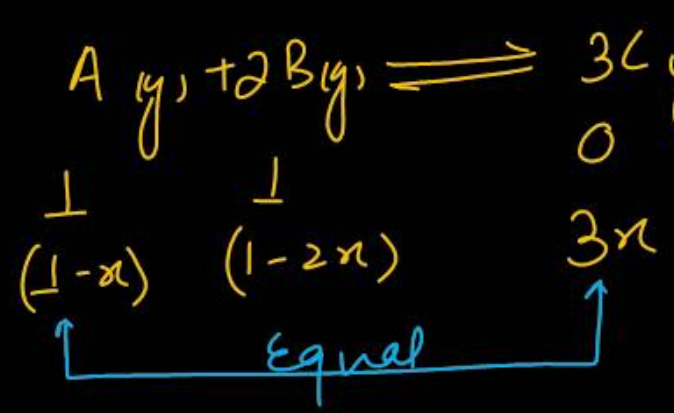
Question no. 58

$A(g) + 2B(g) \rightleftharpoons 3C(g)$,

In above reaction initial concentration of A is equal to that of B. The equilibrium concentration of A and C are equal, K_c of the reaction will be:

(1) 3.20 (2) 2.25

(3) 4.81 (4) 5.11



$(1-x) = 3x$

$1 = 4x$

$x = 1/4$

$1 - 1/4 = 3/4$ $\quad 1 - 2 \times 1/4 = 1/2$ $\quad 3 \times 1/4 = 3/4$

$$K_c = \frac{[C]^3}{[A][B]^2} = \frac{3/4 \times 3/4 \times 3/4}{3/4 \times 1/2 \times 1/2}$$

$$= 9/4 = 2.25$$

Question no. 59

The solubility of $Ca_3(PO_4)_2$ is 1×10^{-5} mol/L at 298 K. The solubility product is :

(1) 1×10^{-25} (2) 108×10^{-15}

(3) 108×10^{-25} (4) 25×10^{-25}

$Ca_3(PO_4)_2 \longrightarrow 3Ca^{+2} + 2PO_4^{-3}$

$s \quad 3s \quad 2s$

$K_{sp} = [3s]^3 [2s]^2$

$= 27s^3 \times 4s^2 = 108 s^5$

$K_{sp} = 108 \times (10^{-5})^5$

$= 108 \times 10^{-25}$

Question no. 60

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Match List-I with List-II.

	List-I (Sample)		List-II (Number of atoms)
A.	3.011×10^{23} $N_2(g)$ molecules	i.	$2N_A$
B.	1 mole of $O_2(g)$	ii.	$4N_A$
C.	44.8 L of $N_2(g)$ at STP	iii.	$0.5N_A$
D.	8 g of $O_2(g)$	iv.	N_A

$6.023 \times 10^{23} = N_A$

$= N_A$ molecule $= 2N_A$ atom

mol $= 44.8/22.4 = 2$ mol

mol $= 8/32 = 1/4$

$= 1/2 N_A = 0.5 N_A$

A - iv
B - i
C - ii
D - iii

Choose the correct answer from options given below :

(1) A – i, B – ii, C – iv, D – iii

(2) A – iv, B – ii, C – iii, D – i

(3) A – iv, B – i, C – ii, D – iii

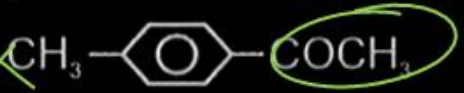
(4) A – i, B – iv, C – iii, D – ii

Question no. 61

AAYAM CAREER INSTITUTE

Which of the following ketones can not be prepared by Friedel-crafts actylation :

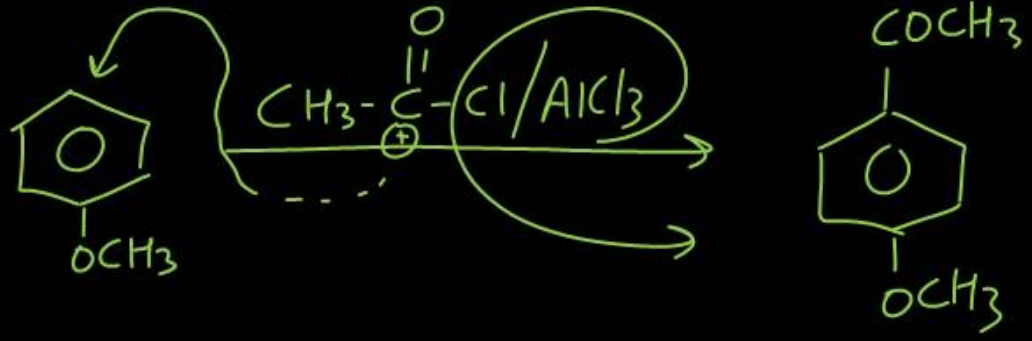
(1) 

(2) 

(3) 

3

(4) 



Question no. 62

AAYAM CAREER INSTITUTE

The ligands in anticancer drug cis-platin are :

(1) NH_3, Cl

(2) NH_3, H_2O

(3) Cl, H_2O

(4) NO, Cl

1

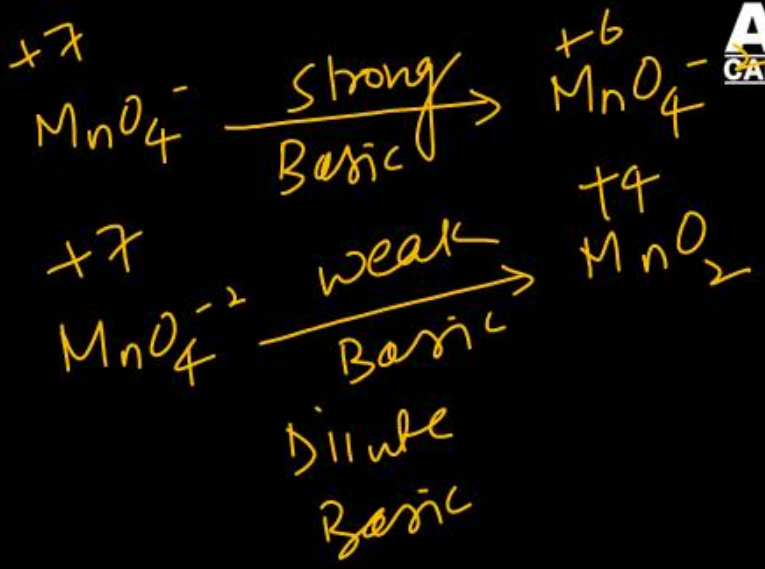
Cis-platin $[Pt(NH_3)_2Cl_2]$

Question no. 63

In weakly alkaline solution, MnO_4^{-1} changes to -

(1) MnO_4^{2-} (2) MnO_2

(3) Mn_2O_3 (4) MnO



Question no. 64

AAYAM CAREER INSTITUTE

Match List-I with List-II.

	List-I		List-II
A.	CrO_2^-	i.	+7
B.	ClO_3^-	ii.	+3
C.	MnO_4^-	iii.	+6
D.	CrO_4^{2-}	iv.	+5

(1) A – i, B – ii, C – iii, D – iv

(2) A – ii, B – iii, C – iv, D – i

(3) A – ii, B – iv, C – i, D – iii

(4) A – iv, B – i, C – ii, D – iii

Question no. 65

50 mL, 0.1 M NaOH (Base) is added to 50 mL, 0.08 M HNO_3 (Acid) and volume of resulting solution is made upto 500 mL. pH of solution would be :

(1) 12 (2) 11.3

(3) 2.7 (4) 11

$(N_1V_1)_{Base} = 50 \times 0.1 = 5$

$(N_1V_1)_{Acid} = 50 \times 0.08 = 4$

Base > Acid Soln Basic in nature

$$[OH^-] = \frac{(N_1V_1)_{Base} - (N_1V_1)_{Acid}}{V_1 + V_2 + V_w = 500}$$

$$= \frac{5-4}{500} = 1/500 = 2 \times 10^{-3}$$

$pOH = 3 - \log 2 = 2.7$

$pH = 11.3$

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Question no. 66

In the formation of HBr from H_2 and Br_2 following mechanism is observed :

$H_2 + Br_2 \longrightarrow 2HBr$

I. $Br_2 \rightleftharpoons 2Br$ (Equilibrium step) α

II. $H_2 + Br^{\cdot} \rightleftharpoons HBr + H^{\cdot}$ (Slow step)

III. $H^{\cdot} + Br_2 \rightleftharpoons HBr + H^{\cdot}$ (Fast step) α

The rate law for the above reaction is :

(1) $r = k'[H_2][Br_2]$

(2) $r = k'[H_2][Br_2]^{1/2}$

(3) $r = k'[H_2]^{1/2}[Br_2]$

(4) $r = k'[H_2]^{1/2}[Br_2]^{1/2}$

$Rate = K[H_2]^1[Br^{\cdot}]$

$\frac{k_f}{k_b} = \frac{[Br^{\cdot}]^2}{[Br_2]}$

$\frac{k_f}{k_b}[Br_2] = [Br^{\cdot}]^2$

$[Br^{\cdot}] = \left(\frac{k_f}{k_b}[Br_2]\right)^{1/2}$

$Rate = k'[H_2][Br_2]^{1/2}$

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Question no. 67

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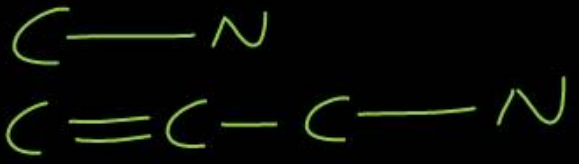
In which of the following carbon-nitrogen bond length is minimum :

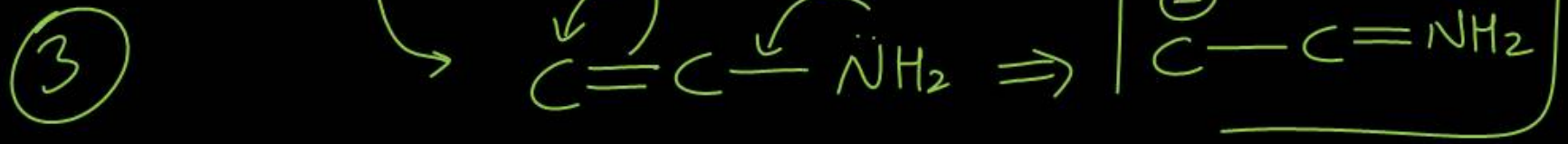
(1) $CH_3 - NH_2$

(2) $CH_2 = CH - CH_2 - NH_2$

(3) $CH_2 = CH - NH_2$

(4) $CH_3 - CH_2 - NH_2$





Question no. 68

AAYAM CAREER INSTITUTE

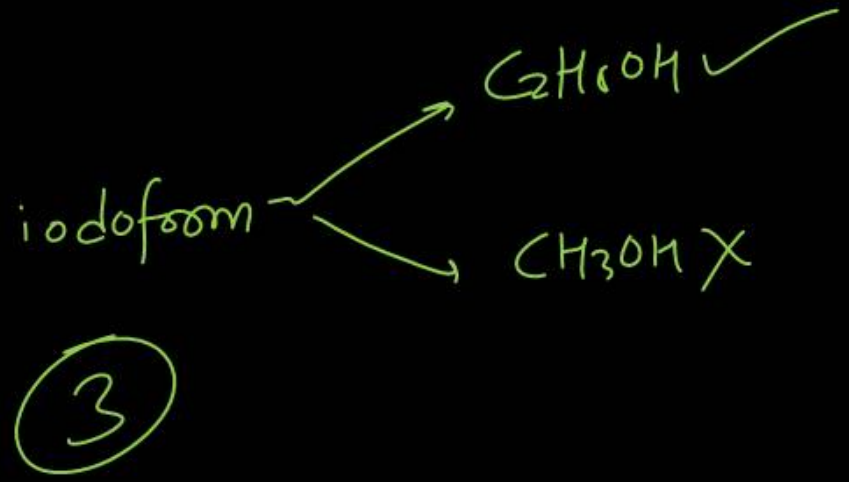
Which reagent can be used to distinguish methanol and ethanol :

(1) Tollen's reagent

(2) 2, 4-DNP

(3) I_2 + NaOH

(4) Fehling's test



Question no. 69

AAYAM CAREER INSTITUTE

Which of the following pair have same hybridisation?

(1) ClO_4^- & ClO_2^- sp^3/sp^3

(2) SF_4 & CCl_4 sp^3d/sp^3

(3) BF_3 & NF_3 sp^2/sp^3

(4) CO_2 & SO_2 sp/sp^2

Question no. 70

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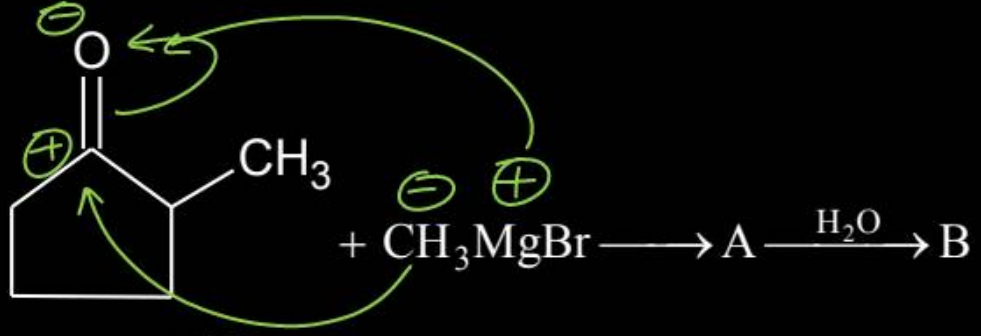
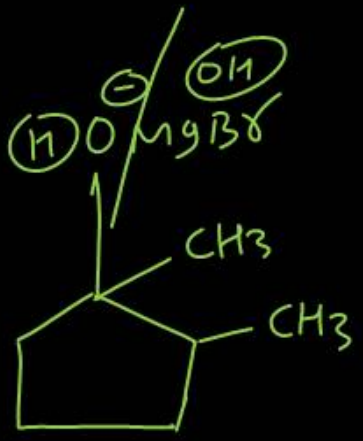
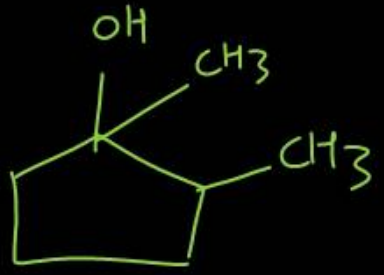
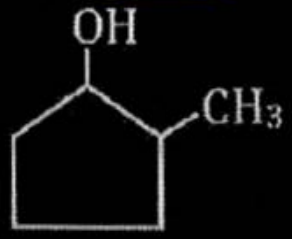
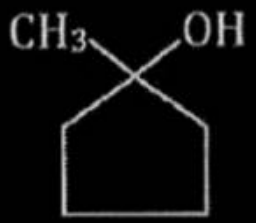
Identify product (B) in following reaction :

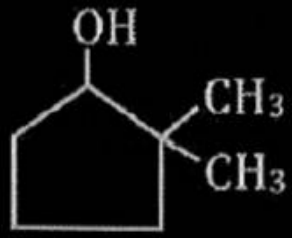


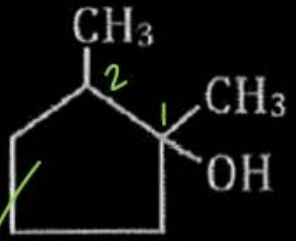




(1) 

(2) 

(3) 

(4) 

4

Question no. 71

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In which of the following options order of arrangement does not agree with the variation of property indicated against it?

A. $Al^{+3} < Mg^{+2} < Na^{+} < F^{-}$

(Increasing ionic size)

B. $Be < C < N < F$

(Increasing first ionisation enthalpy)

C. $Te < Se < O < S$

(Increasing electron gain enthalpy)

D. $Be < Mg < Ca < Sr$

(Increasing metallic radius)

Choose correct option.

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

(3) Only B and C (4) Only A, B and C

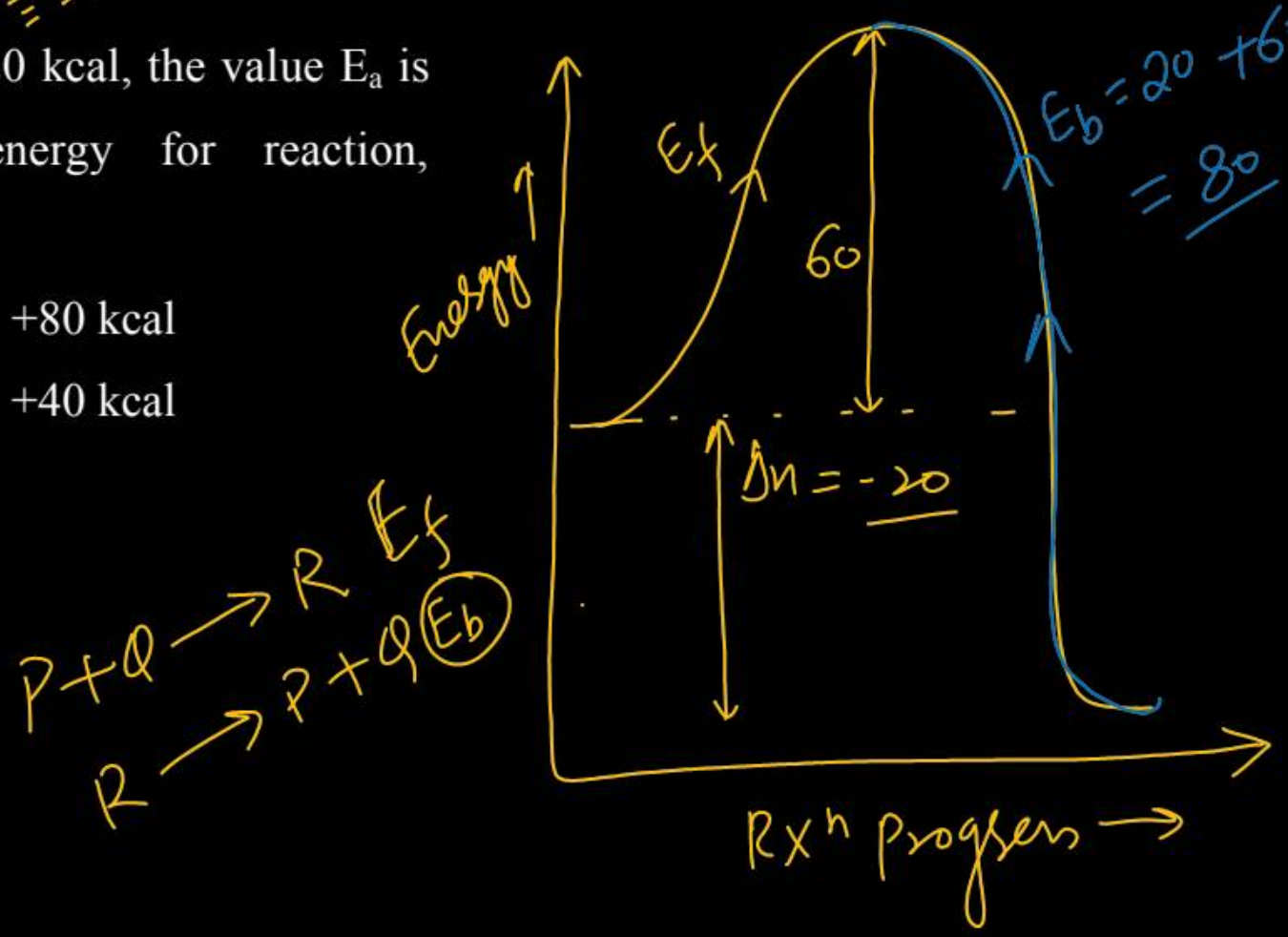
Question no. 72

ΔH = -ve
= -20 kcal

For a reaction, $P + Q \rightarrow R + 20$ kcal, the value E_a is 60 kcal. The activation energy for reaction, $R \rightarrow P + Q$ is :

(1) –80 kcal (2) +80 kcal

(3) –40 kcal (4) +40 kcal



Question no. 73

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At 25°C, the molar conductance's at infinite dilution for the electrolytes NaOH, NaCl and $BaCl_2$ are x, y and z S cm^2 mol^{-1} respectively. The limiting molar conductivity of $Ba(OH)_2$ (in S cm^2mol^{-1}) is :

(1) $x - y + 2z$ (2) $2x - 2y + z$

(3) $x + y - 2z$ (4) $2x + 2y - z$

$BaCl_2 + 2NaOH - 2NaCl = Ba(OH)_2$

$z \quad 2x \quad 2y$

$(2x + z - 2y) = Ba(OH)_2$

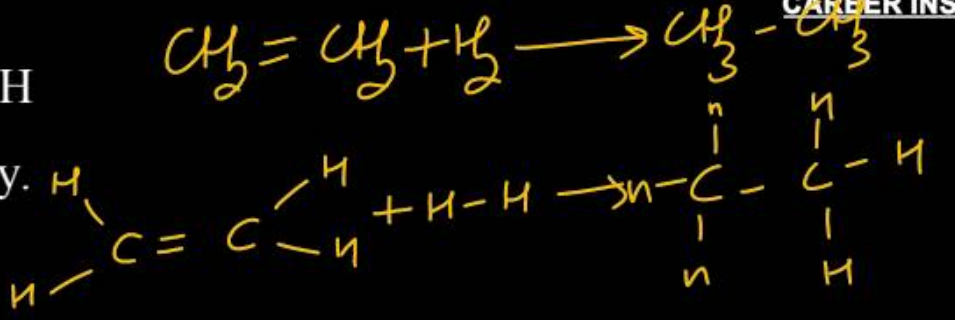
$(2x - 2y + z)$

Question no. 74

The bond energies of C – C, C = C, H – H and C – H bonds are 350, 600, 400 and 410 kJ/mol, respectively. The heat of hydrogenation of ethylene is

(1) –170 kJ mol^{-1} (2) –260 kJ mol^{-1}

(3) –400 kJ mol^{-1} (4) 450 kJ mol^{-1}



$$\Delta H_R = H_R - H_P$$

$$= \left[4\left[410\right] + 600\right] + 400 - \left[6 \times C\text{-}H + C\text{-}C\right]$$

$$= \left[1640 + 1000\right] - \left[6 \times 410 + 350\right]$$

$$= \left[2640\right] - \left[2460 + 350\right]$$

$$= \left[2640\right] - \left[2810\right]$$

$$= -170$$

Question no. 75

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1 g molecule of V_2O_5 has :

(1) 10 moles of O atoms (2) 2 mole of V atoms

(3) 1 mole of O atoms (4) 2.5 moles of O atoms

1 gm molecule = 1 mol V_2O_5

↓

2 atom

= 2 mol of V atom

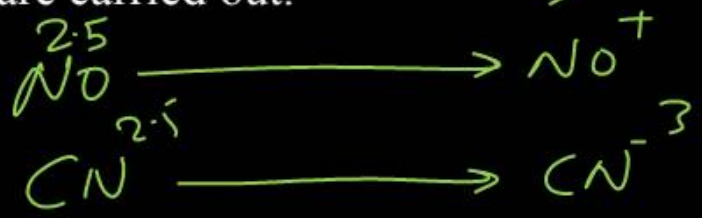
Question no. 76

AAYAM CAREER INSTITUTE

Following transformations are carried out.

$NO \rightarrow NO^+ + e^-$ ..... (i)

$CN + e^- \rightarrow CN^-$ ..... (ii)



For above transformations which statements are correct :

(1) Bond order is increased in (i) but decreased in (ii).

(2) Bond order is decreased in (i) but increased in (ii).

(3) Bond order is increased in both cases.

(4) Bond order is decreased in both cases.

Question no. 77

AAYAM CAREER INSTITUTE

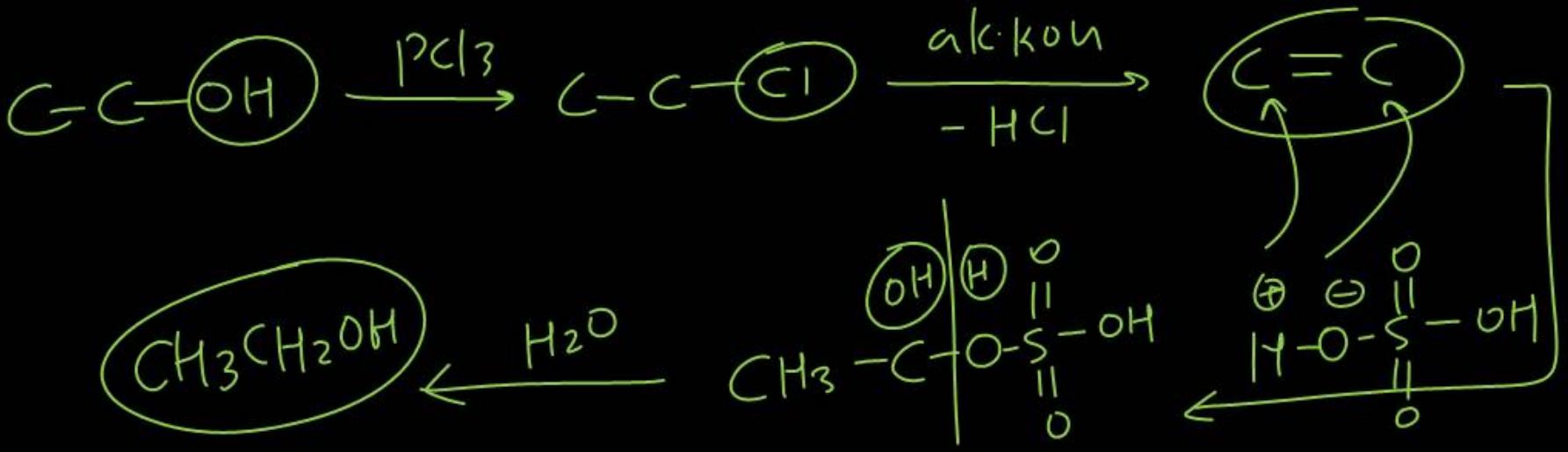
Identify product Z in following reaction :

$$\text{Ethanol} \xrightarrow{PCl_3} X \xrightarrow[KOH]{\text{alcoholic}} Y \xrightarrow[(ii)H_2O.\Delta]{(i)\text{conc.}H_2SO_4} Z$$

(1) $CH_2 = CH_2$ (2) CH_3CH_2OH

(3) $CH_2CH_2OCH_2CH_3$ (4) $CH_3CH_2SO_3H$

2



Question no. 78

What is potential energy of an electron present in N-shell of the Be^{3+} ion.

(1) –3.4 eV (2) –6.8 eV

(3) –13.6 eV (4) –27.2 eV

K, L, M, N → n = 4

$E_n = -13.6 \times \frac{Z^2}{n^2}$ eV/atom

$= -13.6 \times \frac{4^2}{4^2} = -13.6$

$E_n = -13.6$

$T.E. = -K.E. = \frac{P.E.}{2}$

$T.E. = \frac{P.E.}{2}$

$P.E. = 2 \times T.E.$

$= 2 \times -13.6 = -27.2$

Question no. 79

AAYAM CAREER INSTITUTE

The correct order in aqueous medium of basic strength in case of methyl substituted amines is :

(1) $Me_3N > Me_2NH > MeNH_2 > NH_3$

(2) $Me_2NH > MeNH_2 > Me_3N > NH_3$

(3) $Me_2NH > Me_3N > MeNH_2 > NH_3$

(4) $NH_3 > Me_3N > MeNH_2 > Me_2NH$

(2)

gas phase

$3^\circ > 2^\circ > 1^\circ$

aq. phase $R = -C_2H_5$

$2^\circ > 3^\circ > 1^\circ$

aq. phase $R = -CH_3$

$2^\circ > 1^\circ > 3^\circ$

Question no. 80

The number of atoms in 20 g of SO_3 is approximately:

(1) 1×10^{23} (2) 1.5×10^{23}

(3) 2×10^{23} (4) 6×10^{23}

$$mol = \frac{w}{M_w} = \frac{20}{80} = \frac{1}{4}$$

$$molecule = mol \times N_A$$

$$= \frac{1}{4} \times N_A = \frac{N_A}{4}$$

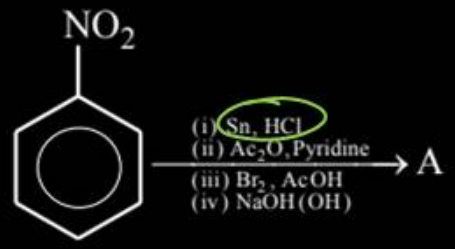
1 molecule of SO_3 = 4 atom

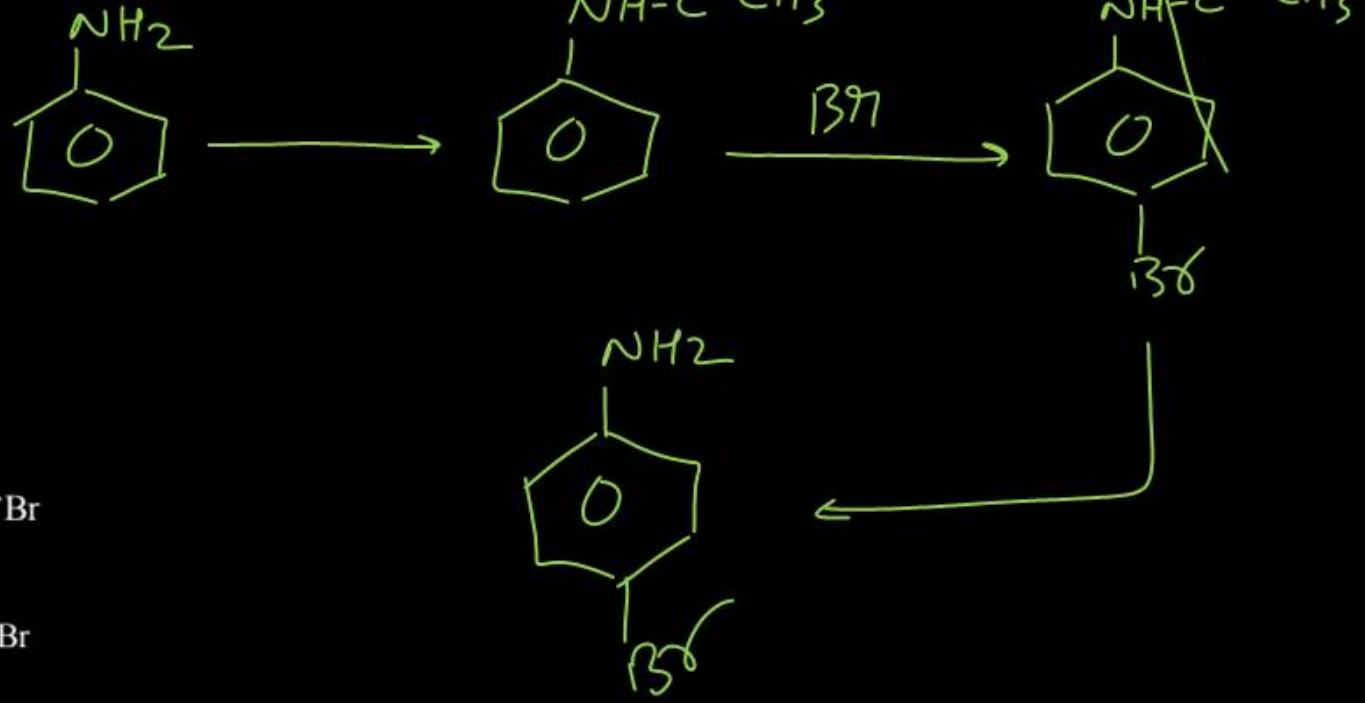
$\frac{N_A}{4}$ molecule of SO_3 = $4 \times N_A/4$

$= N_A$ atom

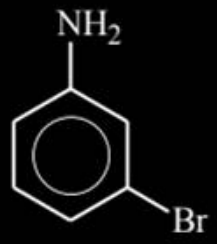
$= 6.023 \times 10^{23}$ atom

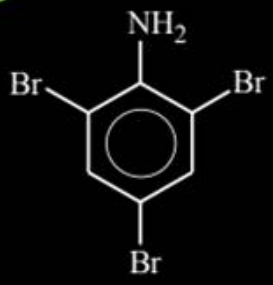
The major product (A) formed in the following reaction sequence is

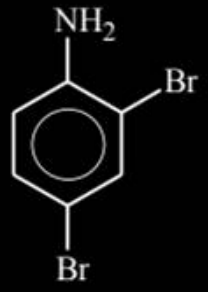




(1) 

(2) 

(3) 

(4) 

Question no. 82

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Consider the below reaction sequence and identify the major product P.

(1) Methane

(2) Methanal

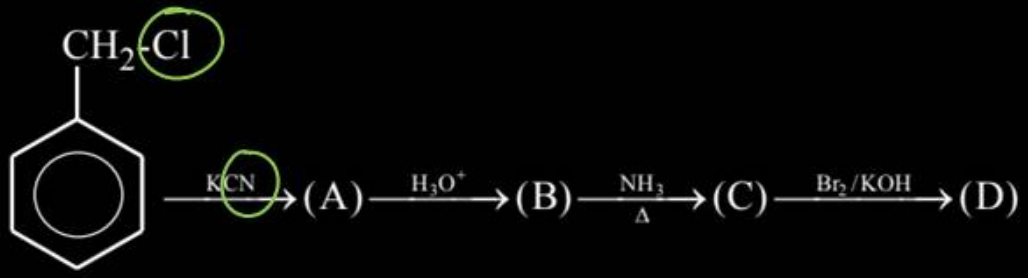
(3) Methoxymethane

(4) Methanoic acid

Question no. 83

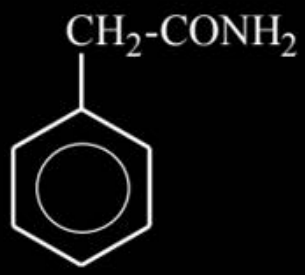
AAYAM CAREER INSTITUTE

Identify product (D) in following reaction is :

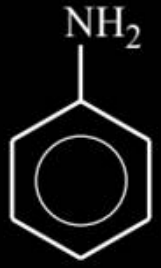


(1)

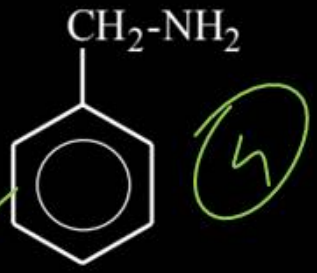
(2)

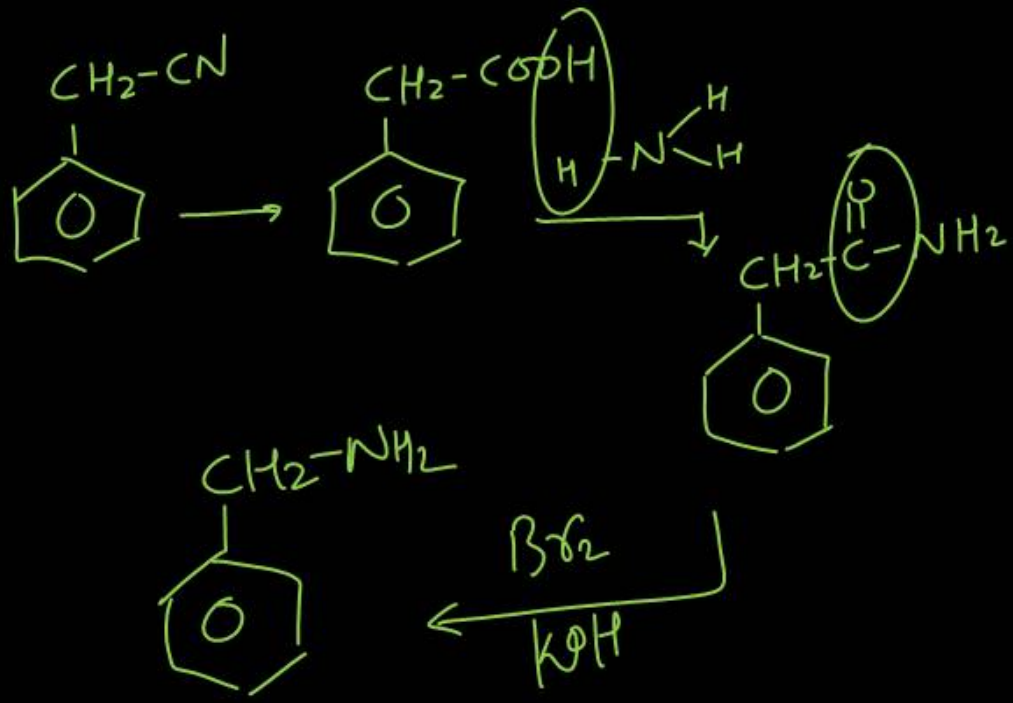


(3)



(4)





Question no. 84

AAYAM CAREER INSTITUTE

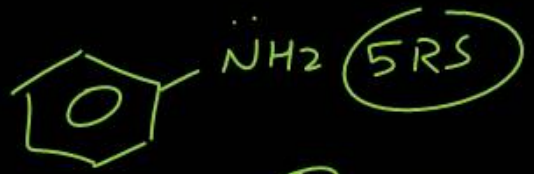
For the following compounds the correct order of basic stregnth will be :

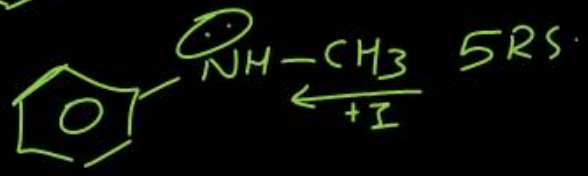
I. $Ph-\ddot{N}H_2$

II. $Ph-\ddot{N}H-CH_3$

III. $Ph-CH_2-\ddot{N}H_2$

IV. $\ddot{N}H_3$





(1) ~~IV > III > II > I~~

(2) III > IV > II > I

(3) ~~II > I > IV > III~~

(4) ~~IV > III > I~~ > II

2

Question no. 85

AAYAM CAREER INSTITUTE

Which one of the following reactions will not form acetaldehyde?

(1) $CH_3CH_2OH \xrightarrow{CrO_3-H_2SO_4}$ CH_3COOH

(2) $CH \equiv CH \xrightarrow[HgSO_4]{H_2SO_4}$ $CH_2=CH-OH \longrightarrow CH_3-CHO$

(3) $CH_3CH_2OH \xrightarrow[573\ K]{Cu}$ $CH_3-CH(OH)-H \longrightarrow CH_3-\overset{O}{\overset{\|}{C}}-H$

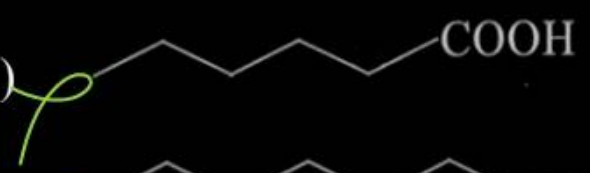
(4) $CH_3CN \xrightarrow[(ii)\ H_2O]{(i)\ DIBAL\text{-}H}$ CH_3CHO

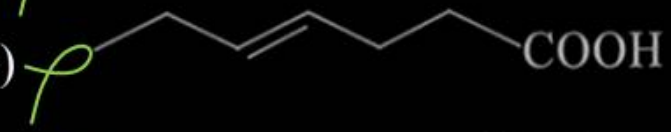
1

Question no. 86

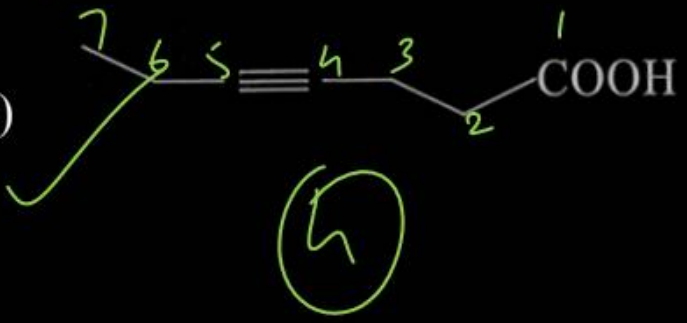
What is the product of following reaction?

$$\text{Hex}-3-\text{ynal} \xrightarrow[\text{(ii) } PBr_3,\ \text{(iii) Mg/ether, (iv) } CO_2/H_3O^+]{\text{(i) } NaBH_4} ?$$

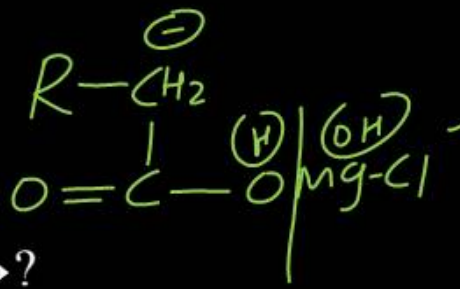
(1) 

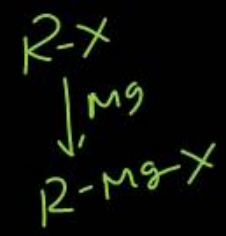
(2) 

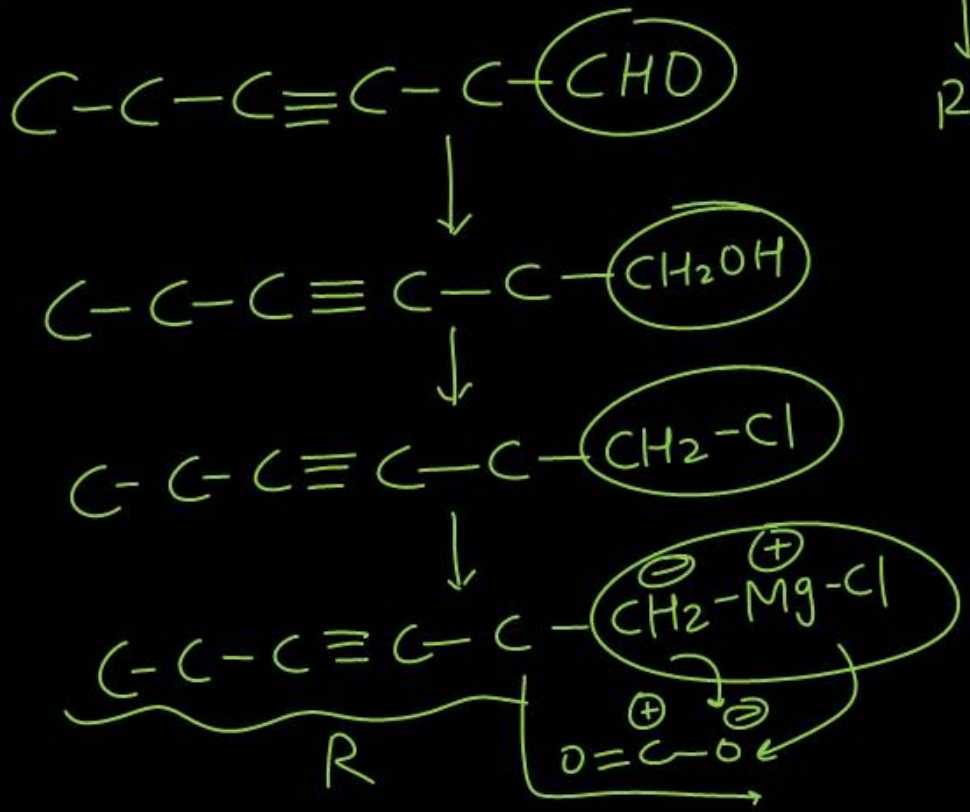
(3) 

(4) 

4







Question no. 87

AAYAM CAREER INSTITUTE

A new carbon-carbon bond formation is possible in

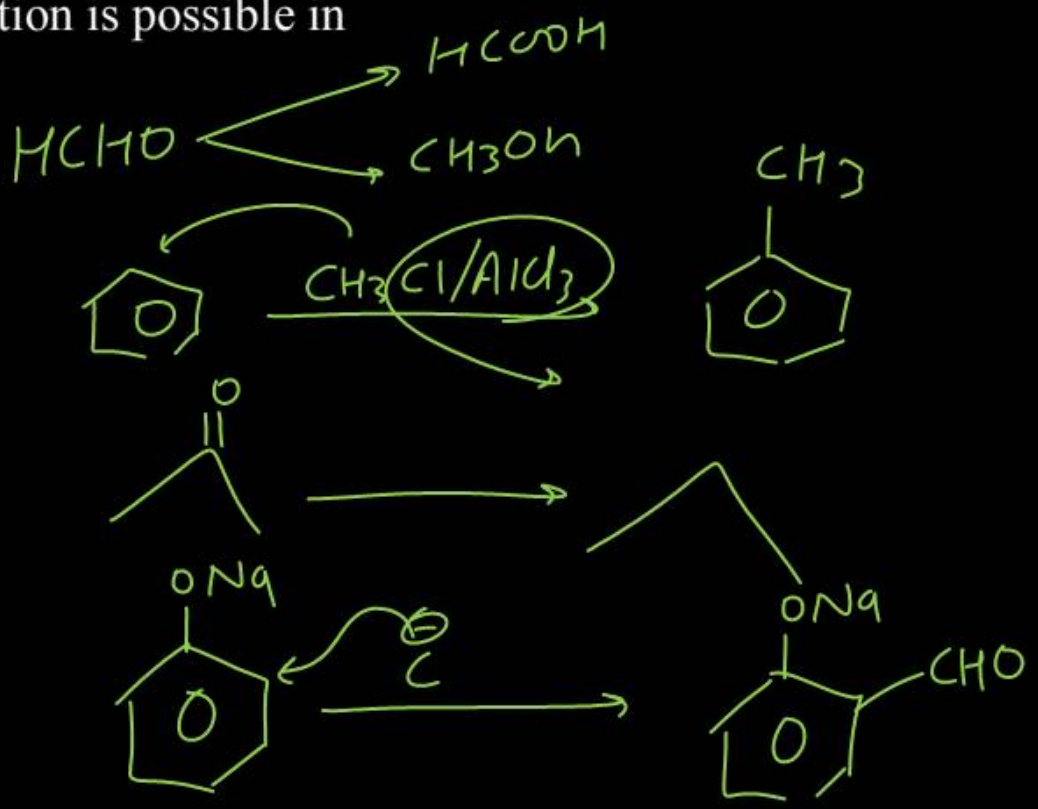
(1) Cannizzaro reaction

(2) Friedel-Crafts alkylation

(3) Clemmensen reduction

(4) Reimer-Tiemann reaction

2/4



Question no. 88

AAYAM CAREER INSTITUTE

Identify product C in following reaction :

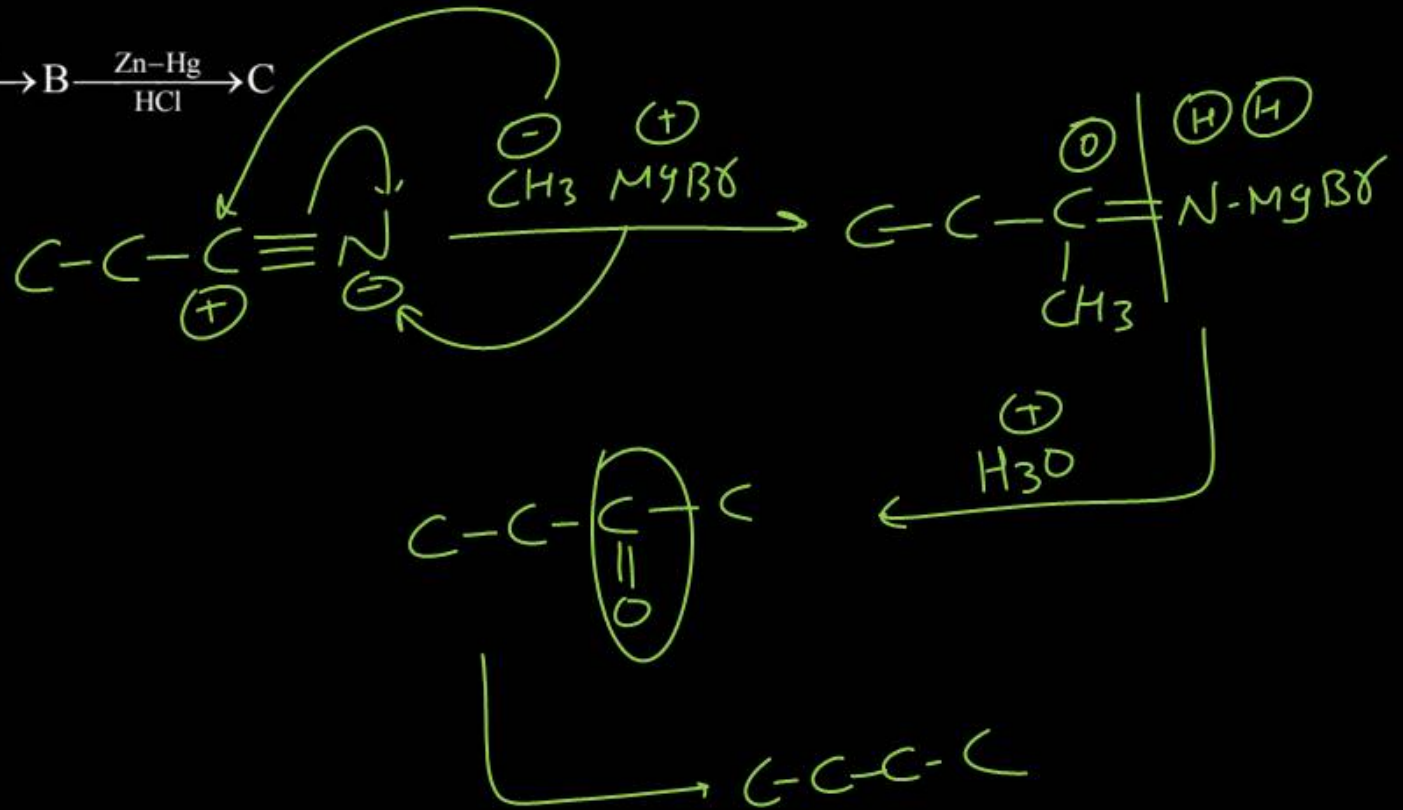
$$CH_3-CH_2-CN \xrightarrow[\text{Ether}]{CH_3MgBr} A \xrightarrow{H_3O^+} B \xrightarrow[HCl]{Zn-Hg} C$$

(1) $CH_3-CH_2-CH_2-CH_3$

(2) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-CH_3$

(3) $CH_3-CH_2-\overset{\overset{OH}{|}}{CH}-CH_3$

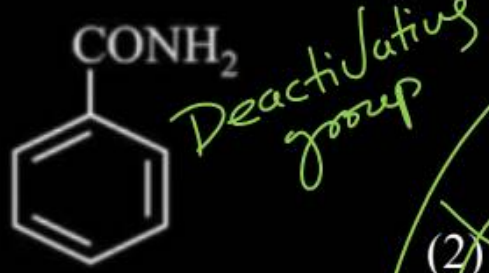
(4) $CH_3-CH_2-CH=CH_2$

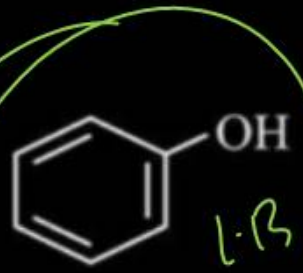


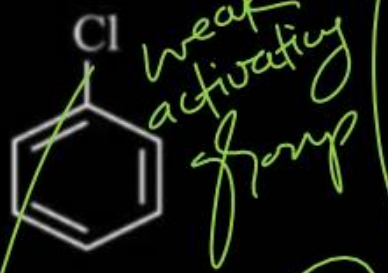
Question no. 89

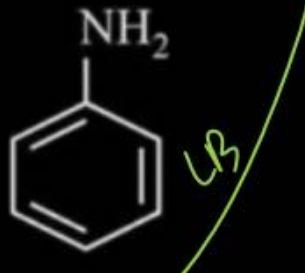
AAYAM CAREER INSTITUTE

Which of these will produce the highest yield in Friedel-Crafts reaction? ESR

(1) 

(2) 

(3) 

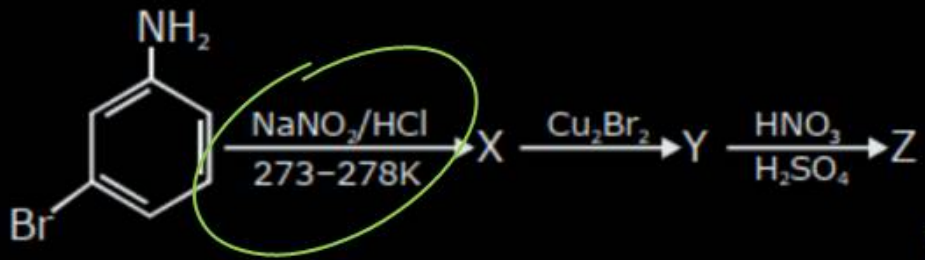
(4) 

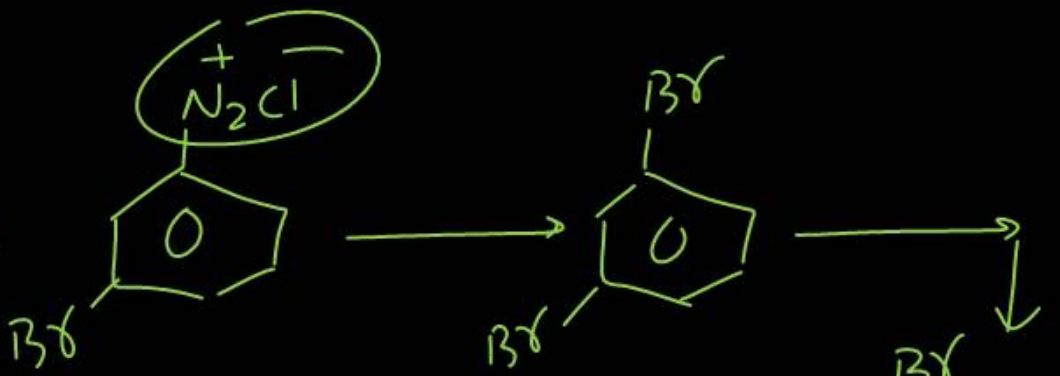
3

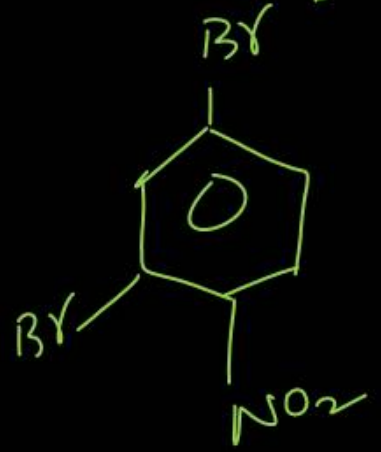
Question no. 90

AAYAM CAREER INSTITUTE

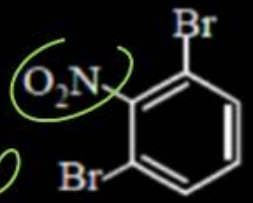
The major product Z obtained in the following reaction scheme is :







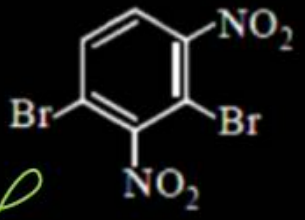
(1)



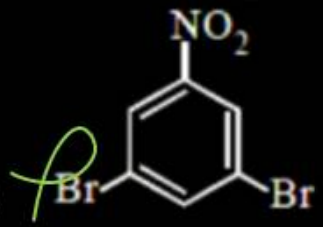
(2)

2

(3)



(4)



Question no. 91

AAYAM CAREER INSTITUTE

Assertion (A) : The secretion of FSH and LH increases gradually during the follicular phase.

Reason (R) : Both LH and FSH attain a peak level in the middle of the cycle

(1) Both A and R are correct and R is the orrect explanation of A.

(2) Both A and R are correct but R is not correct explanation of A

(3) A is correct but R is incorrect

(4) Both A and R are false

2

Question no. 92

AAYAM CAREER INSTITUTE

A steroid hormone which regulates glucose metabolism is :

(1) Cortisol

(2) Insulin

(3) Adrenaline

(4) Thyroid Hormone

1

Question no. 93

AAYAM CAREER INSTITUTE

Match the Column-I with Column-II and select the correct option given below

	Column – I		Column – II
a.	Glycosuria	i.	Accumulation of uric acid in joints
b.	Gout	ii.	Mass crystallised salts of within the kidney
c.	Renal calculi	iii.	Inflammation in glomeruli
d.	Glomerular nephritis	iv.	Presence of glucose in urine

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

Question no. 94

AAYAM CAREER INSTITUTE

The capacity to generate a whole plant from any cell of the plant is called:

(1) Differentiation

(2) Somatic hybridization

(3) Totipotency

(4) Micropropagation

3

Question no. 95

AAYAM CAREER INSTITUTE

For tree and grassland ecosystems, pyramid of biomass is

(1) Upright
(2) Inverted
(3) Spindle-shaped
(4) Urn-shaped

Question no. 96

AAYAM CAREER INSTITUTE

Which of the following activities do not involve the role of GA?

(1) Seed germination (2) Malting

(3) Root growth (4) Bolting

Question no. 97

AAYAM CAREER INSTITUTE

Match List-I with List-II:

	List – I		List – II
a.	Squamous Epithelium	i.	Goblet cells of alimentary canal
b.	Ciliated Epithelium	ii.	Inner lining of pancreatic ducts
c.	Glandular Epithelium	iii.	Walls of blood vessels
d.	Compound Epithelium	iv.	Inner surface of Fallopian tubes

Choose the correct answer from the options given below:

(1) a-ii, b-iii, c-i, d-iv

(2) a-ii, b-iv, c-iii, d-i

(3) a-iii, b-i, c-ii, d-iv

(4) a-iii, b-iv, c-i, d-ii

Question no. 98

AAYAM CAREER INSTITUTE

Highest amphibian species diversity region in India is :

(1) Satpura forest

(2) Aravali hills

(3) Eastern ghat

(4) Western ghat

Question no. 99

AAYAM CAREER INSTITUTE

Match List I with List II related to digestive system of cockroach.

	List – I		List – II
a.	The structures used for storage of food.	i.	Gizzard
b.	Ring of 6-8 blind tubules at junction of foregut and midgut.	ii.	Gastric Caeca
c.	Ring of 100-150 yellow coloured thin filaments at junction of midgut and hindgut.	iii.	Malpighian tubules
d.	The structures used for grinding the food.	iv.	Crop

(1) a-iv, b-iii, c-ii, d-i (2) a-iii, b-ii, c-iv, d-i

(3) a-iv, b-ii, c-iii, d-i (4) a-i, b-ii, c-iii, d-iv

Question no. 100

AAYAM CAREER INSTITUTE

How many meiotic & mitotic division are required to form one mature embryo sac from one functional megaspore:

(1) One and three respectively

(2) One and two respectively

(3) Zero and three respectively

(4) One and one respectively

Question no. 101

AAYAM CAREER INSTITUTE

Unequivocal proof that DNA is genetic material came from experiments of-

(1) Avery, Macleod & McCarty

(2) Hershey and Chase

(3) de Vries, Correns and Tschermak

(4) Sutton and Boveri

Question no. 102

AAYAM CAREER INSTITUTE

India has only 2.4% of world's land area but it contribute the ___ part of global diversity :

(1) 5%

(2) 20%

(3) 1.5%

(4) 8.1%

Question no. 103

AAYAM CAREER INSTITUTE

Which one of the following cell organelles is enclosed by a single membrane ?

(1) Mitochondria

(2) Chloroplasts

(3) Lysosomes

(4) Nucleus

Question no. 104

AAYAM CAREER INSTITUTE

RER is well developed in cells engaged in synthesis of

(1) Nucleotides

(2) Proteins

(3) Lipids

(4) Secretory products

Question no. 105

AAYAM CAREER INSTITUTE

Given diagram represent

(1) Twisted aestivation

(2) Imbricate aestivation

(3) Vexillary aestivation

(4) Valvate aestivation

Question no. 106

AAYAM CAREER INSTITUTE

Match list-I and list-II regarding the blood circulation in different phylum.

	List – I		List– II
a.	Open circulation	i.	Arthropoda
b.	Closed circulation	ii.	Annelida
c.	Incomplete double circulation	iii.	Amphibia
d.	Double circulation	iv.	Birds

(1) a-ii, b-iv, c-i, d-iii (2) a-iv, b-ii, c-iii, d-i

(3) a-i, b-ii, c-iii, d-iv (4) a-iii, b-ii, c-iv, d-i

Question no. 107

AAYAM CAREER INSTITUTE

Given below the unorganized list of some important events in the human female reproductive cycle. Identify the correct sequence of these events and select the correct option.

(i) Secretion of FSH

(ii) Growth of corpus luteum

(iii) Growth of the follicle

(iv) Ovulation

(v) Sudden increase in the levels of LH

(1) (i) → (iv) → (iii) → (v) → (ii)

(2) (ii) → (i) → (iii) → (iv) → (v)

(3) (iii) → (i) → (iv) → (ii) → (v)

(4) (i) → (iii) → (v) → (iv) → (ii)

Question no. 108

AAYAM CAREER INSTITUTE

All tissues are included in ground tissue except:

(1) Cortex

(2) Pith

(3) Pericycle

(4) Epidermis

Question no. 109

AAYAM CAREER INSTITUTE

Which of the following would help in prevention of diuresis ?

(1) Reabsorption of Na and water from renal tubules due to aldosterone

(2) Atrial natriuretic factor causes vasoconstriction

(3) Decrease in secretion of renin by JG cells

(4) More water reabsorption due to undersecretion of ADH

Question no. 110

AAYAM CAREER INSTITUTE

The metal ion in carboxypeptidase is :

(1) Flavin

(2) Haem

(3) Zinc

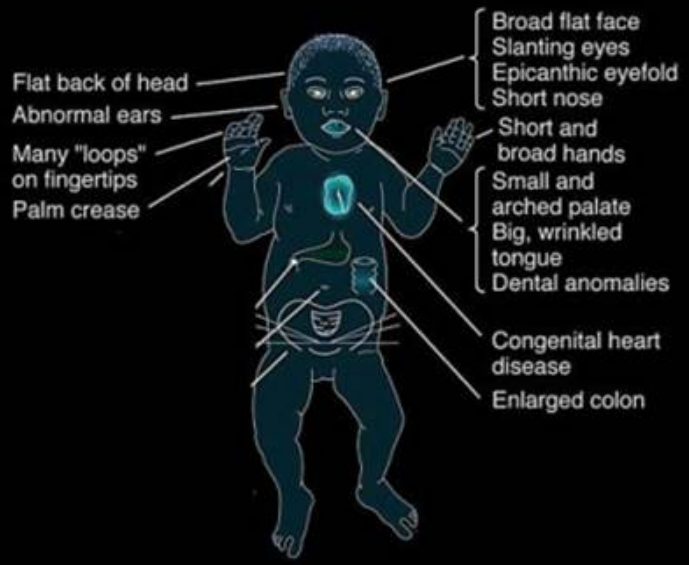
(4) Niacin

3

Question no. 111

AAYAM CAREER INSTITUTE

Refer to the given figure. It is showing the characteristic features of.



(1) Down's syndrome

(2) Turner's syndrome

(3) Klinefelter's syndrome

(4) None of these

Question no. 112

AAYAM CAREER INSTITUTE

In which group of organisms the cell walls form two thin overlapping shells which fit together?

(1) Slime moulds

(2) Chrysophytes

(3) Euglenoids

(4) Dinoflagellates

soap box.

(2)

Question no. 113

AAYAM CAREER INSTITUTE

Nuclear membrane is absent in

(1) Penicillium

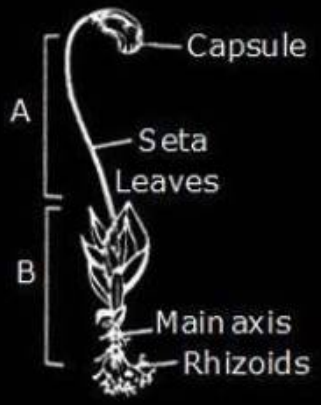
(2) Agaricus

(3) Volvox

(4) Nostoc

Question no. 114

In the following stage of funaria, select the true statement :



(1) A is sporophyte and is independent

(2) A is sporophyte and is dependent on B, which is gametophyte

(3) B is sporophyte and is independent

(4) B is sporophyte and is dependent on A for food, which is gametophyte

Question no. 115

AAYAM CAREER INSTITUTE

Axile placentation is observed in

(1) China rose, Beans and Lupin

(2) Tomato, Dianthus and Pea

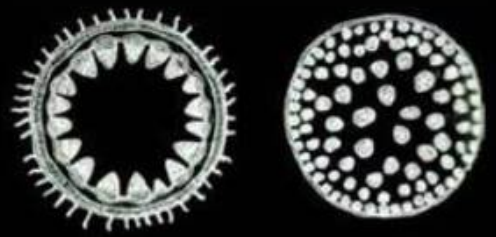
(3) China rose, Petunia and Lemon

(4) Mustard, Cucumber and Primrose

Question no. 116

AAYAM CAREER INSTITUTE

Figures X and Y represent the transverse sections of _____ and _____ respectively.



(1) dicot root, dicot stem
(2) monocot root, monocot stem
(3) dicot stem, monocot stem
(4) monocot stem, dicot stem

Question no. 117

AAYAM CAREER INSTITUTE

Pairing of homologous chromosomes is called:

(1) Disjunction

(2) Synapsis

(3) Segregation

(4) Polytene

Question no. 118

AAYAM CAREER INSTITUTE

These are regarded as major causes of biodiversity loss:

A. Over exploitation

B. Co-extinction

C. Mutation

D. Habitat loss and fragmentation

Choose the correct option:

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

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

Question no. 119

AAYAM CAREER INSTITUTE

Tidal volume and expiratory reserve volume of an athlete is 500 mL and 1000 mL respectively what will be his expiratory capacity if the residual volume is 1200 mL?

(1) 2200 mL
(2) 2700 mL
(3) 1500 mL
(4) 1700 mL

3

EC = TV + ERV
= 500 + 1000
= 1500

Question no. 120

AAYAM CAREER INSTITUTE

The H-zone in the skeletal muscle fibre is

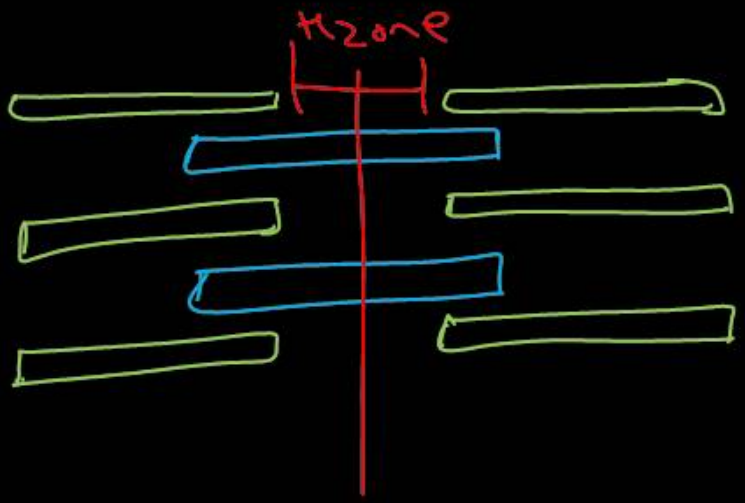
(1) Extension of myosin filaments in the central portion of the A-band

(2) The absence of myofibrils in the central portion of A-band

(3) The central gap between myosin filaments in the A-band

(4) The central part of myosin filaments not overlapped by thin filaments in the A band

4



Question no. 121

AAYAM CAREER INSTITUTE

Which one of the following is an incorrect statement regarding Mycoplasma?

(1) They lack a cell wall.

(2) They are the smallest living cells.

(3) They cannot survive without oxygen.

(4) They are pathogenic in plants and animals.

3

Question no. 122

AAYAM CAREER INSTITUTE

Which of the following act is responsible for depolarisation of the neuron?

(1) Opening of voltage gated K^+ channel

(2) Opening of voltage gated Ca^{+2} channel

(3) Opening of voltage gated Na^+ channel

(4) Closure of voltage gated Na^+ channel

Na^+

3

Question no. 123

AAYAM CAREER INSTITUTE

Match column-I with column-II and select the correct option from the codes given below :

	Column – I		Column – II
a.	A. Glycolysis	i.	Inner mitochondrial membrane
b.	B. TCA cycle	ii.	Mitochondrial matrix
c.	ETS	iii.	Cytoplasm

(1) a - (iii), b-(i), c-(ii)

(2) a-(iii), b-(ii), c-(i)

(3) a -(i), b-(ii), c-(iii)

(4) a-(ii), b-(i), c-(iii)

Question no. 124

AAYAM CAREER INSTITUTE

Match List-I with List-II:

	List – I		List – II
a.	Vexillary aestivation	i.	Brinjal
b.	Epipetalous stamens	ii.	Peach
c.	Epiphyllous stamens	iii.	Pea
d.	Perigynous flower	iv	Lily

(1) a-iii, b-i, c-iv, d-ii

(2) a-iii, b-iv, c-i, d-ii

(3) a-iii, b-ii, c-i, d-iv

(4) a-ii, b-i, c-iv, d-iii

Question no. 125

AAYAM CAREER INSTITUTE

Match List I with List II

	List – I		List – II
a.	Clostridium butylicum	i.	Ethanol
b.	Saccharomyces cerevisiae	ii.	Streptokinase
c.	Trichoderma polysporum	iii.	Butyric acid
d.	Streptococcus sp.	iv	Cyclosporin-A

Choose the correct answer from the options given below:

(1) a-iii, b-i, c-iv, d-ii (2) a-iv, b-i, c-iii, d-ii

(3) a-iii, b-i, c-ii, d-iv (4) a-ii, b-iv, c-iii, d-i

Question no. 126

AAYAM CAREER INSTITUTE

Match List I with List II

	List – I		List–II
a.	P wave	i.	Beginning of systole
b.	Q wave	ii.	Repolarisation of ventricles
c.	QRS complex	iii.	Depolarisation of atria
d.	T wave	iv.	Depolarisation of ventricles

Choose the correct answer from options given below:

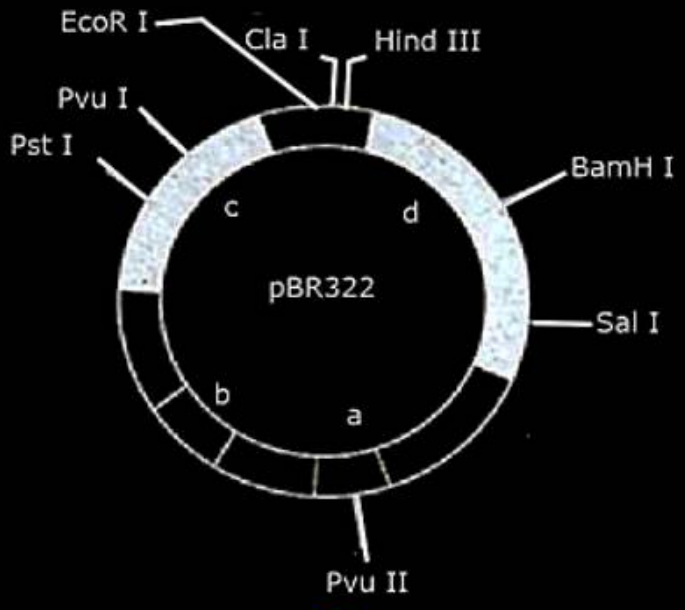
(1) a –iv, b-iii, c-ii, d-i (2) a –ii, b-iv, c-i, d-iii

(3) a –iv, b-iii, c-i, d-ii (4) a –iii, b-i, c-iv, d-ii

Question no. 127

AAYAM CAREER INSTITUTE

Which of the following codes for the proteins involved in the replication of the plasmid :



(1) c

(2) a

(3) d

(4) b

Question no. 128

AAYAM CAREER INSTITUTE

Read the following statements and choose the correct option:

Statement-I : If the dried tissue is fully burnt, all the carbon compounds are oxidised to gaseous form (CO_2, vapour) and are removed.

Statement-II : The ash contains inorganic elements like calcium and magnesium.

(1) Both statements are correct.

(2) Both statements are incorrect.

(3) Only statement I is correct.

(4) Only statement II is correct.

Question no. 129

AAYAM CAREER INSTITUTE

Amensalism is an association between two species where

(1) One species is harmed and other is benefitted

(2) One species is harmed and other is unaffected

(3) One species is benefitted and other is unaffected

(4) Both the species are harmed

Question no. 130

AAYAM CAREER INSTITUTE

Cyclic phosphorylation ends in formation of

(1) ATP only (2) Glucose only

(3) NADPH + H^+ only (4) Both (1) & (3)

Question no. 131

AAYAM CAREER INSTITUTE

Which of the following is not a product of light reaction of photosynthesis ?

(1) NADPH
(2) NADH
(3) ATP
(4) Oxygen

Question no. 132

AAYAM CAREER INSTITUTE

In yeast during anaerobic respiration how many glucose molecules are required for production of 38 ATP?

(1) 1
(2) 2
(3) 19
(4) 38

Question no. 133

AAYAM CAREER INSTITUTE

Which of the following hormone is correctly matched with its source & function?

(1) Vasopressin – Anterior pituitary gland – Induces reabsorption of water in nephron.

(2) Oxytocin – Anterior pituitary gland Contraction in uterine muscles during birth (parturition).

(3) Thymosin – Thymus – Helps in differentiation of T-lymphocyte.

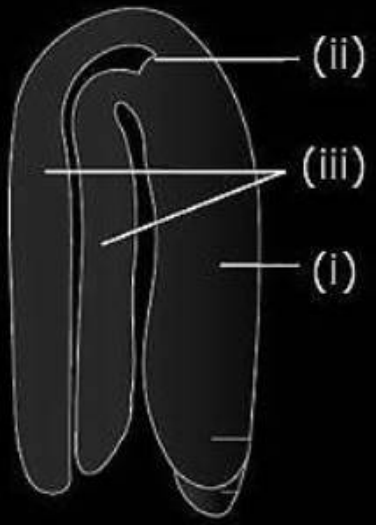
(4) Glucagon – Pancreatic α-cells Induces the uptake & utilization of glucose inside cells.

3

Question no. 134

AAYAM CAREER INSTITUTE

Identify the correct labels :-



(1) (i) Cotyledon, (ii) Plumule, (iii) Hypocotyl

(2) (i) Radicle, (ii) Cotyledon, (iii) Plumule

(3) (i) Hypocotyl, (ii) Plumule, (iii) Cotyledon

(4) (i) Cotyledon, (ii) Plumule, (iii) Epicotyl

Question no. 135

AAYAM CAREER INSTITUTE

Taq Polymerase is obtained from :

(1) Bacillus thuringiensis

(2) Thermus aquaticus

(3) Salmonella typhimurium

(4) Escherichia coli

2

Question no. 136

AAYAM CAREER INSTITUTE

Which are involved in in-situ conservation?

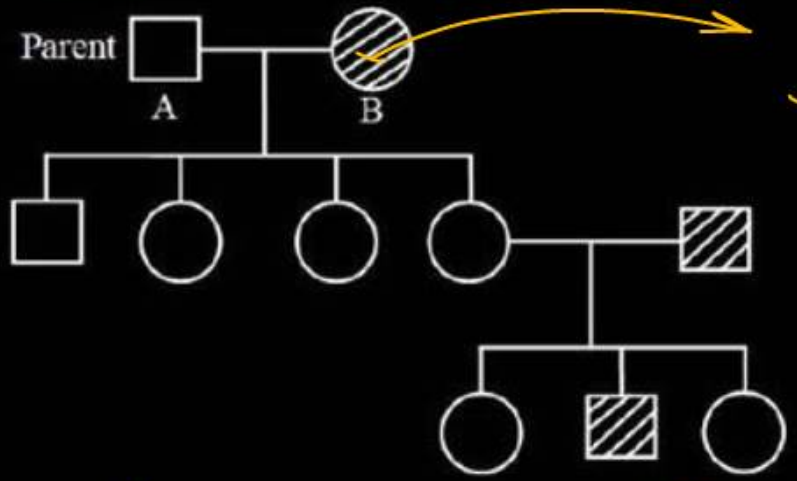
(i) Biosphere reserve
(ii) Cryopreservation
(iii) Tissue culture
(iv) Seed bank
(v) National park
(vi) Zoological park
(vii) Sacred groves
(viii) Safari parks

(1) iii, vii, v
(2) ii, iii, i
(3) i, v, vii
(4) iv, vi, i

Question no. 137

AAYAM CAREER INSTITUTE

Given pedigree shows inheritance of autosomal recessive gene. What is the genotype of given parents respectively :-



a a

Homozygous

(1) AA, aa

(2) aa, AA

(3) aa, Aa

(4) Aa, Aa

Question no. 138

AAYAM CAREER INSTITUTE

Which of the following statements are correct regarding muscle proteins?

(i) Actin is a thin filament and is made up of two strands of F – actins

(ii) The complex protein, tropomyosin is distributed at regular intervals on the troponin

(iii) Myosin is a thick filament which is also a polymerized protein

(iv) The globular head of meromyosin consists of light meromyosin (LMM).

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

Question no. 139

AAYAM CAREER INSTITUTE

Given below are two statements:

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

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

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

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

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

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

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

Question no. 140

AAYAM CAREER INSTITUTE

Match List-I with List-II:

	List – I		List – II
a.	Adenosine	i.	Nitrogenous base
b.	Adenylic acid	ii.	Nucleotide
c.	Adenine	iii.	Nucleoside
d.	Alanine	iv	Amino acid

Choose the option with all correct matches:

(1) a-iii, b-iv, c-ii, d-i

(2) a-iii, b-ii, c-iv, d-i

(3) a-iii, b-ii, c-i, d-iv

(4) a-ii, b-iii, c-i, d-iv

Question no. 141

AAYAM CAREER INSTITUTE

Match List – I with List - II

	List – I (Sub phases of prophase I)		List – II (Specific characters)
a.	Diakinesis	i.	Synaptonemal complex formation
b.	Pachytene	ii.	Completion of terminalisation of chiasmata
c.	Zygotene	iii.	Chromosomes look like thin threads
d.	Leptotene	iv.	Appearance of recombination nodules

Choose the correct answer from the options given below :

(1) a-ii, b-iv, c-i, d-iii

(2) a-iv, b-iii, c-ii, d-i

(3) a-iv, b-ii, c-iii, d-i

(4) a-i, b-ii, c-iv, d-iii

Question no. 142

AAYAM CAREER INSTITUTE

Match the column-I with column-II and choose the correct option

	Column – I		Column – II
a.	False fruit	i.	Black pepper
b.	Perisperm	ii.	Banana
c.	Parthenocarpic fruit	iii.	maize
d.	Albuminous seed	iv	Strawberry

(1) a-iv, b-i, c-ii, d-iii

(2) a-ii, b-iv, c-iii, d-i

(3) a-iv, b-iii, c-i, d-ii

(4) a-iii, b-ii, c-i, d-iv

Question no. 143

AAYAM CAREER INSTITUTE

Which type of linkage/bond is formed when two nucleotides are linked to form a dinucleotide?

(1) N-glycoside linkage

(2) Peptide bond

(3) Phosphodiester linkage

(4) Hydrogen bond

3

Question no. 144

AAYAM CAREER INSTITUTE

Match the classes of pteridophytes with their example given below and choose the correct option

	Column – I		Column – II
a.	Lycopsida	i.	Equisetum
b.	Psilopsida	ii.	Dryopteris
c.	Pteropsida	iii.	Selaginella
d.	Sphenopsida	iv	Psilotum

(1) a-ii, b-iii, c-iv, d-i

(2) a-iii, b-iv, c-ii, d-i

(3) a-iii, b-i, c-ii, d-iv

(4) a-ii, b-i, c-iv, d-iii

Question no. 145

AAYAM CAREER INSTITUTE

In a pea plants, yellow seeds are dominant to green. If a heterozygous yellow seeded plant is crossed with a green seeded plant, what ratio of green and yellow seeded plants would you except progeny.

(1) 3 : 1

(2) 1 : 2

(3) 1 : 1

(4) 9 : 1

Question no. 146

AAYAM CAREER INSTITUTE

Select the incorrect match w.r.t. examples of classes of fungi

(1) Phycomycetes – Alternaria, Colletotrichum

(2) Basidiomycetes – Ustilago, Puccinia

(3) Deuteromycetes – Trichoderma, Alternaria

(4) Ascomycetes – Neurospora, Claviceps

1

Question no. 147

AAYAM CAREER INSTITUTE

Read the following Assertion and Reason and select correct option

Assertion (A): Golgi bodies are the site of synthesis of glycoproteins and glycolipids.

Reason (R): SER is site of synthesis of steroidal hormones in animal cells.

(1) If both assertion and reason are true and the reason is the correct explanation of the assertion

(2) If both assertion and reason are true but reason is not the correct explanation of the assertion

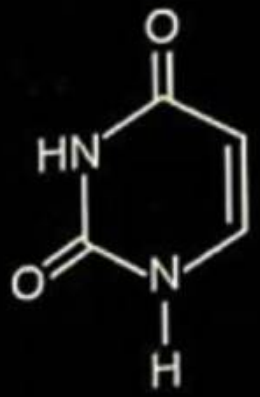
(3) If assertion is true but reason is false

(4) If the assertion is false and reason true.

Question no. 148

AAYAM CAREER INSTITUTE

Identify the following compound and select the correct option



3

(1) Adenine

(2) Adenosine

(3) Uracil

(4) Uridine

Question no. 149

AAYAM CAREER INSTITUTE

Match the following columns and select the correct option

	Column – I		Column – II
a.	Cyclosporin A	i.	Lactobacillus
b.	Streptokinase	ii.	Monascus Purpureus
c.	Statin	iii.	Trichoderma polysporum
d.	Lactic acid	iv.	Streptococcus

(1) a-iii, b-iv, c-i, d-ii (2) a-iii, b-iv, c-ii, d-i

(3) a-iv, b-iii, c-ii, d-i (4) a-iv, b-ii, c-iii, d-i

Question no. 150

AAYAM CAREER INSTITUTE

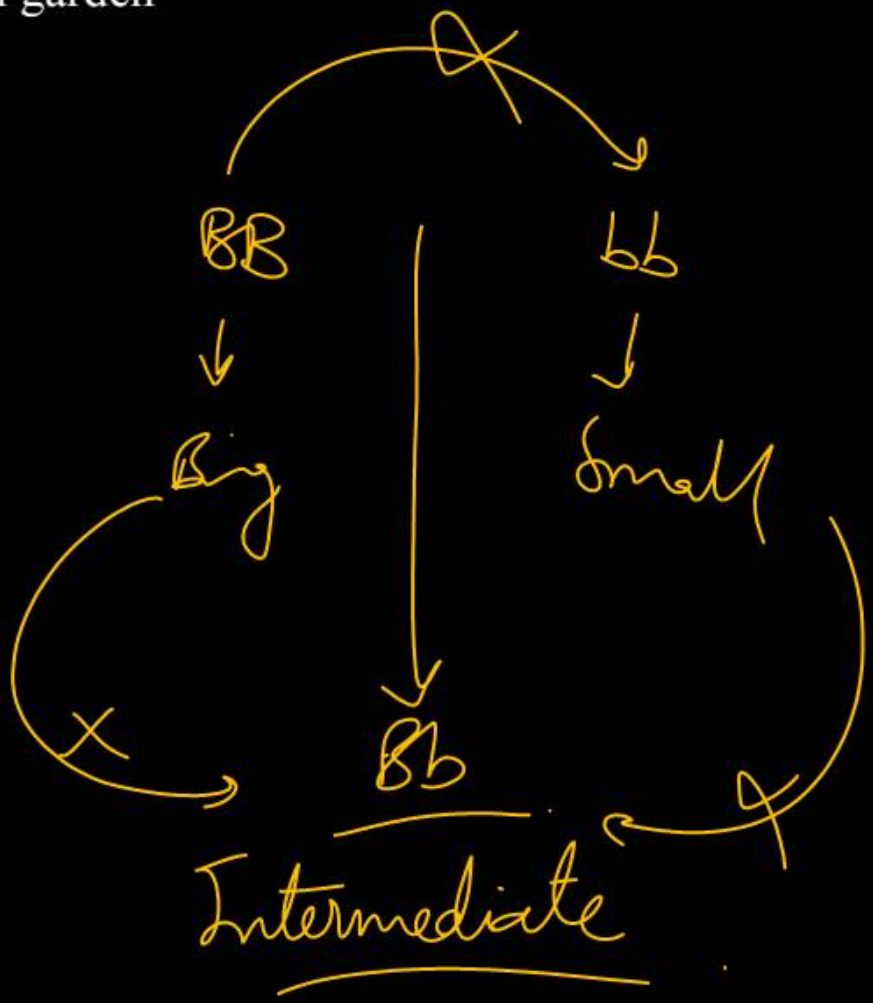
The starch synthesis regarding the grain size in garden pea show A for Bb genotype. Here A is

(1) Codominance

(2) Dominance

(3) Incomplete dominance

(4) Multiple allelism



Question no. 151

AAYAM CAREER INSTITUTE

Mark the incorrect match w.r.t. electron transport system in mitochondria

(1) NADH dehydrogenase – Complex I

(2) Cytochrome bc_1 – Complex III

(3) Succinate dehydrogenase – Complex II

(4) Cytochrome c oxidase – Complex V

ATP Synthase

Question no. 152

AAYAM CAREER INSTITUTE

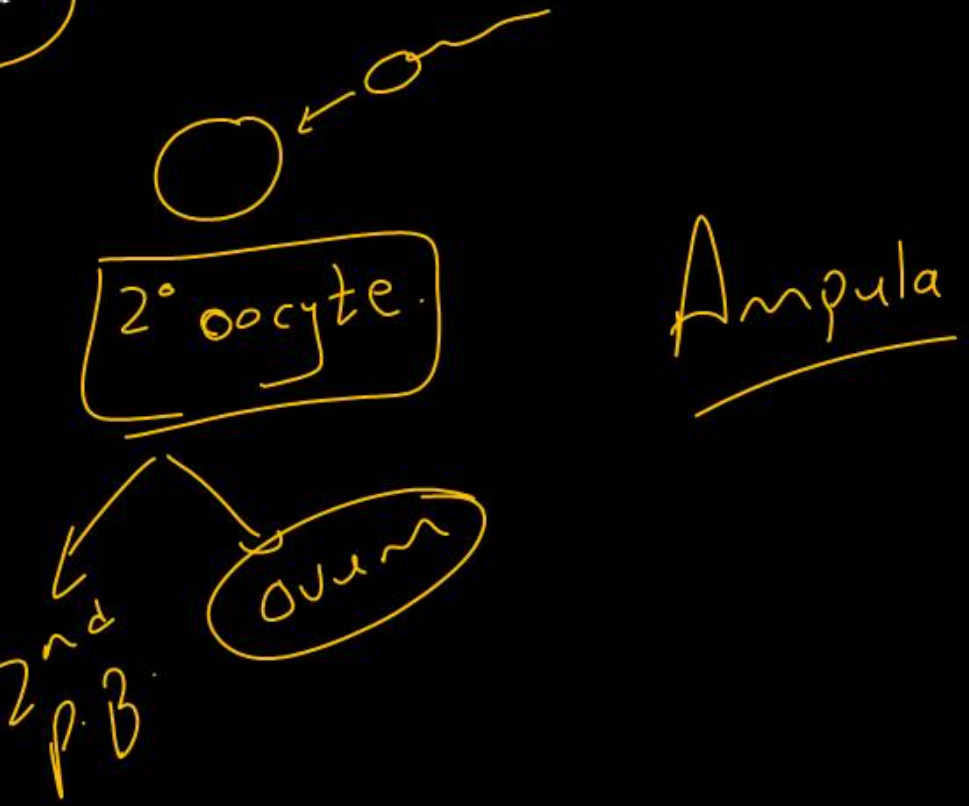
During Oogenesis of female human being second polar body is formed along with

(1) Secondary oocyte is Ampulla

(2) Ootid in the ovary

(3) Secondary oocyte in ovary

(4) Ootid/ovum in the ampulla



Question no. 153

AAYAM CAREER INSTITUTE

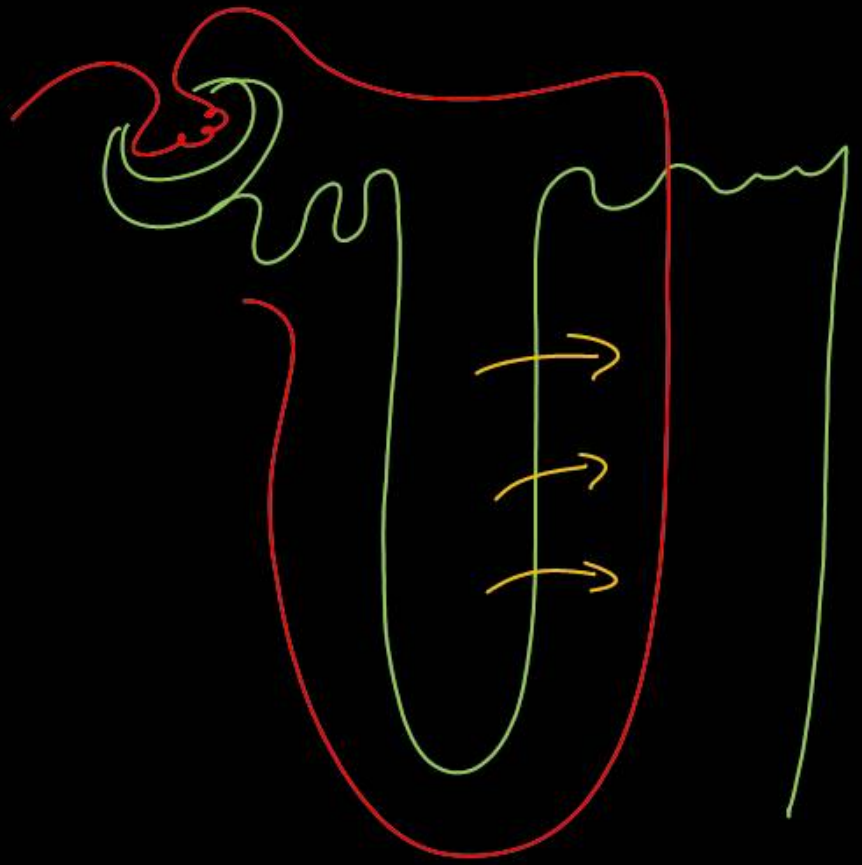
During counter current exchange in the kidney, NaCl is transported from

(1) The blood of Ascending limb of vasa recta into the descending limb of Henle's loop

(2) Renal filtrate of ascending limb of Henle into the blood of descending limb of vasa recta

(3) Renal filtrate of descending limb of Henle into the blood of ascending limb of vasa recta

(4) More than one options



During muscle contraction, cross bridge is broken due to the

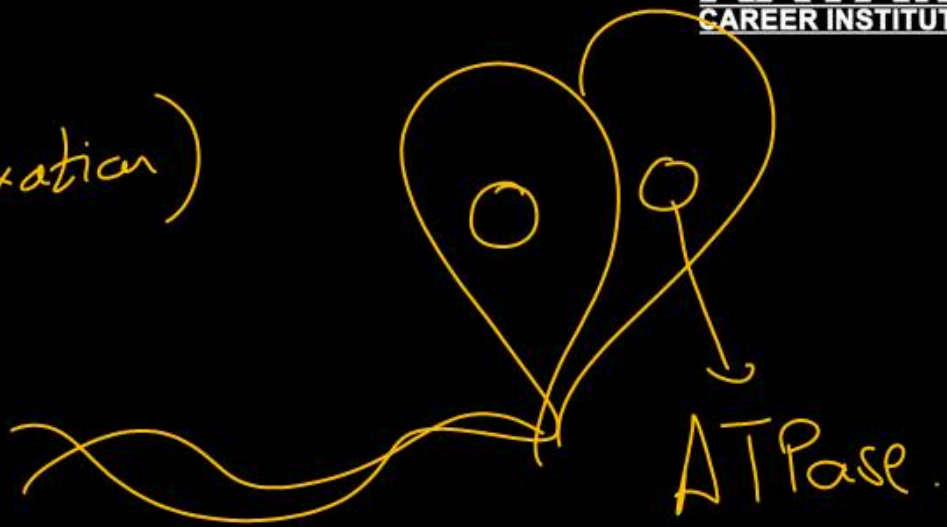
(1) Hydrolysis of ATP at Myosin head

(2) Hydrolysis of ATP at acto-myosin junction

(3) Attachment of ATP to ATP binding site of myosin head

(4) Attachment of ATP to myosin head when it is in detached condition

(Relaxation)



3

Question no. 155

AAYAM CAREER INSTITUTE

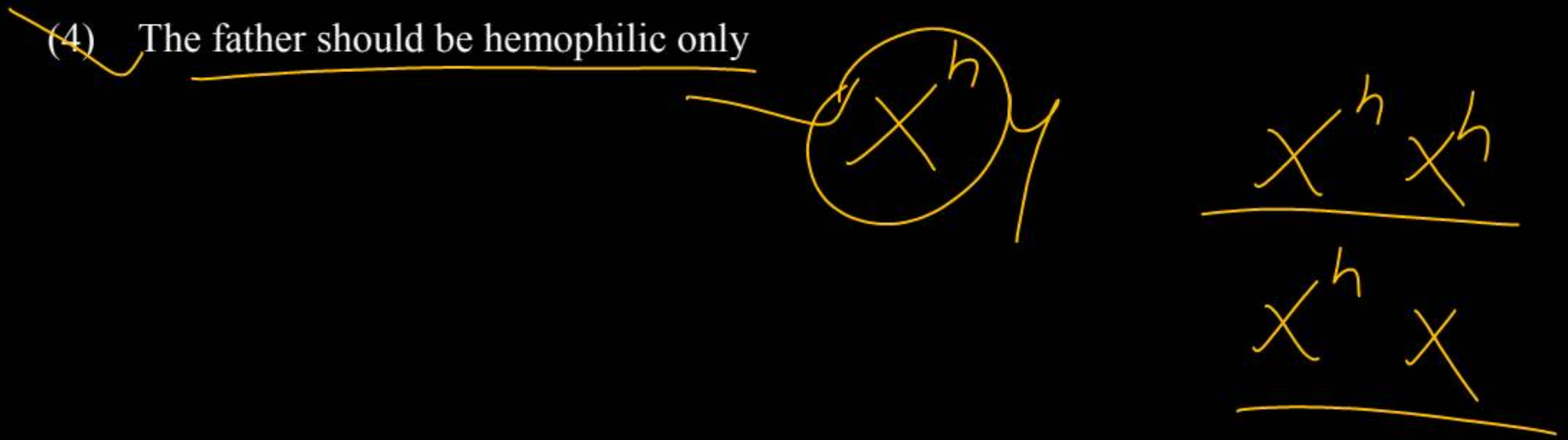
Choose the correct w.r.t. haemophilic daughter

(1) The mother should to be at least haemophilic

(2) The father should be non haemophilic

(3) The mother should be carrier only

(4) The father should be hemophilic only



Question no. 156

AAYAM CAREER INSTITUTE

Intercalated discs are present in

(1) Smooth muscles

(2) Striated voluntary muscles

(3) Skeletal muscles

(4) Cardiac muscles

4

Question no. 157

AAYAM CAREER INSTITUTE

Generation of secondary messengers is associated with the mechanism of action of

(1) Estrogen and ACTH

(2) Insulin and TSH

(3) Cortisol and ACTH

(4) Progesterone and androgens

Question no. 158

AAYAM CAREER INSTITUTE

Among the following terms, how many are related to physiological barrier of innate immunity

Skin, Tears, Interferons, Monocyte, Saliva, Mucus Coating

(1) One

(2) Two

(3) Four

(4) Three

Question no. 159

AAYAM CAREER INSTITUTE

Choose the mismatch w.r.t. disease and vector

(1) Dengue - Culex ♀ Aedes

(2) Malaria - Anopheles

(3) Chikungunya - Aedes

(4) Filariasis - Culex

1

Question no. 160

AAYAM CAREER INSTITUTE

Complete the analogy w.r.t cranial capacity of hominids.

Homo habilis : 750 cc :: Homo erectus: _____

(1) 650 cc

(2) 900 cc

(3) 1450 cc

(4) 160 cc

2

Question no. 161

AAYAM CAREER INSTITUTE

All of the following are associated with test tube baby programme except

(1) In vitro fertilization

(2) ZIFT

(3) IUI

(4) ET

Question no. 162

AAYAM CAREER INSTITUTE

Protonephridia is an excretory organ of

(1) Echinoderms (2) Arthropods

(3) Molluscs (4) Cephalochordates

4

Question no. 163

AAYAM CAREER INSTITUTE

Which of the following is a primary lymphoid organ?

(1) Bone marrow

(2) Spleen

(3) Peyer's patches

(4) MALT

1

Question no. 164

AAYAM CAREER INSTITUTE

Colostrum provides

(1) Active immunity

(2) Innate immunity

(3) Artificial acquired immunity

(4) Passive immunity

4

Question no. 165

AAYAM CAREER INSTITUTE

Arrange the number of chromosomes in antipodal cells, embryo, integuments, endosperm and nucellus sequentially, if the haploid number in a flowering plant is 20.

(1) 40, 40, 10, 60, 20

(2) 20, 40, 20, 60, 20

(3) 40, 10, 20, 60, 20

(4) 20, 40, 40, 60, 40

If $n = 20$

$2n = 40$

$3n = 60$

Question no. 166

AAYAM CAREER INSTITUTE

Match List-I with List-II.

	List-I		List-II
A.	Dicot stem	i.	Hypodermis is sclerenchymatous
B.	Monocot stem	ii.	Pericycle gives rise to lateral roots only
C.	Monocot root	iii.	Pericycle gives rise to lateral roots and secondary meristem
D.	Dicot root	iv.	Hypodermis is collenchymatous

(1) A – i, B – ii, C – iii, D – iv

(2) A – i, B – iv, C – iii, D – ii

(3) A – i, B – iv, C – ii, D – iii

(4) A – iv, B – i, C – ii, D – iii

Question no. 167

AAYAM CAREER INSTITUTE

The Nile perch was introduced in Lake Victoria which led to the extinction of cichlid fish in the lake. This cause is best explained by

(1) overexploitation

(2) alien species invasion

(3) co-extinction

(4) habitat loss and fragmentation

Question no. 168

Read the following statements and choose the incorrect set of statements.

I. Bacteria live in extreme habitats such as hot springs, deserts, snow and deep oceans.

II. Methanogens are present in the gut of several ruminant animals.

III. The colonies of Archaebacteria are surrounded by gelatinous sheath.

IV. The bacteria that live in salty areas are known as thermoacidophiles.

V. Bacteria reproduce mainly by fission.

Choose the correct answer from options given below:

(1) I and V

(2) II, IV and V

(3) III and IV

(4) I, II and III

Question no. 169

Given below are two statements; one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A) : hnRNA is non-functional RNA.

Reason (R): hnRNA have both coding sequences exons and non-coding sequences introns.

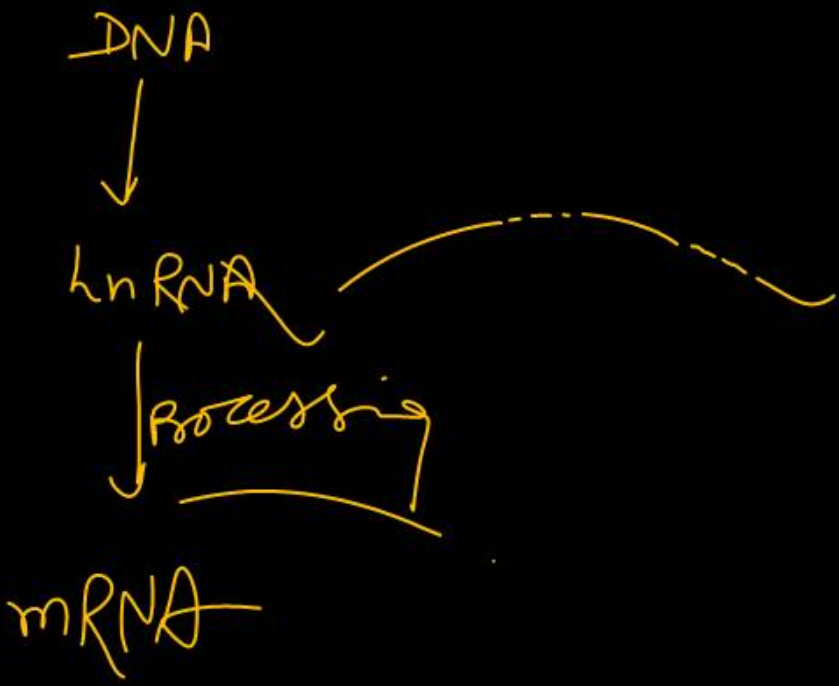
In the light of the above statements, choose the correct answer from the options given below :

(1) A is false, but R is true.

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

(3) Both A and R are true and R is not the correct explanation of A.

(4) A is true, but R is false.



Question no. 170

AAYAM CAREER INSTITUTE

Which of the following option contains all the three stop or terminator codons?

(1) UGA, UUU, UAA

(2) UGA, UAG, UAA

(3) AUG, UAG, UUU

(4) AUC, UAG, AUG

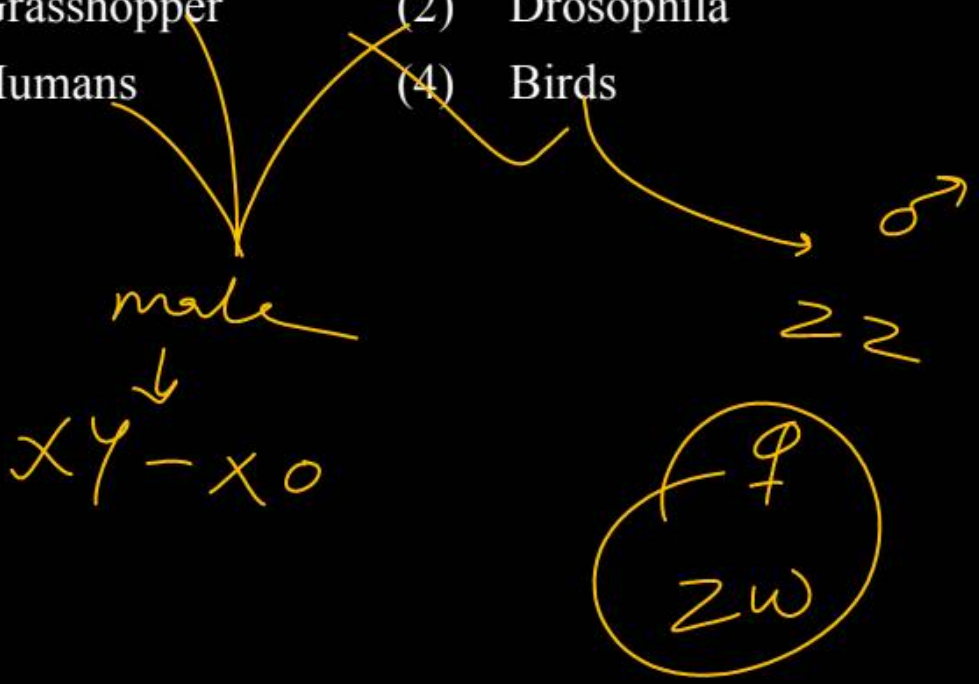
Question no. 171

AAYAM CAREER INSTITUTE

Which organism shows female heterogamety?

(1) Grasshopper (2) Drosophila

(3) Humans (4) Birds



Question no. 172

AAYAM CAREER INSTITUTE

The part of pituitary gland that consist of two portions, pars distalis and pars intermedia is called

(1) neurohypophysis (2) adenohypophysis

(3) sella turcica (4) pars intermedia

2

Question no. 173

AAYAM CAREER INSTITUTE

A nematode Meloidogyne incognita infects the roots of tobacco plants and causes a great yield reduction. A novel strategy is adopted to prevent this infestation which involves.

(1) silencing of specific mRNA of nematode

(2) inhibition of DNA replication in nematode

(3) inhibition of transcription in nematode

(4) silencing of specific mRNA of tobacco plant

Question no. 174

AAYAM CAREER INSTITUTE

Match List-I with List-II.

	List-I		List-II
A.	Natality	i.	Number of deaths in the population during a given period
B.	Mortality	ii.	Number of births during a given period
C.	Immigration	iii.	Number of individuals of the population who left the habitat
D.	Emigration	iv.	Number of individuals of the same species that have come into the habitat.

(1) A – i, B – ii, C – iii, D – iv

(2) A – ii, B – i, C – iv, D – iii

(3) A – iii, B – ii, C – i, D – iv

(4) A – iv, B – ii, C – iii, D – i

Question no. 175

AAYAM CAREER INSTITUTE

Refer to the given equation and answer the question.

$2(C_{51}H_{98}O_6) + 145\ O_2 \rightarrow 102\ CO_2 + 98\ H_2O + \text{Energy}$

The RQ of above equation is

(1) 1 (2) 0.7

(3) 1.75 (4) 1.62

$RQ = \frac{CO_2 \text{ evolved}}{O_2 \text{ consumed}}$

$\frac{102}{145} \Rightarrow 0.7$

Question no. 176

AAYAM CAREER INSTITUTE

Which of the given blood group(s) is/are not possible in progenies when parents have blood group AB and O?

I. A

II. AB

III. B

IV. O

(1) I only

(2) II only

(3) Both II and IV

(4) IV only

3

Question no. 177

AAYAM CAREER INSTITUTE

DNA fingerprinting relies on identifying minisatellites which are

VNTRs

(1) repetitive coding short DNA sequences.

(2) repetitive non-coding short DNA sequences.

(3) repetitive coding and non-coding short DNA sequences.

(4) non-repetitive non-coding short DNA sequences.

Question no. 178

AAYAM CAREER INSTITUTE

Identify the incorrect statement.

(1) In Arthropoda, jointed appendages help in locomotion.

(2) Radula for feeding are present in mollusca.

(3) Water vascular system is present in Echinodermata.

(4) Roundworm is an example of Platyhelminthes.

Question no. 179

AAYAM CAREER INSTITUTE

Find the odd one out in the given list.

I. Multiload 375

II. LNG – 20

III. Lippes loop

IV. Cervical cap

V. Progestasert

Barrier method.

Choose the correct option :

(1) Only V

(2) Only IV

(3) IV and V

(4) III, IV and V

2

Question no. 180

AAYAM CAREER INSTITUTE

Which of the following correctly defines amphibian heart?

(1) Two auricles and one ventricle.

(2) Two auricles and two ventricle.

(3) One auricles and two ventricle.

(4) One auricles and one ventricle.