Question no. 1

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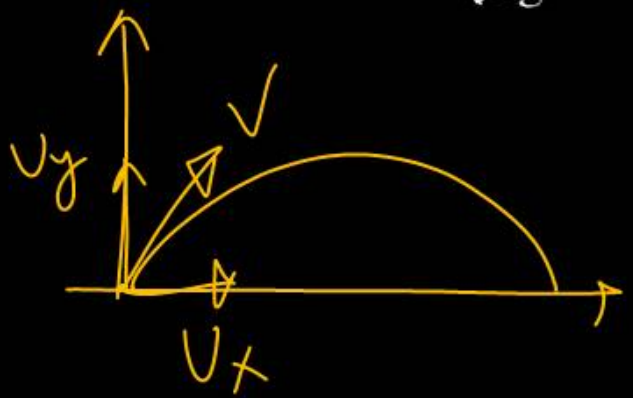
A particle is projected with a velocity v such that its range on the horizontal plane is twice the greatest height attained by it. The range of the projectile is (where g is acceleration due to gravity)

(1) $\frac{4v^2}{5g}$

(2) $\frac{4g}{5v^2}$

(3) $\frac{v^2}{g}$

(4) $\frac{4v^2}{\sqrt{5}g}$



$R = 2H_{max}$

$\frac{2U_xU_y}{g} = 2\frac{U_y^2}{2g}$

$U_y = 2U_x$

$V^2 = U_x^2 + U_y^2$

$V^2 = U_x^2 + 4U_x^2$

$U_x = V/\sqrt{5}$

$U_y = 2V/\sqrt{5}$

$R = 2\frac{V}{\sqrt{5}}\frac{2V}{\sqrt{5}}g$

$R = \frac{4V^2}{5g}$ (1)

Question no. 2

$t_R = n\, t_S$

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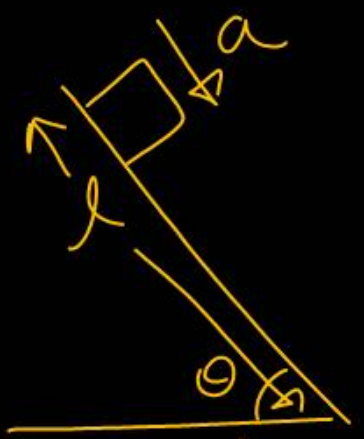
A given object takes n times the time to slide down 45° rough inclined plane as it takes the time to slide down an identical perfectly smooth 45° inclined plane. The coefficient of kinetic friction between the object and the surface of inclined plane is:

(1) $1-\frac{1}{n^2}$ (2) $1-n^2$

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



$l = 0 + \frac{1}{2}at^2$

$t = \sqrt{\frac{2l}{a}}$

$\frac{t_R}{t_S} = \sqrt{\frac{a_S}{a_R}}$

$\frac{nt_S}{t_S} = \sqrt{\frac{g\sin 45^\circ}{g(\sin 45^\circ - \mu\cos 45^\circ)}}$

$n^2 = \frac{1}{1-\mu}$

$1-\mu = \frac{1}{n^2}$

$\mu = 1-\frac{1}{n^2}$

(1)

Question no. 3

In a photoelectric effect experiment, for radiation with frequency υ_0 with $h\upsilon_0 = 8eV$, electrons are emitted with energy 2 eV. What is the energy of the electrons emitted for incoming radiation of frequency $1.25\ \upsilon_0$?

(1) 1 eV (2) 3.25 eV

(3) 4 eV (4) 9.25 eV

$E = \phi + K$.

$8 = \phi + 2$.

$\phi = 6(eV)$

$E' = \phi + k'$

$1.25(h\upsilon_0) = 6 + k'$

$1.25 \times 8 = 6 + k'$

$10 = 6 + k'$

$10 - 6 = k'$

$k' = 4eV$.

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Question no. 4

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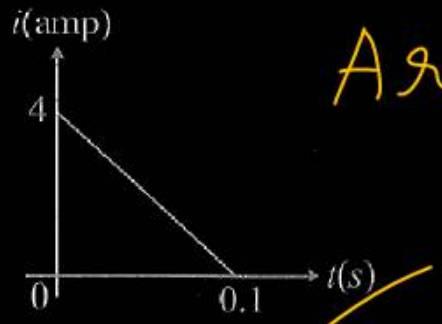
In a coil of resistance 10 Ω, the induced current developed by changing magnetic flux through it, is shown in figure as a function of time. The magnitude of change in flux through the coil in weber is



(1) 8

(2) 2

(3) 6

(4) 4

$R = 10\Omega$

$\Delta\phi = ?$

$\text{Area} = Q = \frac{1}{2} \times 0.1 \times 4 = 0.2\,C$

$Q = \frac{\Delta\phi}{R}$

$\Delta\phi = QR$

$= 0.2 \times 10$

$= 2$

Question no. 5

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The equation of alternating current is:

$I = 50\sqrt{2} \sin 400\pi t$ amp. Then the frequency and rootmean square of current are respectively

(1) 200 Hz, 50 amp

(2) 400π Hz, $50\sqrt{2}$ amp

(3) 200 Hz, $50\sqrt{2}$ amp

(4) 50 Hz, 200 amp

$I = I_0 \sin \omega t$ | $\omega = 400\pi$

$I_0 = 50\sqrt{2}$ | $2\pi f = 400\pi$

$I_{rms} = \frac{I_0}{\sqrt{2}} = 50A$ | $f = 200 Hz$

Question no. 6

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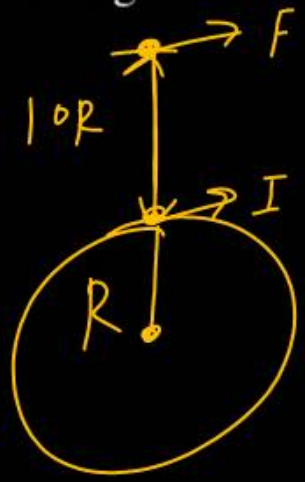
A body of mass m is raised to a height 10R from the surface of the earth, where R is the radius of the earth. The increase in potential energy is (G=universal constant of gravitation, M = mass of the earth and g = acceleration due to gravity)

(1) $\frac{GMm}{11R}$

(2) $\frac{GMm}{10R}$

(3) $\frac{mgR}{11G}$

(4) $\frac{10GMm}{11R}$



$\Delta U = U_F - U_I$

$= -\frac{GMm}{11R} - \left(-\frac{GMm}{R}\right)$

$\Delta U = -\frac{GMm}{R}\left(\frac{1}{11} - \frac{1}{1}\right)$

$\Delta U = +\frac{GMm}{R} \times \left(\frac{+10}{11}\right)$

$\Delta U = \frac{10GMm}{11R}$

Question no. 7

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Match Column I with Column II.

For a satellite in circular orbit,

	Column I		Column II
(A)	Kinetic energy	(p)	$-\frac{GM_Em}{2r}$
(B)	Potential energy	(q)	$\sqrt{\frac{GM_E}{r}}$
(C)	Total energy	(r)	$-\frac{GM_Em}{r}$
(D)	Orbital velocity	(s)	$\frac{GM_Em}{2r}$

(where M_E is the mass of the earth, m is mass of the satellite and r is the radius of the orbit)

(1) A–r, B–s, C–q, D–p

(2) A–q, B–p, C–r, D–s

(3) A–p, B–q, C–s, D–r

(4) A–s, B–r, C–p, D–q

$V_o = \sqrt{\frac{GM}{r}}$

$K.E. = \frac{1}{2}mv^2 = \frac{GMm}{2r}$

Question no. 8

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Two bodies of mass 1 kg and 3 kg have position vectors $\hat{i} + 2\hat{j} + k$ and $-3\hat{i} - 2\hat{j} + \hat{k}$ respectively. The magnitude of position vector of centre of mass of this system will be similar to the magnitude of vector.

(1) $\hat{i} - 2\hat{j} + \hat{k}$

(2) $-3\hat{i} - 2\hat{j} + \hat{k}$

(3) $-2\hat{i} + 2\hat{k}$

(4) $-2\hat{i} - \hat{j} + 2\hat{k}$

$|\vec{r}_{com}| \rightarrow$

$\vec{r}_{com} = \dfrac{1(\hat{i}+2\hat{j}+\hat{k}) + 3(-3\hat{i}-2\hat{j}+\hat{k})}{4}$

$\vec{r}_{com} = \dfrac{\hat{i}+2\hat{j}+\hat{k}-9\hat{i}-6\hat{j}+3\hat{k}}{4}$

$= \dfrac{-8\hat{i}-4\hat{j}+4\hat{k}}{4} = -2\hat{i}-\hat{j}+\hat{k}$

$|\vec{r}_{com}| = \sqrt{4+1+1} = \sqrt{6}$

$\sqrt{1+4+1} = \sqrt{6}$

$\sqrt{14}$

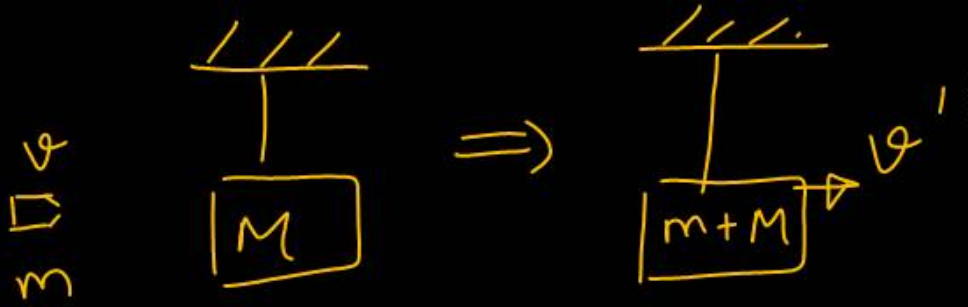
$\sqrt{9}$

Question no. 9

A bullet of mass m moving with velocity v strikes and gets embedded in a suspended wooden block of mass M. If the block rises to a height h, the velocity v of the bullet is

(1) $\sqrt{2gh}$ (2) $\frac{M+m}{m}\sqrt{2gh}$

(3) $\frac{m}{M+m}2gh$ (4) $\frac{M+m}{M}\sqrt{2gh}$



Momentum Cons:

$$mv + 0 = (m+M)v' \Rightarrow v' = \frac{mv}{m+M}$$

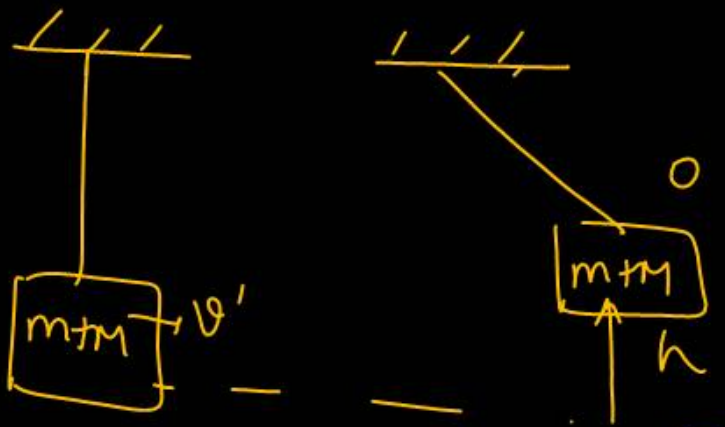
Energy Cons.

$$\frac{1}{2}(m+M)\frac{m^2v^2}{(m+M)^2} = (m+M)gh$$

$$v^2 = \frac{(m+M)^2}{m^2}2gh$$

$$\Rightarrow V = \frac{m+M}{m}\sqrt{2gh}$$

(2)



Question no. 10

When a ceiling fan is switched OFF, its angular velocity reduces to half its initial value after it completes 36 rotations. The number of rotations it will make further before coming to rest is (Assuming angular retardation to be uniform)

(1) 10 (2) 20

(3) 18 (4) 12

$\omega_i = \omega_0$

$\omega_f = 0$

$\omega_f^2 = \omega_i^2 + 2\alpha\theta$

$\left(\frac{\omega_0}{2}\right)^2 = \omega_0^2 - 2\alpha(2\pi \times 36)$

$\frac{\omega_0^2}{4} - \omega_0^2 = -4\pi \times 36\,\alpha$

$\alpha = \frac{3\omega_0^2}{4 \times 4\pi \times 36}$

$\omega_f^2 = \omega_i^2 + 2\alpha\theta$

$0 = \frac{\omega_0^2}{4} - 2\alpha(2\pi N)$

$N = \frac{\omega_0^2}{16\pi\alpha}$

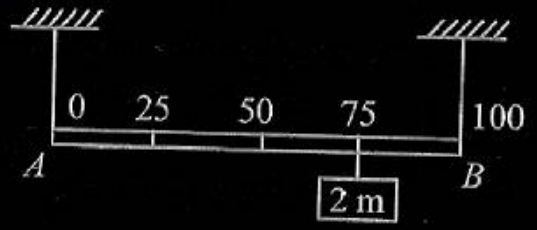
$N = \frac{\omega_0^2}{16\pi \frac{3\omega_0^2}{16\pi \times 36}}$

$N = \frac{36}{3} = 12$

(4)

Question no. 11

Shown in the figure is rigid and uniform one meter long rod AB held in horizontal position by two strings tied to its ends and attached to the ceiling. The rod is of mass 'm' and has another weight of mass 2 m hung at a distance of 75 cm from A. The tension in the string at A is

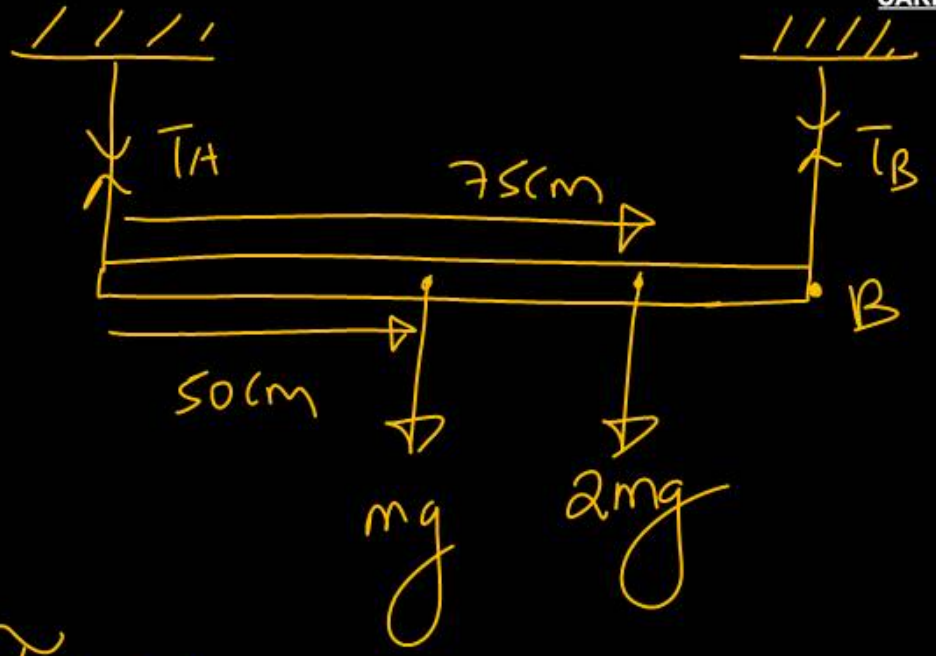


(1) 0.5 mg

(2) 2 mg

(3) 0.75 mg

(4) 1 mg



$\tau_B = 0$

$2mg \times 250 + mg \times 500 + T_A \times 1000 = 0$

$100 T_A = 100 mg$

$T_A = 1 mg$

(4)

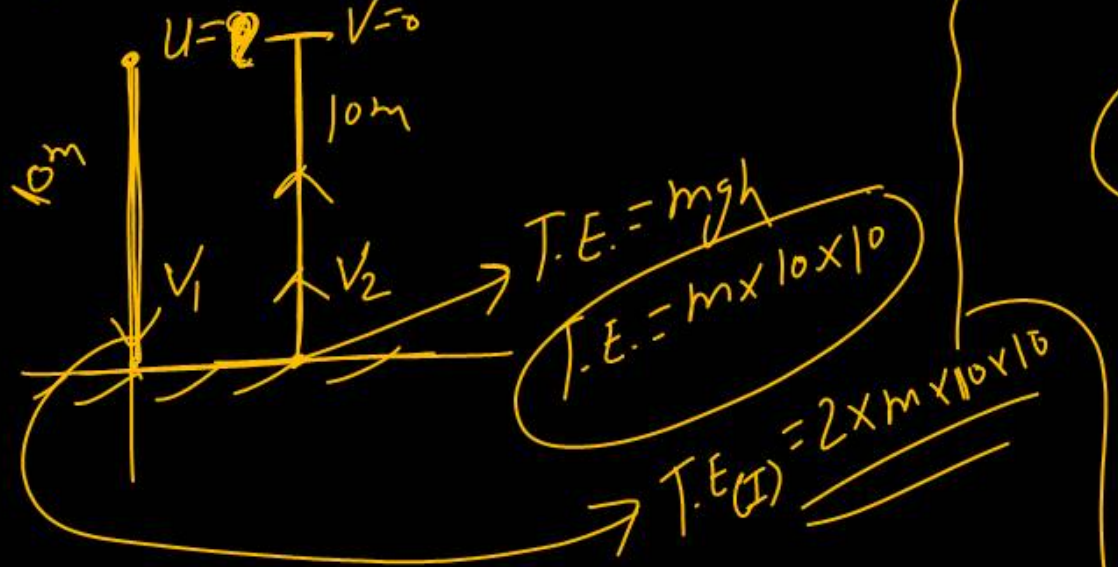
Question no. 12

AAYAM CAREER INSTITUTE

A ball falls under gravity from a height of 10 m with an initial downward velocity u. It collides with the ground, losses 50% of its energy in collision and then rises back to the same height. The initial velicity u is

(1) 7 ms^{-1} (2) 25 ms^{-1}

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



$T.E. = mgh$

$T.E. = m \times 10 \times 10$

$T.E_{(I)} = 2 \times m \times 10 \times 10$

$\frac{1}{2} m V_1^2 = 2 \times m \times 10 \times 10$

$V_1^2 = 2 \times 2 \times 10 \times 10$

$V_1 = 2 \times 10 \rightarrow 20m$

$V^2 = u^2 + 2as$

$400 = u^2 + 2 \times 10 \times 10$

$u^2 = 200$

$u = 10\sqrt{2}$

$u = 10 \times 1.4$

$u = 14 m/s$

Question no. 13

AAYAM CAREER INSTITUTE

In the following circuit, the output Y for all possible inputs A and B is expressed by which of the given correct truth table.

$Y = \overline{\overline{A+B}} = A+B$

(1)

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

(2)

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

(3)

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

(4)

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

Question no. 14

AAYAM CAREER INSTITUTE

If M_o is the mass of an oxygen isotope $_8O^{17}$, M_p and M_N are the masses of a proton and a neutron respectively, the nuclear binding energy is

(1) $(17M_N - M_O)c^2$

(2) $(8M_p - M_O)c^2$

(3) $(8M_p + 9M_N - M_O)c^2$

(4) $(9M_p + 8M_N - M_O)c^2$

3

$= \Delta m\, c^2$

$= (Z m_p + (A-Z) m_N - m_{Nu})\, c^2$

$= (8m_p + (17-8) m_N - M_o)\, c^2$

$= (8m_p + 9m_n - M_o)\, c^2$

If V_r is the velocity of rain falling vertically and V_m is the velocity of a man walking on a level road, and θ is the angle with vertical at which he should hold the umbrella to protect himself, than the relative velocity of rain w.r.t the man is given by

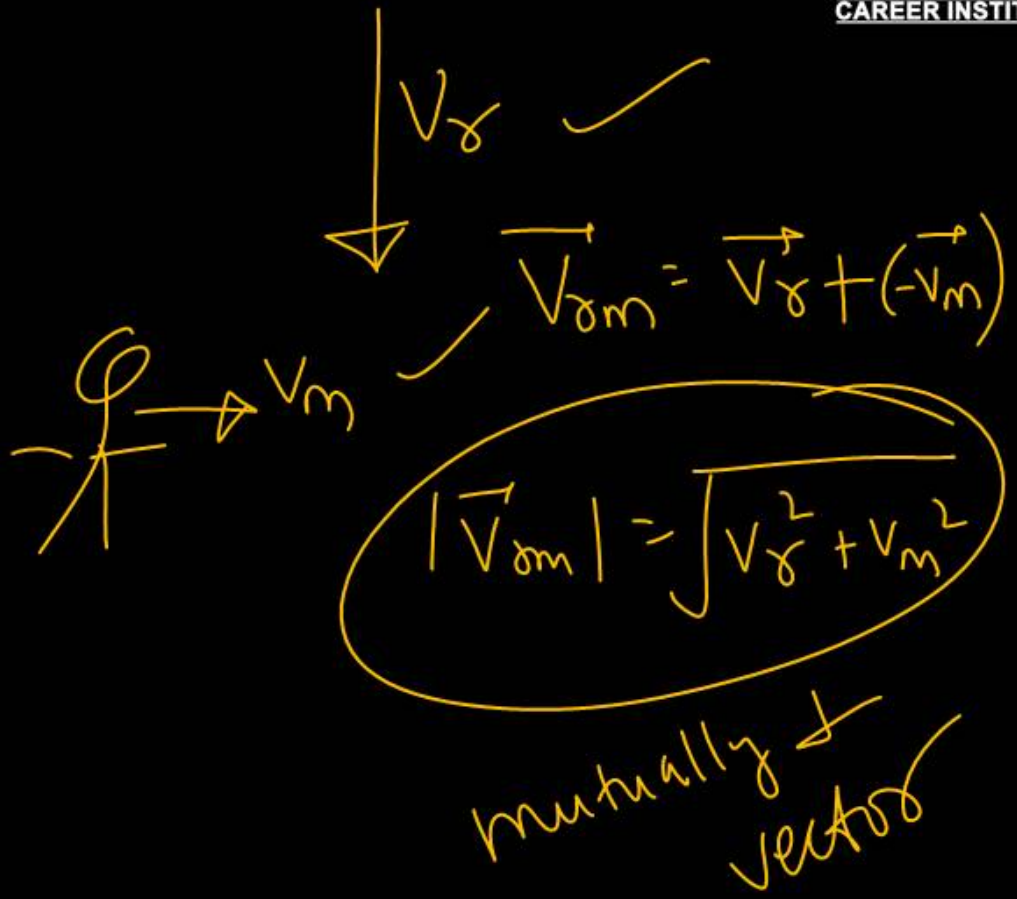
(1) $V_{rm} = \sqrt{V_r^2 + Vm^2 + 2V_r V_m \cos\theta}$

(2) $V_{rm} = \sqrt{V_r^2 + V_m^2 - 2V_r V_m \cos\theta}$

(3) $V_{rm} = \sqrt{V_r^2 + V_m^2}$

(4) $V_{rm} = \sqrt{V_r^2 - V_m^2}$

3



Question no. 16

AAYAM CAREER INSTITUTE

A screw gauge gives the following reading when used to measure the diameter of a wire.

Main scale reading : 0 mm

Circular scale reading : 52 divisions

Given that 1 mm on main scale corresponds to 100 divisions of the circular scale.

The diameter of wire from the above data is:

(1) 0.52 cm (2) 0.052 cm

(3) 0.026 cm (4) 0.005 cm

$MSR = 0$

$CSR = 52$

$LC = \frac{P}{CS\ Div.} = \frac{1\,mm}{100}$

$= 0.01\,mm$

$= 0.001\,cm$

$R = MSR + CSR \times LC$

$= 0 + 52 \times 0.001\,cm$

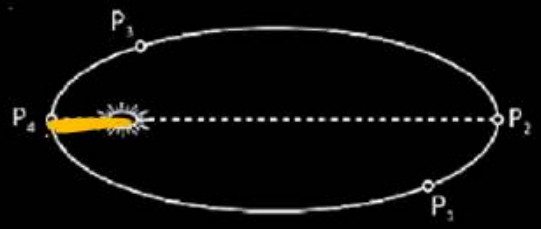
$= \frac{52}{1000}\,cm = 0.052\,cm$

(2)

Question no. 17

AAYAM CAREER INSTITUTE

The figure shows a planet in elliptical orbit around the sun S. Where is the kinetic energy of the planet maximum?



$L = mv \cdot r$

$vr = \text{const}$

$v \propto \frac{1}{r}$

(1) P_1

(2) P_2

(3) P_3

(4) P_4

Question no. 18

AAYAM CAREER INSTITUTE

Two planets have radii r_1 and r_2 and densities d_1 and d_2, respectively. Then, the ratio of accelerations due to gravity on them is

(1) $r_1d_1 : r_2d_2$ (2) $r_1d_2 : r_2d_1$

(3) $r_1^2d_1 : r_2^2d_2$ (4) $r_1d_1^2 : r_2d_2^2$

$$g = \frac{GM}{R^2}.$$

$$\rho = \frac{M}{V} \Rightarrow M = \rho V$$

$$\Rightarrow M = \rho \times \frac{4}{3}\pi R^3$$

$$g = \frac{G}{R^2} \times \rho \times \frac{4}{3}\pi R^3.$$

$$g = G\rho \times \frac{4}{3}\pi R.$$

$$g \propto \rho R.$$

$$\frac{g_1}{g_2} = \frac{r_1 d_1}{r_2 d_2}$$

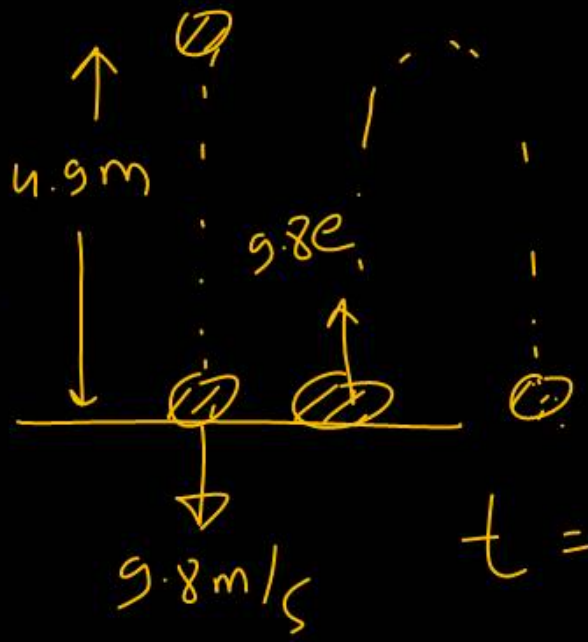
Question no. 19

AAYAM CAREER INSTITUTE

A ball falling freely from a height of 4.9 m hits a horizontal surface. If $e = \frac{3}{4}$, then the ball will hit the surface second time after

(1) 0.5 s (2) 1.5 s

(3) 3.5 s (4) 3.4 s



$t = \frac{2u}{g}$

(2)

$\sqrt{2 \times 9.8 \times 4.9}$

$= 9.8$

$t = 2 \times \frac{9.8e}{9.8} = 2e$

$= 2 \times 3/4$

$= 1.5 \text{ sec}$

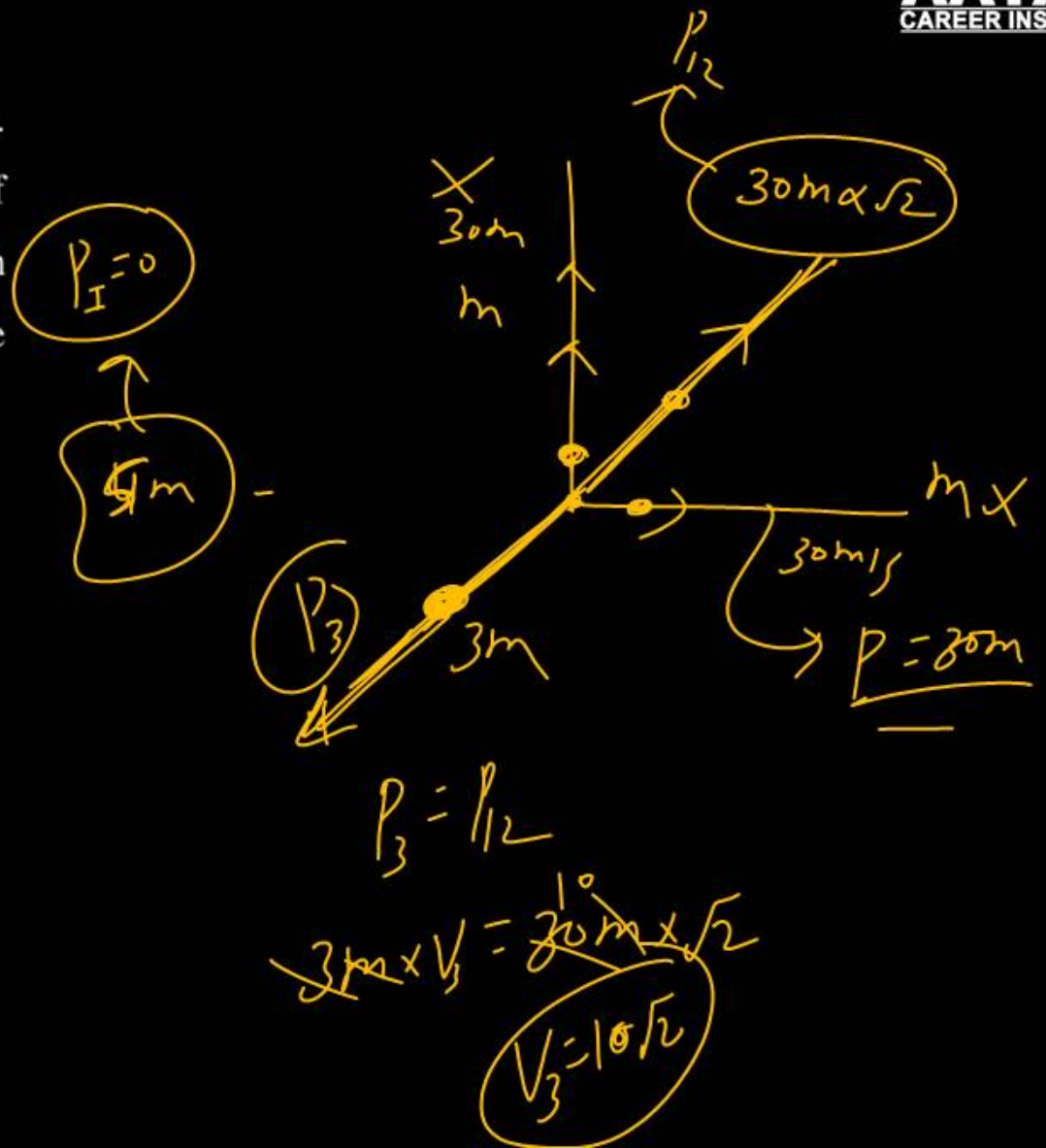
Question no. 20

AAYAM CAREER INSTITUTE

A body of 1 kg body explodes into three fragments. The ratio of their masses is 1 : 1 : 3. The fragments of same mass move perpendicular to each other with speed 30 ms^{-1}, while the heavier part remains in the initial direction. The speed of heavier part is

(1) $\frac{10}{\sqrt{2}} ms^{-1}$ (2) $10\sqrt{2} ms^{-1}$

(3) $20\sqrt{2} ms^{-1}$ (4) $30\sqrt{2} ms^{-1}$



Question no. 21

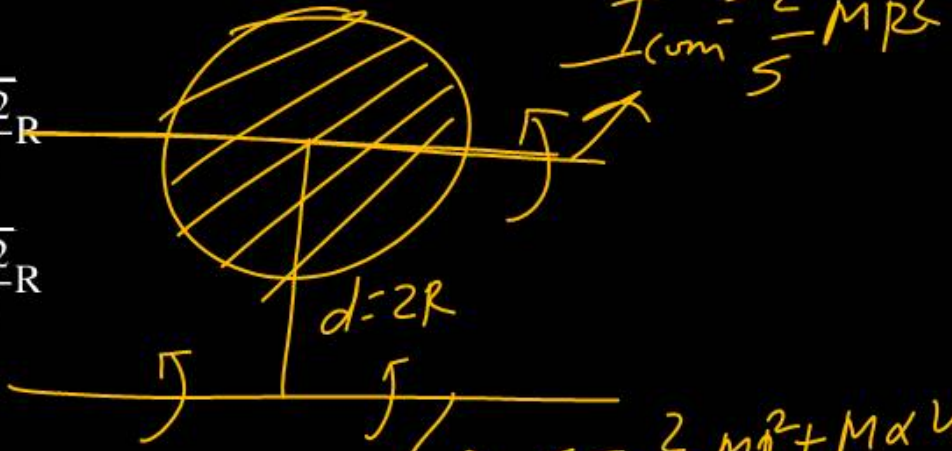
The moment of inertia of a solid sphere about an axis passing through centre of gravity is $\frac{2}{5}MR^2$, then its radius of gyration about a parallel axis at a distance 2R from first axis is

(1) 5R

(2) $\sqrt{\frac{22}{5}}R$

(3) $\frac{5}{2}R$

(4) $\sqrt{\frac{12}{5}}R$



$I = \frac{2}{5}MR^2 + M(4R^2)$

$I = \frac{22}{5}MR^2$ → $I = MK^2$

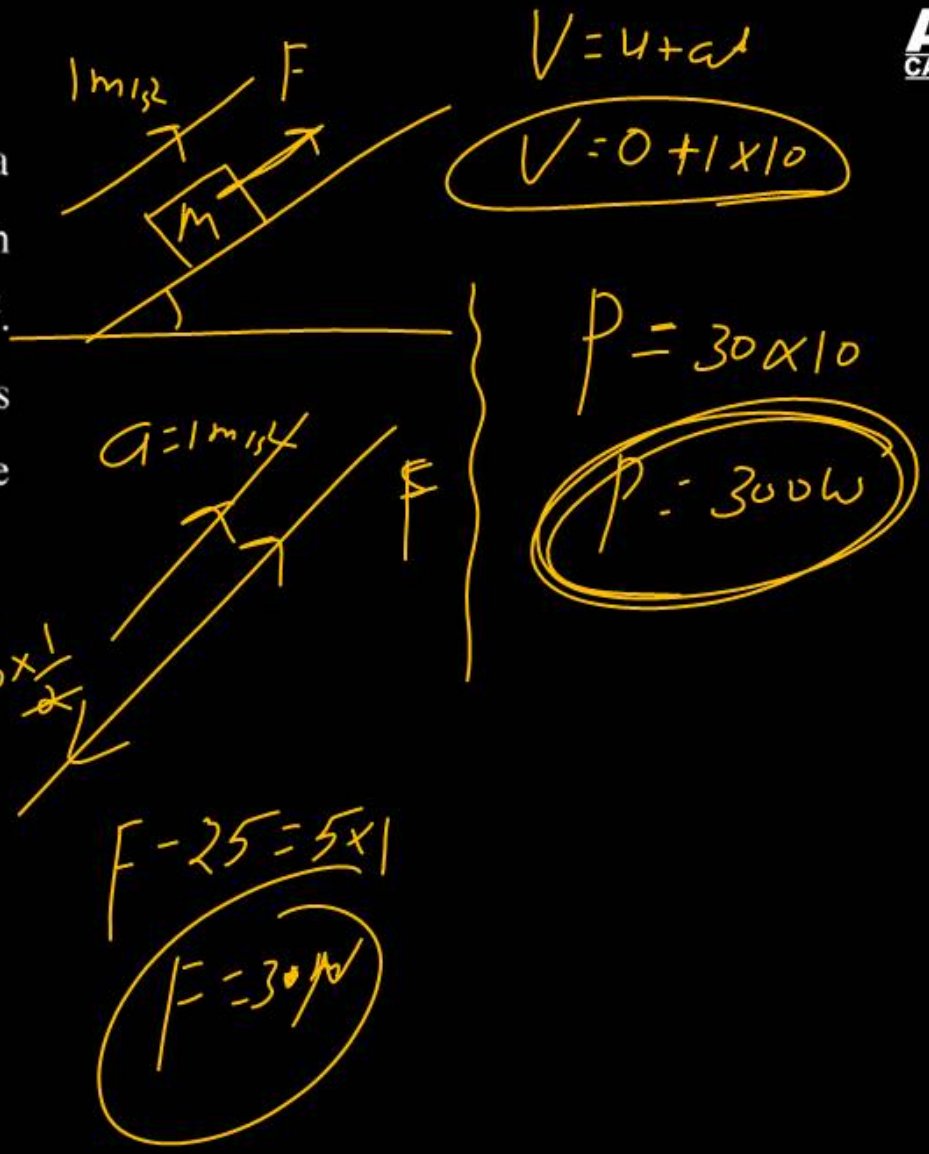
$K = \sqrt{\frac{22}{5}} \times R$

Question no. 22

A block of mass 5 kg starting from rest pulled up on a smooth incline plane making an angle of 30° with horizontal with an effective acceleration of 1 ms^{-2}. The power delivered by the pulling force at t =10 s from the start is [Use g = 10 ms^{-2}] (calculate the nearest integer value)

(1) 500 W (2) 300 W

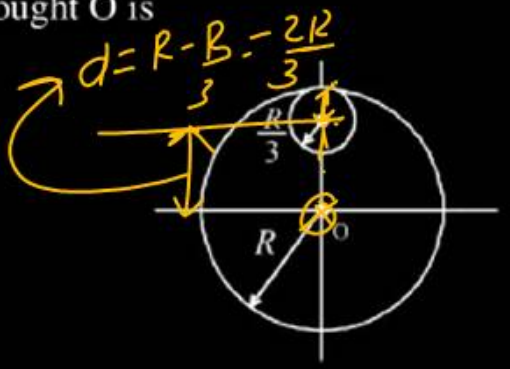
(3) 350 W (4) 400 W



Question no. 23

From a circular disc of radius R amd mass 9 M, a small disc of radius $\frac{R}{3}$ is removed as shown in figure.

The moment of inertia of the remaining disc about an axis perpendicular to the plane of the disc and passing throught O is



(1) $4\ MR^2$

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

(3) $40\ MR^2$

(4) $\frac{97}{9}\ MR^2$

Question no. 24

The electric intensity due to a dipole of length 10 cm and having a charge of 500 μC at a point on the axis at a distance 20 cm from one of the charges in air, is

(1) $6.25 \times 10^7 N/C$ (2) 9.28×10^7 N/C

(3) 13.1×10^{11} N/C (4) 20.5×10^7 N/C

$$E = \frac{9 \times 10^9 \times 2 \times P \times r}{[r^2 - a^2]^2}$$

$$E = \frac{9 \times 10^9 \times 2 \times 500 \times 10^{-6} \times 10 \times 25 \times 10^{-2} \times 10^{-2}}{[(625 - 25) \times 10^{-4}]^2}$$

$$= \frac{9 \times 10^{-1} \times 10000 \times 25}{360000 \times 10^{-8}}$$

$$= \frac{1}{4} \times 25 \times 10^7$$

$$= 6.25 \times 10^7 \frac{N}{C}.$$

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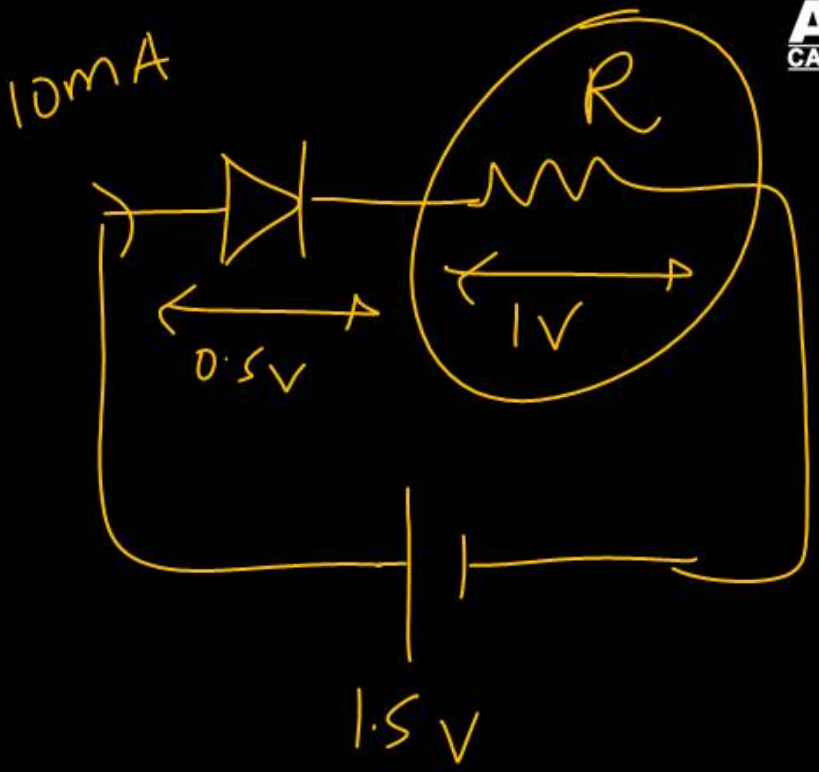
Question no. 25

When a diode is forward biased, it has a voltage drop of 0.5 V. The safe limit of current through the diode is 10 mA. If a battery of emf 1.5 V is used in the circuit, the value of minimum resistance to be connected in series with the diode so that the current does not exceed the safe limit is:

(1) 300Ω
(2) 50Ω
(3) 100Ω
(4) 200Ω



3

$V = 9R$

$I = 10 \times 10^{-3} \times R$

$R = 100\Omega$

Question no. 26

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In a reactor, 2 kg of $_{92}U^{235}$ fuel is fully used up in 30 days. The energy released per fission is 200 MeV. J Then the power output of the reactor is close to :

(1) 35 MW (2) 60 MW

(3) 125 MW (4) 54 MW

$U_T = \frac{2000}{235} \times 6.023 \times 10^{23} \times 200 \times 10^6 \times 1.6 \times 10^{-19}$

$t = 24 \times 3600 \times 30$

$U_T = ?$

$P = \frac{U_T}{t}$

$n = \frac{2000}{235}$

$N = \frac{2000}{235} \times 6.023 \times 10^{23}$

$P = \frac{U_T}{t} = 62.2 \text{ MW}$

If negligibly small current is passed through a wire of length 15m and resistance of 5 Ω, having uniform cross section of 6×10^{-7} m^2, then coefficient of resistivity of material is

(1) $1 \times 10^{-7} \Omega - m$ (2) $2 \times 10^{-7} \Omega - m$

(3) $3 \times 10^{-7} \Omega - m$ (4) $4 \times 10^{-7} \Omega - m$

$l = 15\,m$

$R = 5\,\Omega$

$A = 6 \times 10^{-7}\,m^2$

$\rho = 2$

$R = \frac{\rho l}{A}$

$\rho = \frac{RA}{l}$

$\rho = \frac{5 \times 6 \times 10^{-7}}{15}$

$\rho = \frac{30}{15} \times 10^{-7}$

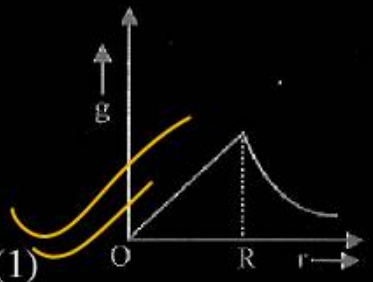
$\rho = 2 \times 10^{-7}$

Question no. 28

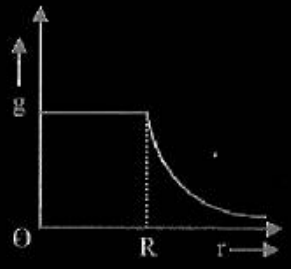
The variation of acceleration due to gravity (g) with distance. (r) from the center of the earth is correctly represented by:

(Given R = radius of earth)

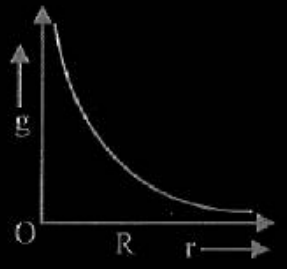
(1)



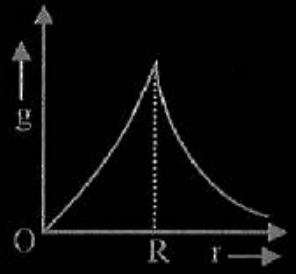
(2)

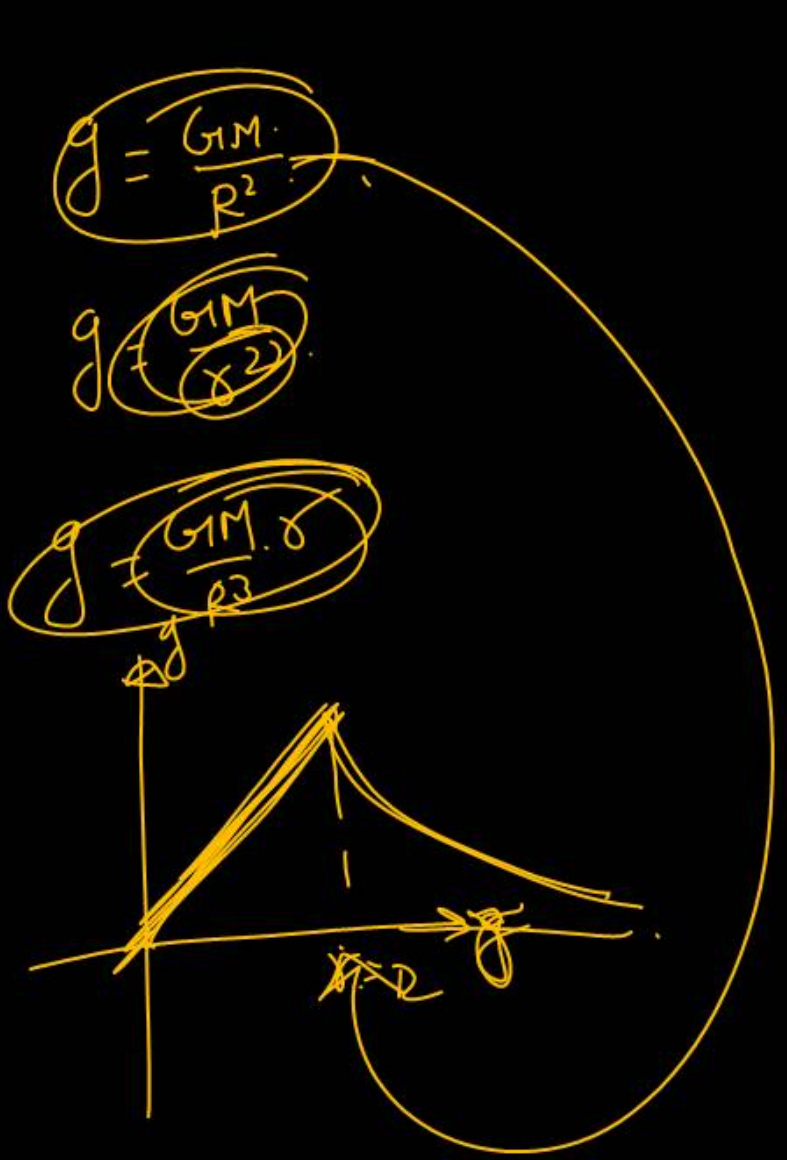


(3)



(4)





Question no. 29

AAYAM CAREER INSTITUTE

The radius of the orbit of a planet is two times that of the earth. The time period of planet is

(1) 4.2 T

(2) 2.8 T

(3) 5.6 T

(4) 8.4 T

$\left(\frac{T}{T_2}\right)^2 = \left(\frac{2}{2}\right)^3$

$\left(\frac{T}{T_2}\right)^2 = \frac{1}{8}$

$\frac{T}{T_2} = \frac{1}{2\sqrt{2}}$

$T_2 = 2\sqrt{2}T$

2×1.4

$r \rightarrow T$

$r \rightarrow r$

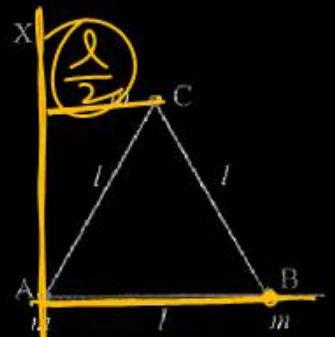
$T^2 \propto r^3$

$\left(\frac{T_1}{T_2}\right)^2 = \left(\frac{r_1}{r_2}\right)^3$

Question no. 30

AAYAM CAREER INSTITUTE

Three particles, each of mass m gram, are situated at the vertices of an equilateral triangle ABC of side ℓ cm (as shown in the figure). The moment of inertia of the system about a line AX perpendicular to AB and in the plane of ABC, in gram-cm^2 units will be



(1) $\frac{3}{2}m\ell^2$

(2) $\frac{3}{4}m\ell^2$

(3) $2\ m\ell^2$

(4) $\frac{5}{4}m\ell^2$

$$I = m\ell^2 + m\left(\frac{\ell}{2}\right)^2$$

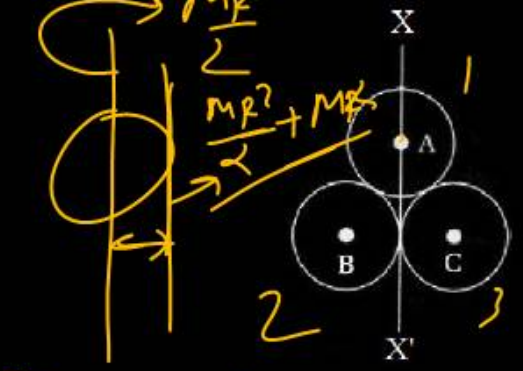
$$I = m\ell^2 + \frac{m\ell^2}{4}$$

$$= \frac{5}{4}m\ell^2$$

Question no. 31

AAYAM CAREER INSTITUTE

Three rings each of mass M and radius R are arranged as shown in figure. The moment of inertia of the system about the axis XX' will be



(1) $\frac{7}{2}MR^2$

(2) $3R^2$

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

(4) $5MR^2$

$I_{XX'} = I_1 + I_2 + I_3$

$I_{XX'} = \frac{MR^2}{2} + 2 \times \frac{3}{2} MR^2$

$I_{XX'} = \frac{7MR^2}{2}$

Question no. 32

If the linear momentum of a body is increased by 50%, then the kinetic energy of that body increases by

(1) 100%
(2) 125%
(3) 225%
(4) 25%

$P \propto \sqrt{K}$.

$K \propto p^2$

$$\frac{K_f - K_i}{K_i} = \frac{p_f^2 - p_i^2}{p_i^2}$$

150, (100)

$$= \frac{(150)^2 - (100)^2}{(100)^2}$$

$$= \frac{(150-100)(150+100)}{(100)^2}$$

$$= \frac{50 \times 250}{100 \times 100}$$

$$= 125\ \%$$

Question no. 33

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Which one of the following statements is true?

(1) Momentum is conserved in elastic collisions but not in inelastic collisions

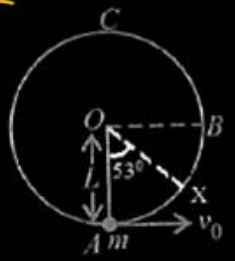
(2) Total kinetic energy is conserved in elastic collisions but momentum is not conserved in elastic collisions

(3) Total kinetic energy is not conserved but momentum is conserved in inelastic collisions

(4) Kinetic energy and momentum both are conserved in all types of collisions

Question no. 34

A bob of mass m is suspended by a light string of length L. It is imparted a horizontal velocity v_0 at the lowest point A such that it completes a circle in the vertical plane. Match Column I with Column II.



	Column I		Column II
A.	Velocity v_0 is	p	$\sqrt{4.2gL}$
B.	Velocity at point B is	q	$\sqrt{gL}$
C.	Velocity at point C is	r	$\sqrt{5gL}$
D.	Velocity at point X is	s	$\sqrt{3gL}$

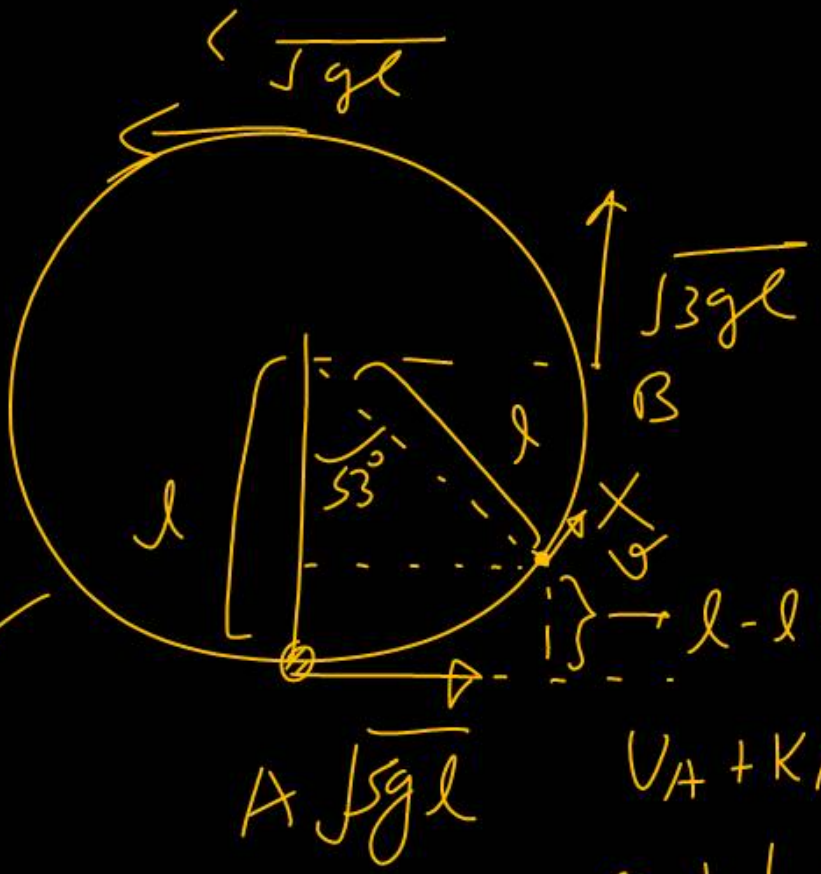
(1) A - p, B - q, C - s, D – r

(2) A - q, B - r, C - s, D - p

(3) A - r, B - s, C - q, D – p

(4) A - s, B - q, C - r, D - p

3



$V_A + K_A = V_B + K_B$

$0 + \frac{1}{2}m\left(\sqrt{5gl}\right)^2 = mg\left(l - \frac{3l}{5}\right) + \frac{1}{2}mv_x^2$

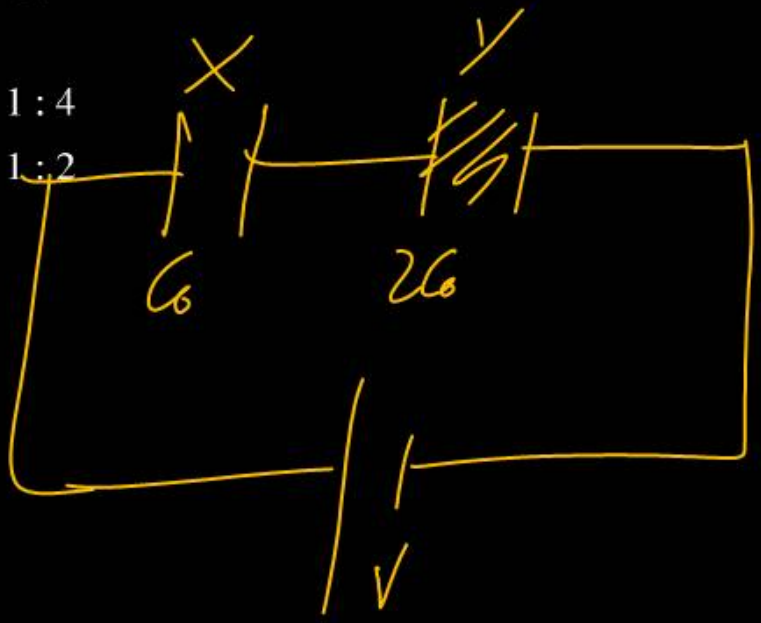
$\sqrt{\frac{2}{m}\left(\frac{5mgl}{2} - \frac{2mgl}{5}\right)} = v_x$

$\sqrt{\frac{u2}{10}gl} = v_x$

Question no. 35

Two parallel plate capacitors X and Y, have the same area of plates and same separation between plates. X has air and Y with dielectric of constant 2. between its plates. They are connected in series to a battery of 12 V. The ratio of electrostatic energy stored in X and Y is

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



$$\frac{U_x}{U_y} = ? = \frac{\frac{q^2}{2C_x}}{\frac{q^2}{2C_y}} = \frac{C_y}{C_x}$$

$$U = \frac{q^2}{2C}$$

$$\frac{U_x}{U_y} = \frac{C_y}{C_x} = \frac{2C_0}{C_0} = \frac{2}{1}$$

Question no. 36

A proton of mass 'm_p' has same energy as that of a photon of wavelength 'λ'. If the proton is moving at non-relativistic speed, the ratio of its de-Broglie wavelength to the wavelength of photon is.

(1) $\frac{1}{c}\sqrt{\frac{2E}{m_p}}$

(2) $\frac{1}{c}\sqrt{\frac{E}{m_p}}$

(3) $\frac{1}{c}\sqrt{\frac{E}{2m_p}}$

(4) $\frac{1}{2c}\sqrt{\frac{E}{m_p}}$

$\lambda_p = \frac{h}{\sqrt{2m_pE}}$ — (1) $E = \frac{hc}{\lambda} \Rightarrow \lambda = \frac{hc}{E}$ — (2)

$$\frac{\lambda_p}{\lambda} = \frac{h}{\sqrt{2m_pE}} \times \frac{E}{hc}$$

$$= \frac{1}{c}\frac{\sqrt{E} \times \sqrt{E}}{\sqrt{2m_pE}}$$

$$= \frac{1}{c}\sqrt{\frac{E}{2m_p}}$$

Question no. 37

Two radiations of photons energies 1 eV and 2.5 eV, successively illuminate a photosensitive metallic surface of work function 0.5 eV. The ratio of the maximum speeds of the emitted electrons is

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

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

$E = \phi + K_1$

$1 = 0.5 + K_1$

$K_1 = 0.5\ (eV)$ — (1)

$2.5 = 0.5 + K_2$

$2 = K_2$ — (2)

$\frac{K_1}{K_2} = \frac{0.5}{2.0}$

$\frac{\frac{1}{2}mv_1^2}{\frac{1}{2}mv_2^2} = \frac{1}{4}$

$\frac{v_1}{v_2} = \frac{1}{2}$

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Question no. 38

When current in a coil changes from 5 A to 2 A in 0.1 s, average voltage of 50 V is produced. The self-inductance of the Coil is :

(1) 6 H

(2) 0.67 H

(3) 3 H

(4) 1.67 H

$$\mathcal{E} = L\frac{\Delta I}{\Delta t}$$

$$50 = L \times \frac{3}{0.1}$$

$$\frac{5}{3} = L$$

$$L = 1.67$$

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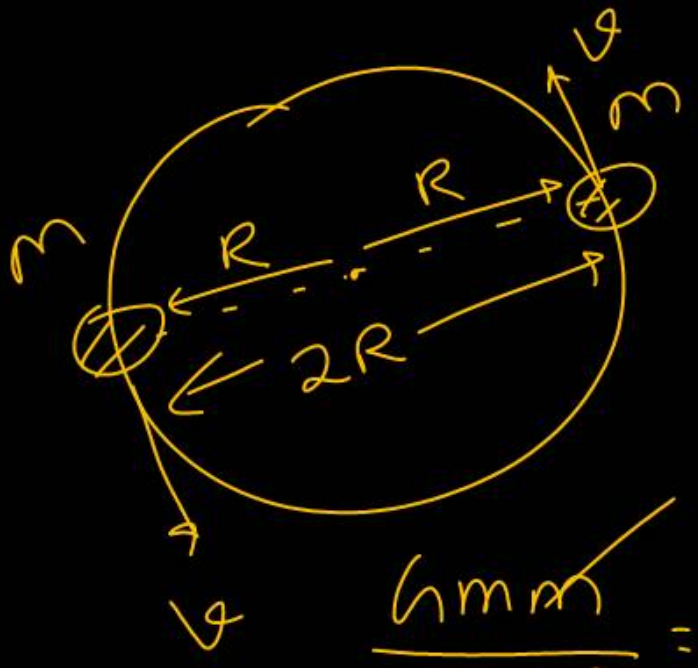
Question no. 39

Two particles of equal mass go round a circle of radius R under the action of their mutual gravitational attraction. The speed v of each particle is

(1) $\sqrt{\left(\frac{GM}{2R}\right)}$ (2) $\frac{1}{2R}\sqrt{\left(\frac{1}{GM}\right)}$

(3) $\frac{1}{2}\sqrt{\left(\frac{GM}{R}\right)}$ (4) $\sqrt{\left(\frac{4GM}{R}\right)}$



$$\frac{Gmm}{(2R)^2} = \frac{mv^2}{R}$$

(3)

$$\frac{Gm}{4R} = v^2$$

$$v = \frac{1}{2}\sqrt{\frac{Gm}{R}}$$

Question no. 40

Two planets A and B have the same material density. If the radius of A is twice that of B, then the ratio of escape velocity $\frac{v_A}{v_B}$ is

(1) 2

(2) $\sqrt{2}$

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

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

$V = \sqrt{\frac{2GM}{R}}$

$V \propto \sqrt{\frac{R^3}{R}}$

$V \propto R$

$\frac{V_A}{V_B} = \frac{2R}{R}$

$\frac{V_A}{V_B} = 2$

$M = \rho \times V$

$M = \rho \times \frac{4}{3}\pi R^3$

$M \propto R^3$

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Question no. 41

In two separate collisions, the coefficients of restitutions, e_1 and e_2 are in the ratio 3 : 1. In the first collision, the relative velocity of approach is twice the relative velocity of separation. Then the ratio between the relative velocity of approach and relative and relative velocity of separation in the second collision is

(1) 1 : 6 (2) 2 : 3

(3) 3 : 2 (4) 6 : 1

$\frac{e_1}{e_2} = \frac{3}{1}$

$e_1 = \frac{V_{s_1}}{V_{a_1}} = \frac{V_{s_1}}{2V_{s_1}} = \frac{1}{2}$

$e_2 = e_1/3 = 1/6$

$e = \frac{V_{sep}}{V_{app}}$

$e_2 = \frac{V_{s_2}}{V_{a_2}}$

$\frac{V_{a_2}}{V_{s_2}} = \frac{1}{e_2} = 6$

(1)

Question no. 42

A particle of mass m is projected with a velocity v making an angle of 45° with the horizontal. The magnitude of angular momentum of the projectile about an axis of projection when the particle is maximum height h is

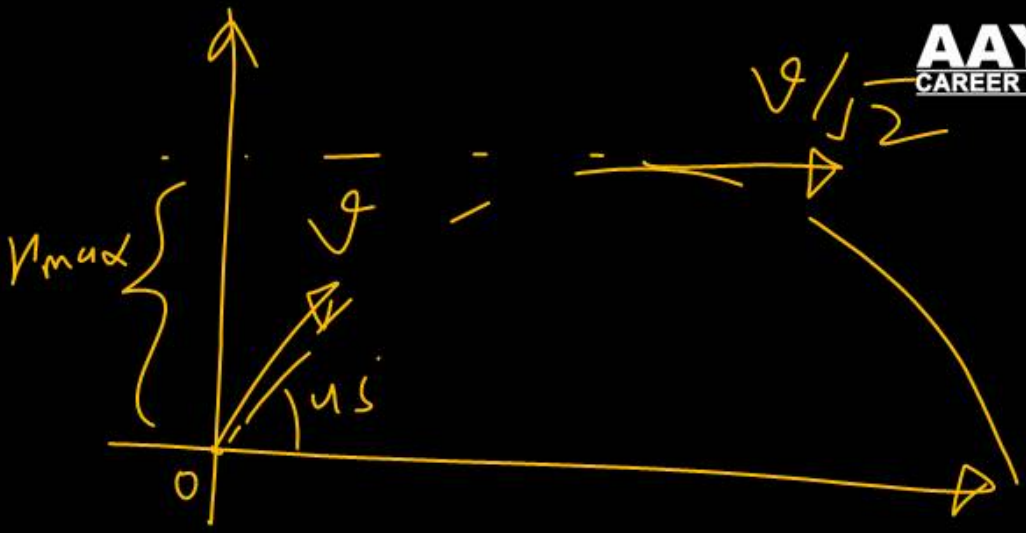
(1) zero

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

(3) $\frac{mv^2}{\sqrt{2}g}$

(4) $m(2gh^3)$

(2)



$L = mvr_\perp$

$L = m\frac{v}{\sqrt{2}} \times r_{max}$

$L = m\frac{v}{\sqrt{2}} \frac{v^2(1/2)}{2g} = \frac{mv^3}{4\sqrt{2}g}$

Question no. 43

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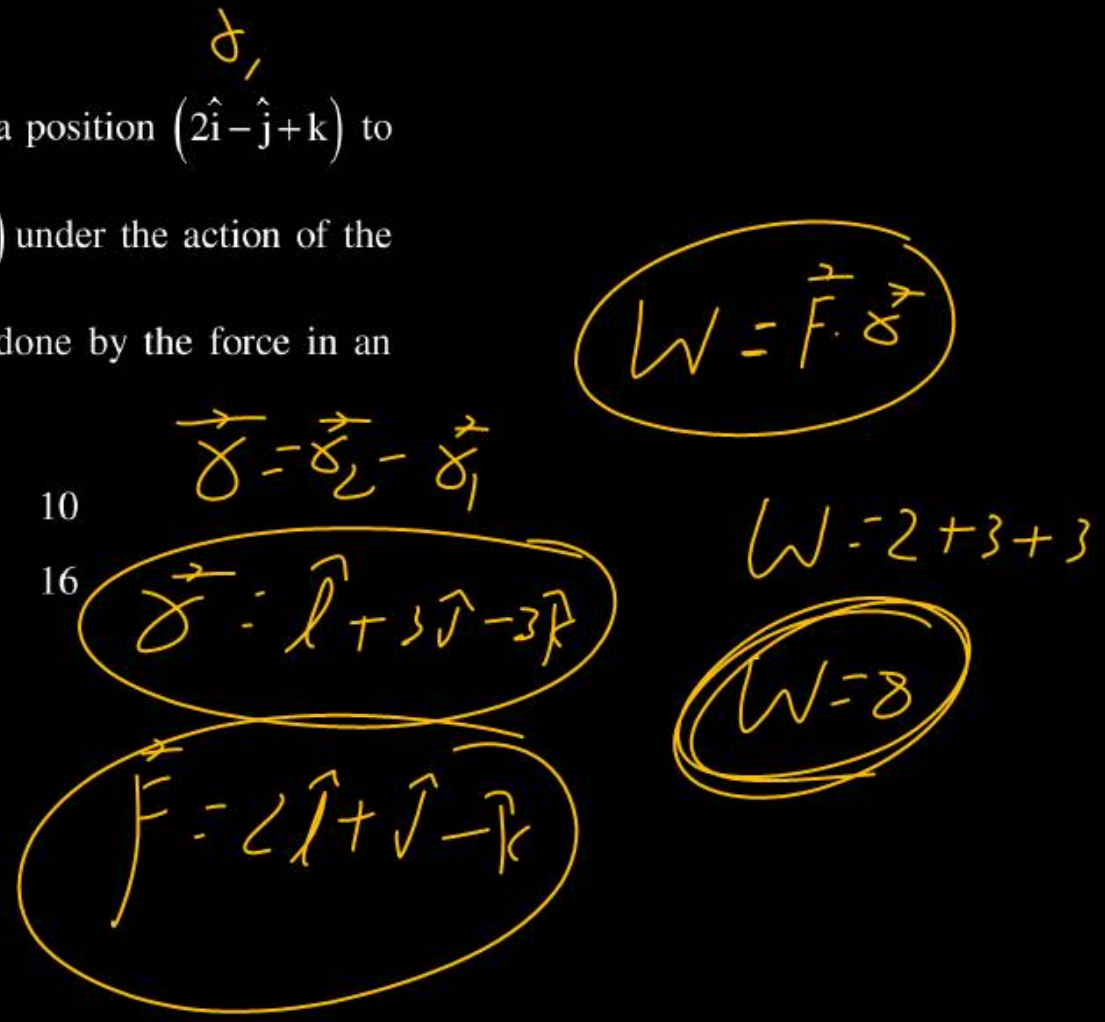
A particle is displaced from a position $\left(2\hat{i}-\hat{j}+k\right)$ to another position $\left(3\hat{i}+2\hat{j}-2k\right)$ under the action of the force $\left(2\hat{i}+\hat{j}-k\right)$. The work done by the force in an arbitrary unit is

(1) 8 (2) 10

(3) 12 (4) 16



Question no. 44

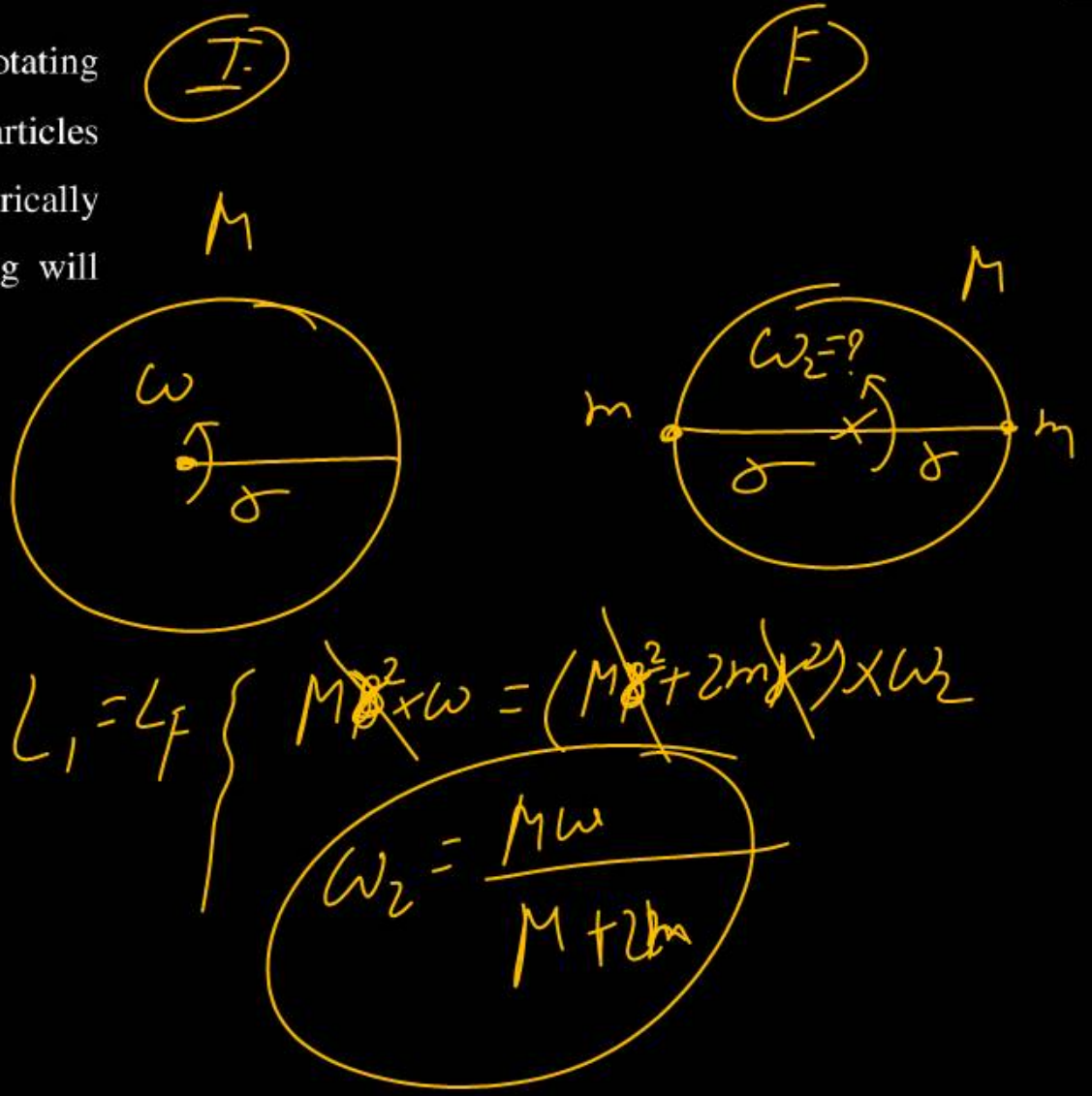
A thin circular ring of mass M and radius r is rotating about its axis with an angular speed ω. Two particles having mass m each are now attached at diametrically opposite points. The angular speed of the ring will become:

(1) $\omega\dfrac{M}{M+2m}$

(2) $\omega\dfrac{M+2m}{M}$

(3) $\omega\dfrac{M-2m}{M+2m}$

(4) $\omega\dfrac{M}{M+m}$



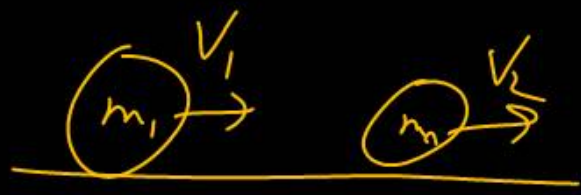
Question no. 45

AAYAM CAREER INSTITUTE

A spherical ball of mass m_1 collides head on with another ball of mass m_2 at rest. The collision is elastic. The fraction of kinetic energy lost by m_1 is

(1) $\frac{m_1 m_2}{(m_1+m_2)}$ (2) $\frac{m_1}{m_1+m_2}$

(3) $\frac{m_2}{m_1+m_2}$ (4) $\frac{m_1 m_2}{(m_1+m_2)}$



(1)

$K_I = \frac{1}{2} m_1 U^2$

$\frac{K_I - K_F}{K_I} = ?$

$V_1 = \left(\frac{m_1 - m_2}{m_1 + m_2}\right) U + 0$

$K_F = \frac{1}{2} m_1 \times V_1^2$

$\text{fraction} = 1 - \frac{K_F}{K_I}$

$\Rightarrow 1 - \frac{\frac{1}{2} m_1 \times \left(\frac{m_1 - m_2}{m_1 + m_2}\right)^2}{\frac{1}{2} m_1 U^2}$

$\Rightarrow 1 - \left(\frac{m_1 - m_2}{m_1 + m_2}\right)^2$

Question no. 46

AAYAM CAREER INSTITUTE

The complex that can show fac-and mer-isomers is

(1) $[Pt(NH_3)_2Cl_2]$ (2) $[Co(NH_3)_3(NO_2)_3]$

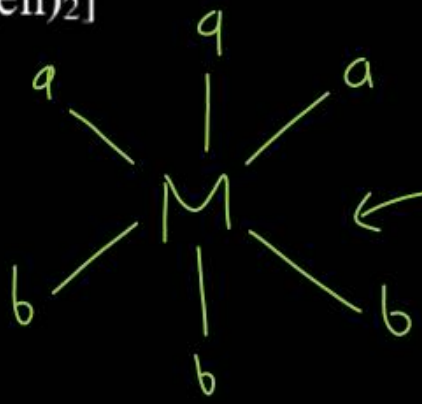
(3) $[Co(NH_3)_4Cl_2]^+$ (4) $[CoCl_2(en)_2]$

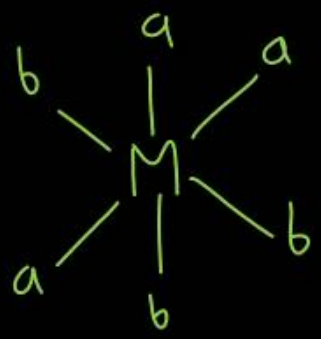
2

Ma_3b_3 → fac/mer

fac → facial → cis

mer → meridonial → trans





Question no. 47

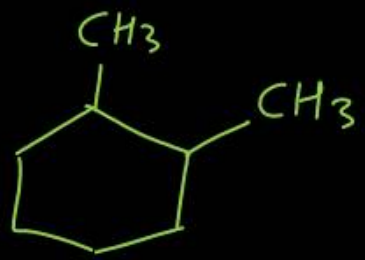
AAYAM CAREER INSTITUTE

How many positional isomer are possible for dimethylcyclohexane?

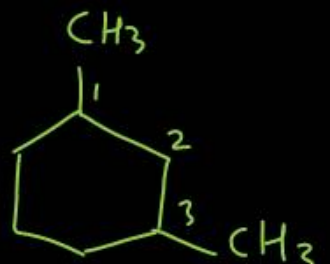
(1) 3 (2) 4

(3) 5 (4) 6

2

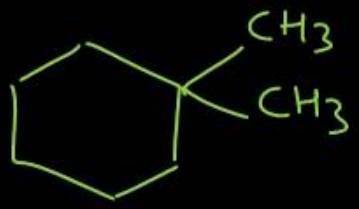


1,2

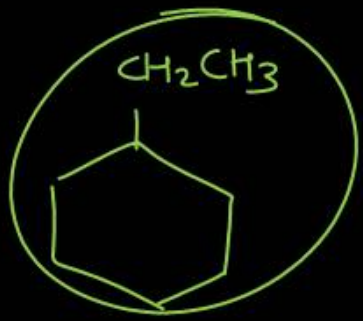


1,3

1,4



1,1



Question no. 48

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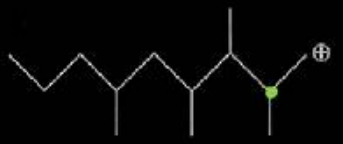
Select the most stable carbocation among the following.

(1) 

(2) 

(3) 

(4) 

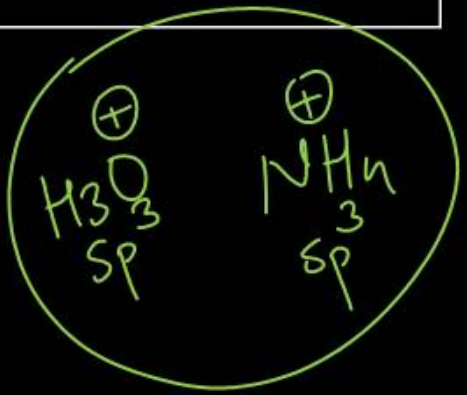
Question no. 49

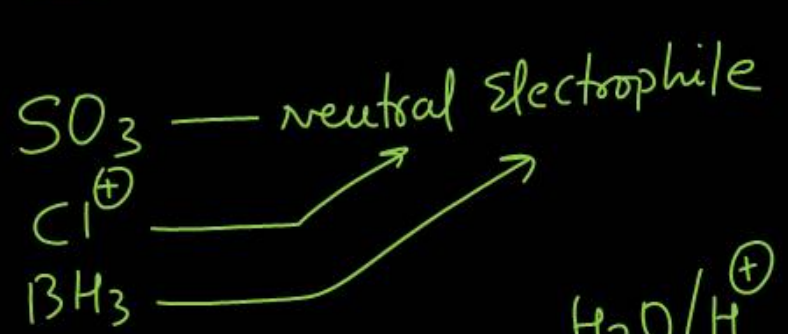
Classify the following species as electrophiles (E) and nucleophiles (N) in routine organic synthesis

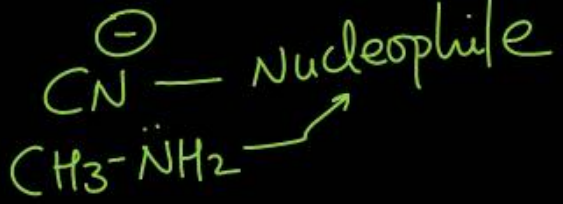
SO_3, Cl^+, CH_3NH_2, H_3O^+, BH_3, CN^-

	Electrophiles (E)	Nucleophiles (N)
(1)	SO_3, Cl^+, BH_3	CH_3NH_2, H_3O^+, CN^-
(2)	Cl^+, H_3O^+	SO_3, CH_3NH_2, BH_3, CN^-
(3)	Cl^+, H_3O^+, BH_3	SO_3, CH_3NH_2, H_3O^+, CN^-
(4)	SO_3, Cl^+, BH_3	CH_3NH_2, CN^-

4







Question no. 50

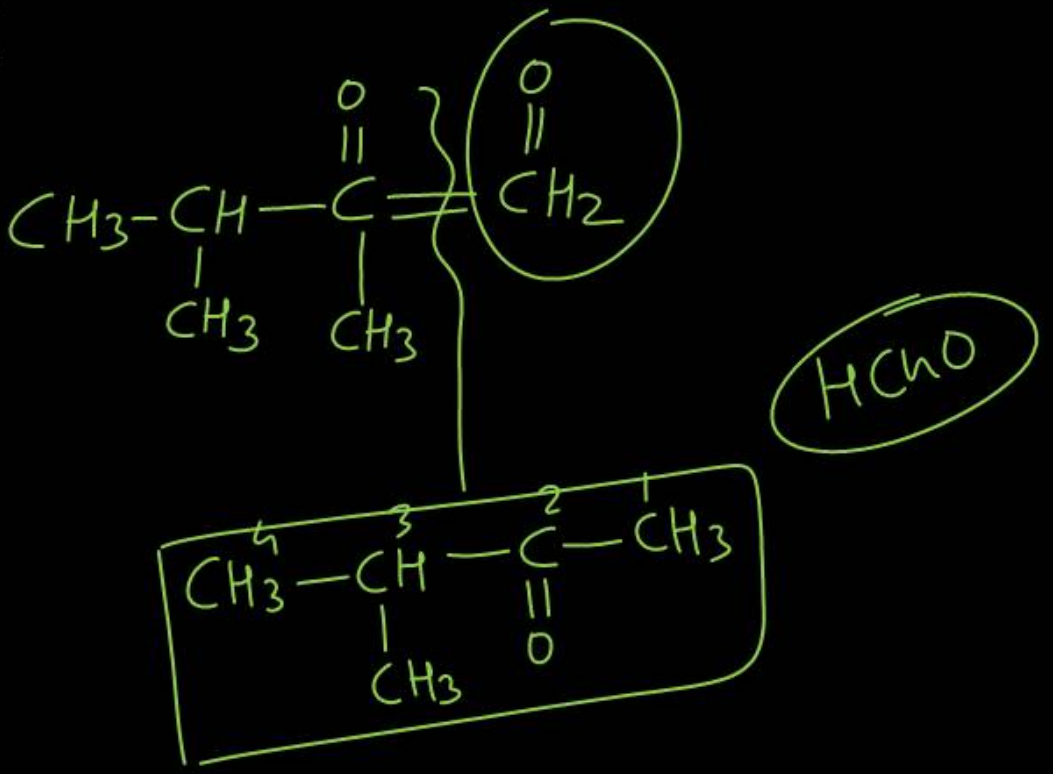
The major products obtained during ozonolysis of 2, 3-dimethyl-1-butene and subsequent reductions with Zn and H_2O are

(1) methanoic acid and 2-methyl-2-butanone

(2) methanal and 3-methyl-2-butanone

(3) methanol and 2, 2-dimethyl-3-butanone

(4) methanoic acid and 2-methyl-3-butanone



(2)

Question no. 51

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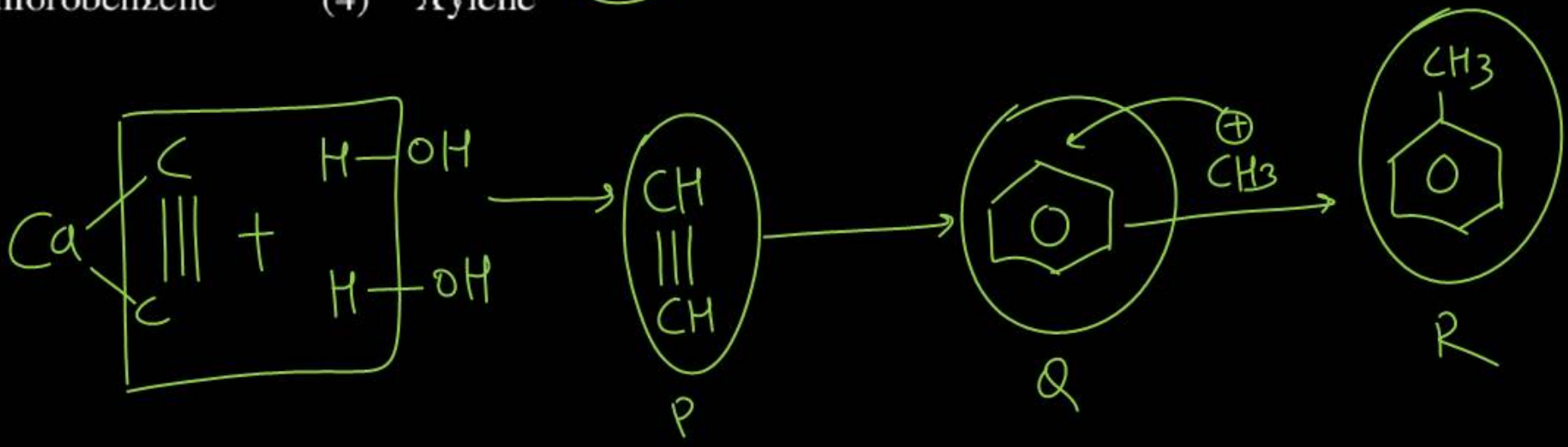
In the following reaction, the product **R** is

$$CaC_2 \xrightarrow{H_2O} P \xrightarrow[\text{tube}]{\text{Hot iron}} Q \xrightarrow[AlCl_3]{CH_3Cl} R$$

(1) Benzene (2) Toluene

(3) Chlorobenzene (4) Xylene

2



Question no. 52

AAYAM CAREER INSTITUTE

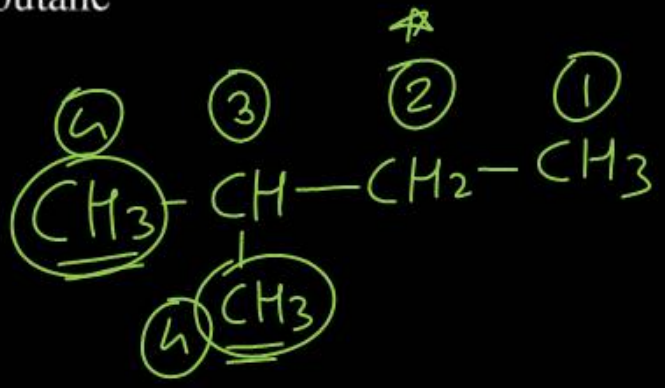
The number of possible enantiomeric pairs that can be produced during monochlorination of 2-methyl butane is:

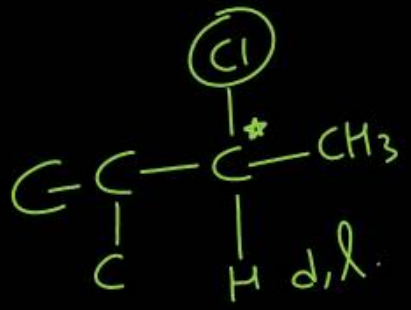
(1) 2

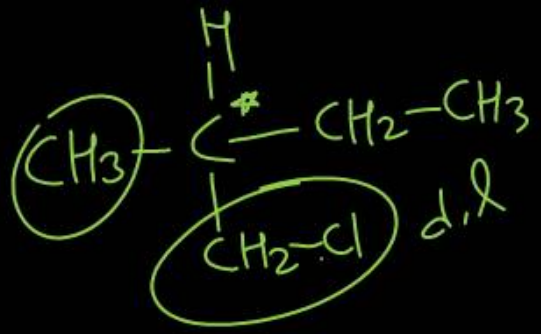
(2) 3

(3) 4

(4) 1



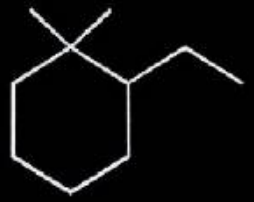




Question no. 53

AAYAM CAREER INSTITUTE

The IUPAC name of the following compound is

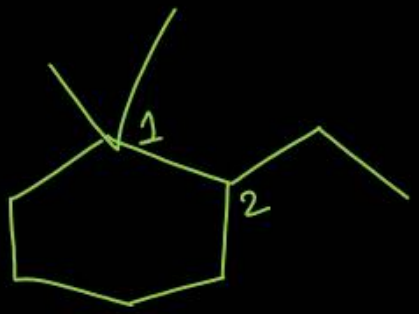


(1) 1-ethyl-2, 2-dimethylcyclohexane.

(2) 2, 2-dimethyl-1-ethylcyclohexane.

(3) 1, 1-dimethyl-2-ethylcyclohexane.

(4) 2-ethyl-1, 1-dimethylcyclohexane.

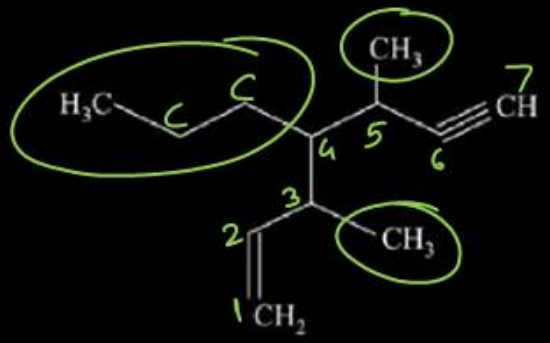


2-Ethyl-1,1 dimethyl cyclohexane

Question no. 54

AAYAM CAREER INSTITUTE

The IUPAC name for the following compound is



3,5dimethyl-4-n-propyl hept-1-ene-6-yne

(1) 3-methyl-4-(1-methylprop-2-ynyl)-1-heptene

(2) 3, 5-dimethyl-4-propylhept-6-en-1-yne

(3) 3, 5-dimethyl-4-propylhept-1-en-6-yne

(4) 3-methyl-4-(3-methylprop-1-enyl)-1-heptyne

3

Question no. 55

AAYAM CAREER INSTITUTE

The shortest wavelength of hydrogen atom in Lyman series is λ. The longest wavelength in Balmer series of He^+ is

(1) $\frac{9\lambda}{5}$ (2) $\frac{36\lambda}{5}$

(3) $\frac{5\lambda}{9}$ (4) $\frac{5}{9\lambda}$

$n_1 = 1$, $n_2 = \infty$

$$\frac{1}{\lambda_H} = \frac{n_1^2}{RZ^2} \quad - (1)$$

$$\frac{1}{\lambda_{He^+}} = \frac{n_1^2 \times n_2^2}{n_2^2 - n_1^2} \times \frac{1}{RZ^2} \quad - (2)$$

$Z = 2$

$n_1 = 2$, $n_2 = 3$

Eqn (1) / Eqn (2)

$$\frac{\lambda_H}{\lambda_{He^+}} = \frac{1^2/R \times 1^2}{\frac{2^2 \times 3^2}{3^2 - 2^2} \times \frac{1}{R \times 2^2}} = \frac{1}{9/9-4}$$

$$\frac{\lambda_H}{\lambda_{He^+}} = \frac{1}{9/5} = 5/9$$

$$\frac{\lambda}{\lambda_{He^+}} = 5/9 \Rightarrow \boxed{\lambda_{He^+} = \frac{9\lambda}{5}}$$

For the following redox reaction E°_{cell} is 1.10 volt. then what will be E_{cell} value –

$Zn(s) + Cu^{2+}(0.1M) \rightarrow Zn^{2+}(1\ M) + Cu(s)$ $n = 2$

(1) 2.14 V (2) 1.80 V

(3) 1.07 V (4) 0.82 V

$$E_{cell} = E^{\circ}_{cell} - \frac{0.06}{2} \log_{10} \frac{[P]}{[R]}$$

$$= 1.10 - 0.03 \log \frac{1}{0.1}$$

$$= 1.10 - 0.03 \log 10$$

$\log 10 \rightarrow 1$

$$= 1.10 - 0.03$$

$$E_{cell} = 1.07\ V$$

Question no. 57

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

Assertion (A) : PH_3 has lower boiling point than NH_3.

Reason (R) : In liquid state, NH_3 molecules are associated through van der Waals' forces, but PH_3 molecules are associated through hydrogen bonding.

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

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

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

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

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

B.Pt $\propto$ V.WF $\propto$ H-Bonding
$\hookrightarrow \propto$ mol.wt $\propto$ Size $\propto$ Surface area

NH_3, PH_3, AsH_3, BiH_3, SbH_3

$PH_3 < AsH_3 < NH_3 < SbH_3 < BiH_3$

mol.wt ↑
B.Pt ↑

H-Bonding

Question no. 58

AAYAM CAREER INSTITUTE

Select the incorrect statement for $[Co(en)_3]Cl_3$ among the following.

(1) Homoleptic complex ✓

(2) d^2sp^3 hybridised ✓

(3) Optically active ✓

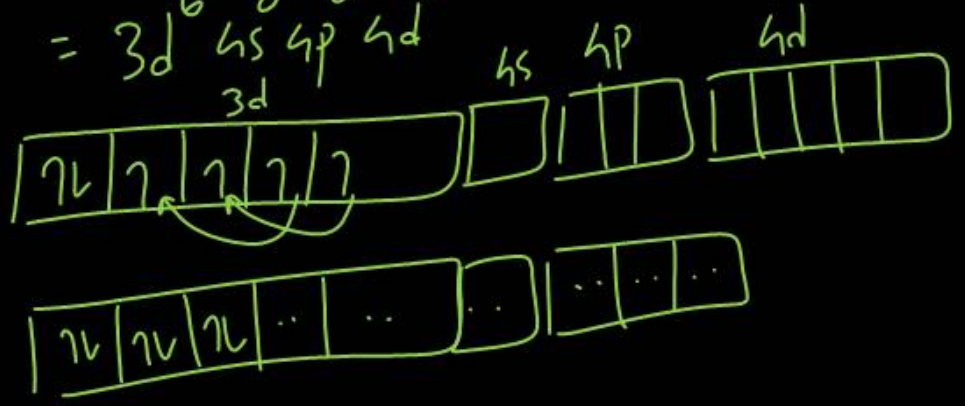
(4) Paramagnetic in nature ✗

4

$[M(AA)_3]$

$Co^{+3} = [Ar]\ 4s^2\ 3d^4$

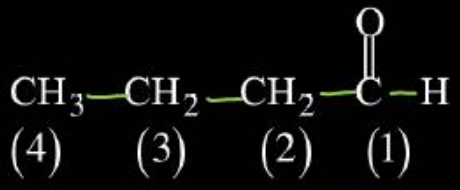
$= 3d^6\ 4s^0\ 4p^0\ 4d^0$



Question no. 59

AAYAM CAREER INSTITUTE

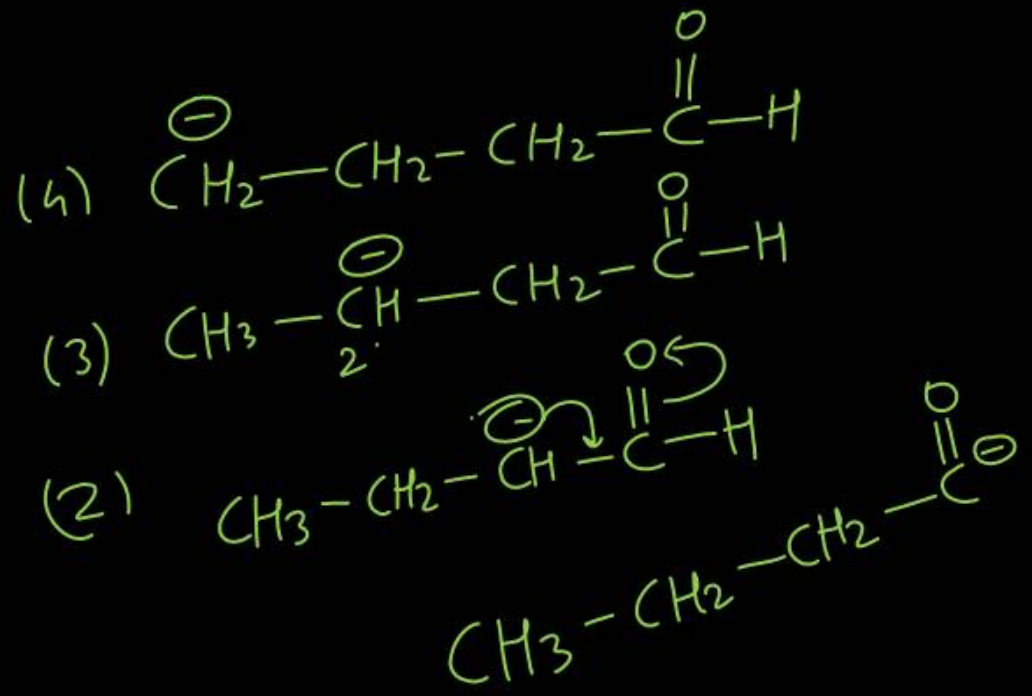
Which of the following carbon has most acidic hydrogen?



(1) $C_1 - H$ (2) $C_2 - H$

(3) $C_3 - H$ (4) $C_4 - H$

(2)



Question no. 60

AAYAM CAREER INSTITUTE

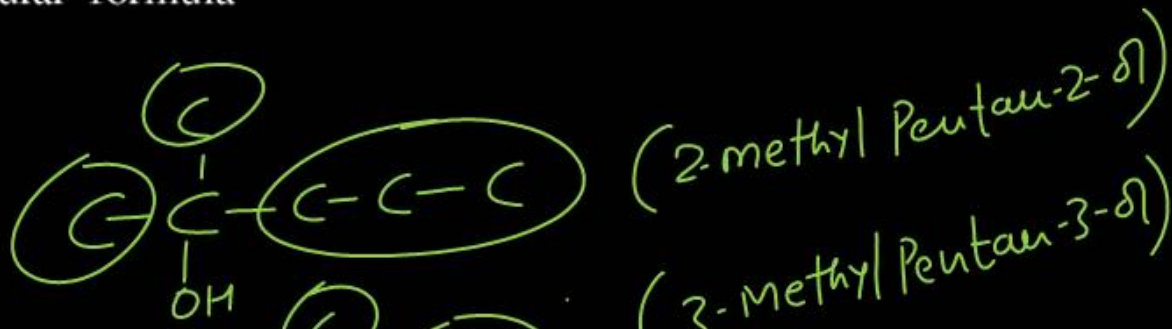
How many structural isomers of molecular formula $C_6H_{14}O$ are tertiary alcohols?

(1) 2

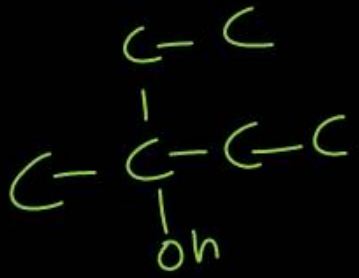
(2) 3

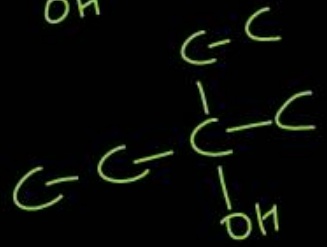
(3) 4

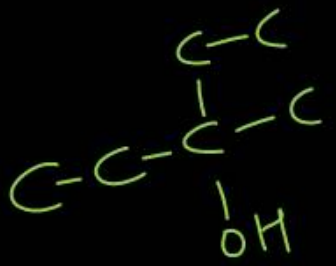
(4) 5



1



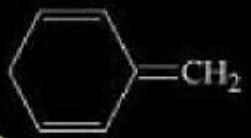


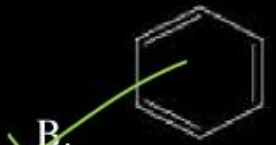


Question no. 61

AAYAM CAREER INSTITUTE

Among the following, the aromatic compounds are

A. 

B. 

C. 

D. 

(1) B and C only

(2) A and B only

(3) A, B and C only

(4) B, C and D only

Question no. 62

AAYAM CAREER INSTITUTE

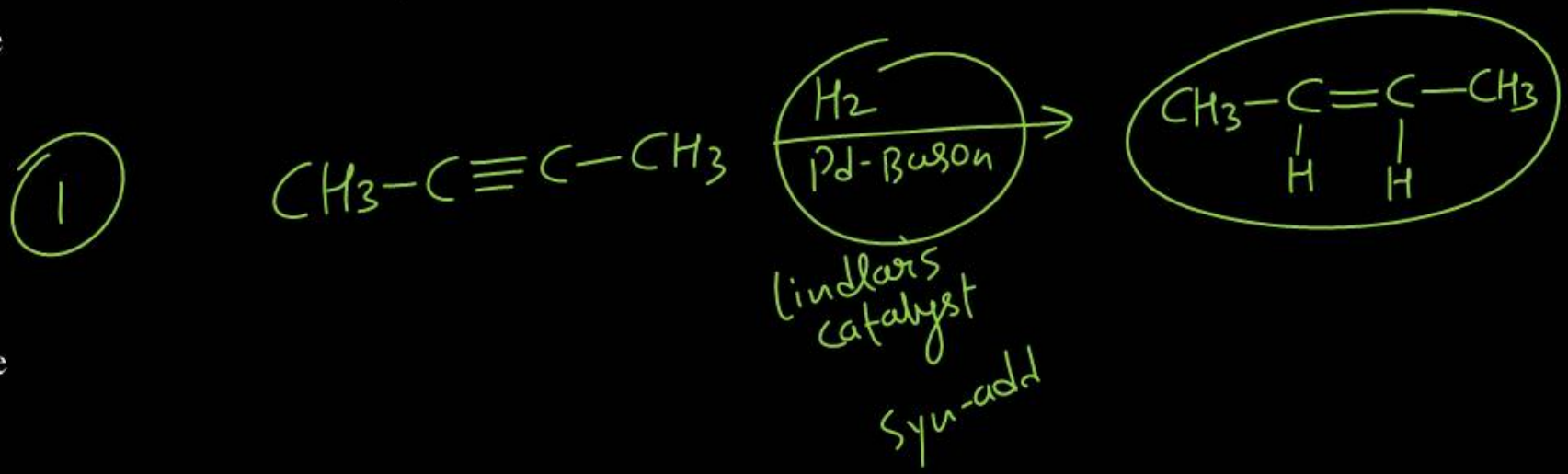
When 2-butyne is treated with $H_2/Pd–BaSO_4$; the product formed will be

(1) cis-2-butene

(2) trans-2-butene

(3) 1-butene

(4) 2-hydroxy butane



Question no. 63

AAYAM CAREER INSTITUTE

Match Column I with Column II and choose the correct combination from the options given.

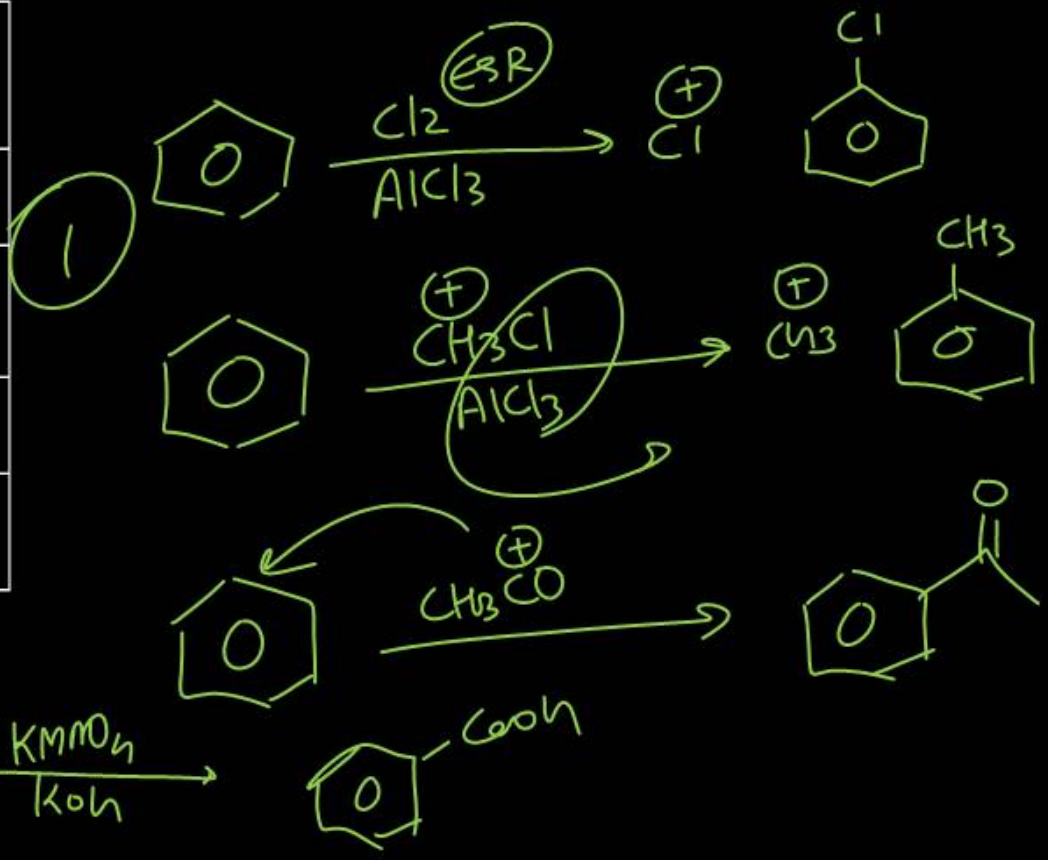
	Column I (Reaction)		Column II (Production)
A.	Benzene + Cl_2 $\xrightarrow{AlCl_3}$	p.	Benzoic acid
B.	Benzene + CH_3Cl $\xrightarrow{AlCl_3}$	q.	Methyl phenyl ketone
C.	Benzene + CH_3COCl $\xrightarrow{AlCl_3}$	r.	Toluene
D.	Toluene $\xrightarrow{KMnO_4/NaOH}$	s.	Chlorobenzene

(1) A – s; B – r; C – q; D – p

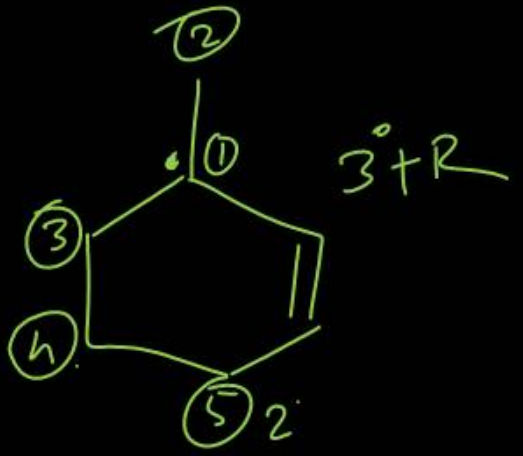
(2) ~~A – s; B – r; C – p; D – q~~

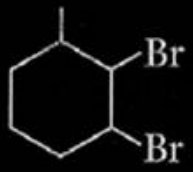
(3) ~~A – r; B – s; C – p; D – q~~

(4) ~~A – r; B – s; C – q; D – p~~

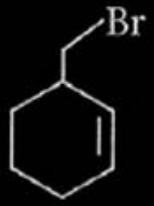


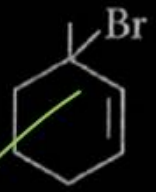
The major product of the following reaction is



(1) 

(2) 

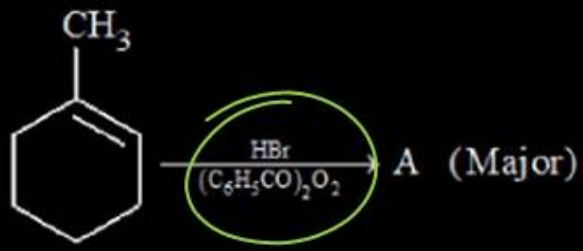
(3) 

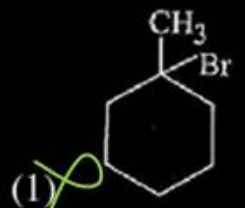
(4) 

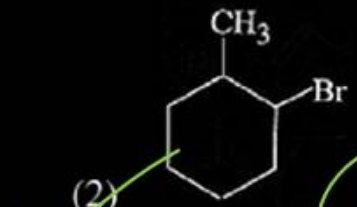
Question no. 65

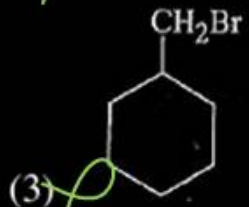
AAYAM CAREER INSTITUTE

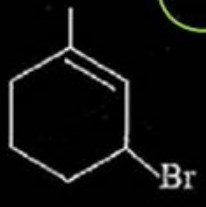
In the given reaction, identify major product A.



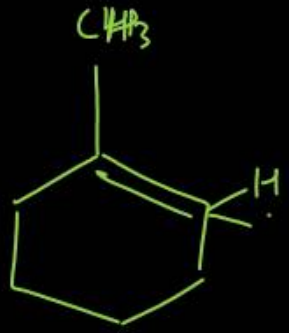
(1) 

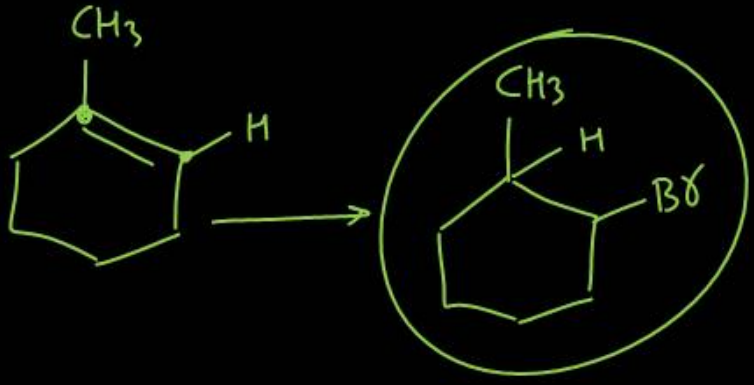
(2) 

(3) 

(4) 

2





Question no. 66

AAYAM CAREER INSTITUTE

The correct stability order for the following resonating structures of $CH_3 - CH = CH - CHO$ will be –

I. 

II. 

III. 

(1) ~~II > III > I~~ (2) ~~I > II > III~~

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

octet incomplete
less stable

III > II > I

4

1. Non polar R.S. > Polar R.S.
2. Polar R.S. ⇒ octet of all atom is complete
3.

Question no. 68

What is the standard reduction potential (E°) for $Fe^{3+} \rightarrow Fe$?

Given :

$Fe^{2+} + 2e^- \rightarrow Fe;\ E^\circ_{Fe^{2+}/Fe} = -0.47\ V$

$Fe^{3+} + e^- \rightarrow Fe^{2+};\ E^\circ_{Fe^{3+}/Fe^{2+}} = +0.77\ V$

(1) + 0.057 V (2) + 0.30 V

(3) – 0.30 V (4) – 0.057 V

$\Delta G_3^\circ = -n_3 F E_3^\circ$

$\Delta G_1^\circ = -n_1 F E_1^\circ$

$\Delta G_2^\circ = -n_2 F E_2^\circ$

$\Delta G_3^\circ = \Delta G_1^\circ + \Delta G_2^\circ$

$+n_3 F E_3^\circ = +n_1 F E_1^\circ - n_2 F E_2^\circ$

$-n_3 E_3^\circ = n_1 E_1^\circ - n_2 E_2^\circ$

$E_3^\circ = \dfrac{n_1 E_1^\circ + n_2 E_2^\circ}{n_3}$ Direct

$= \dfrac{2 \times (-0.47) + 1 \times 0.77}{3}$

$E_3^\circ = -0.0566 - 0.057$

Question no. 69

AAYAM CAREER INSTITUTE

Which of the following complex ion is not expected to absorb visible light? — not coloured

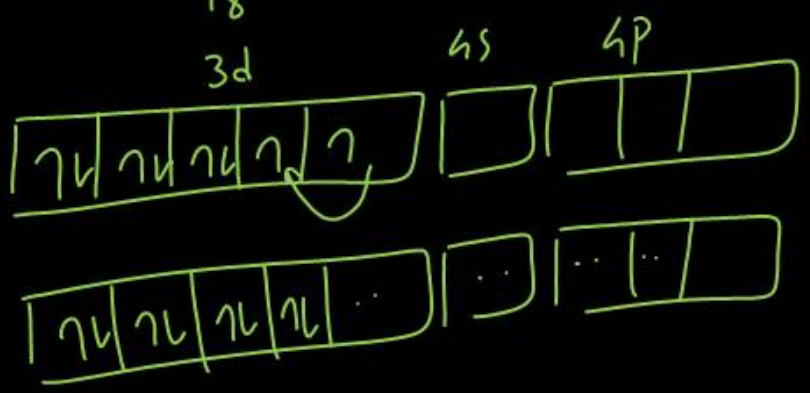
(1) $[Ni(H_2O)_6]^{2+}$ (2) $[Ni(CN)_4]^{2-}$

(3) $[Cr(NH_3)_6]^{3+}$ (4) $[Fe(H_2O)_6]^{2+}$

Unpaired e⁻ = 0
Dia
colourless

$Ni^{+2} = [Ar]\,4s^2\,3d^8$

18

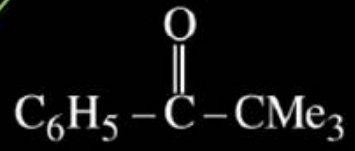


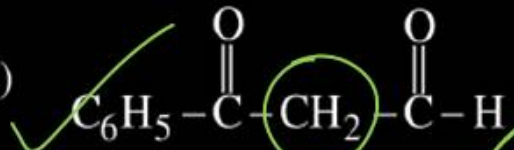
Question no. 70

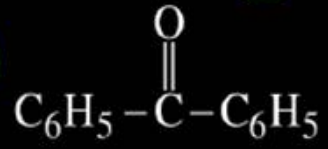
AAYAM CAREER INSTITUTE

Which of the following compounds can exhibit tautomerism?

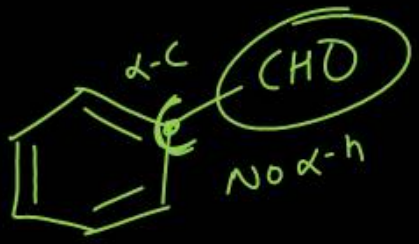
(1) C_6H_5CHO

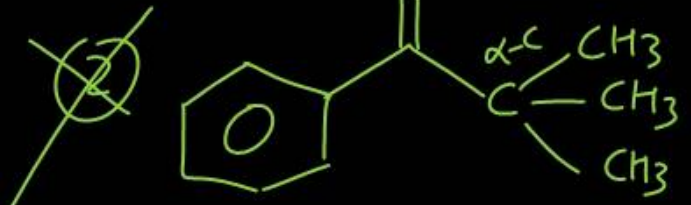
(2) 

(3) 

(4) 

1 α-H





Question no. 71

AAYAM CAREER INSTITUTE

Which of the following can not exhibit hyperconjugation?

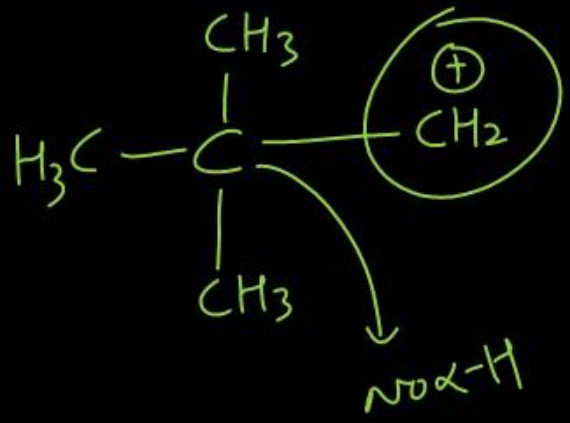
(1) $CH_3\overset{+}{C}H_2$

(2) $H_3C-\overset{+}{C}H-CH_3$

(3) $CH_3CH=CH_2$

(4) $(CH_3)_3C-\overset{+}{C}H_2$

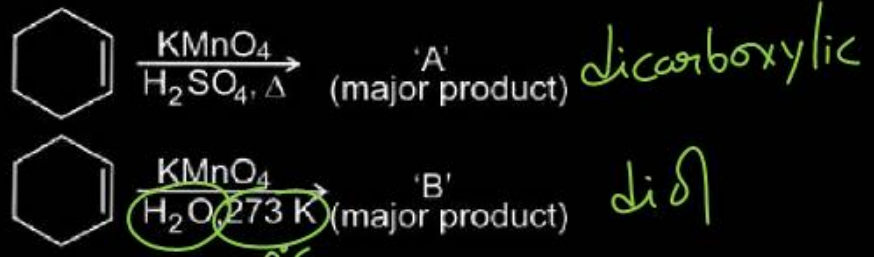
4



Question no. 72

AAYAM CAREER INSTITUTE

For below chemical reactions, identify the correct statement from the following.

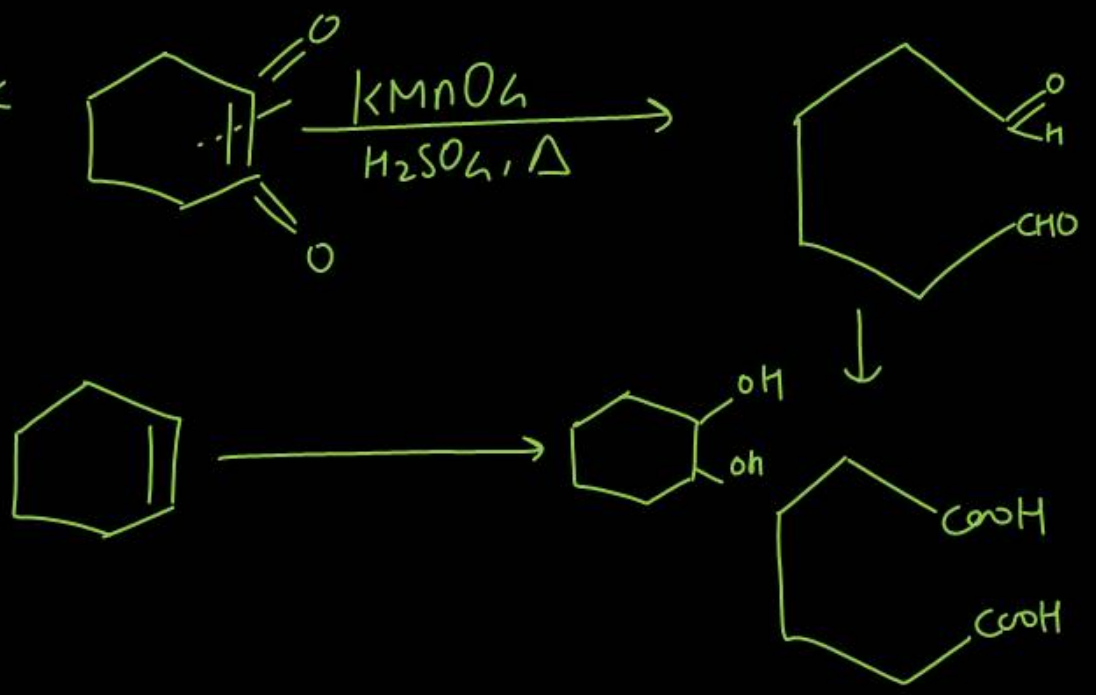


(1) Compound 'A' is diol and compound 'B' is dicarboxylic acid.

(2) Both compound 'A' and compound 'B' are dicarboxylic acids.

(3) Compound 'A' is dicarboxylic acid and compound 'B' is diol.

(4) Both compound 'A' and compound 'B' are diols.



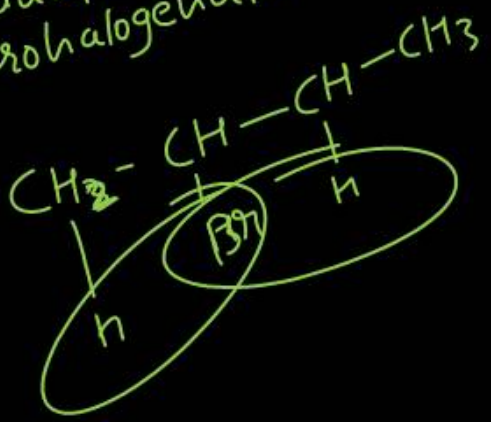
Question no. 73

AAYAM CAREER INSTITUTE

Among the following rules, the one which is applied in the given reaction is

$CH_3CHBrCH_2CH_3 \xrightarrow{\text{Alc. KOH}}$

β-Elimination
dehydrohalogenation



I. $CH_3CH = CHCH_3$ (Major product)

II. $CH_2 = CHCH_2CH_3$ (Minor product)

(1) Saytzeff's rule

(2) Hofmann's rule

(3) Markownikoff's rule

(4) Kharasch effect

1

Question no. 74

AAYAM CAREER INSTITUTE

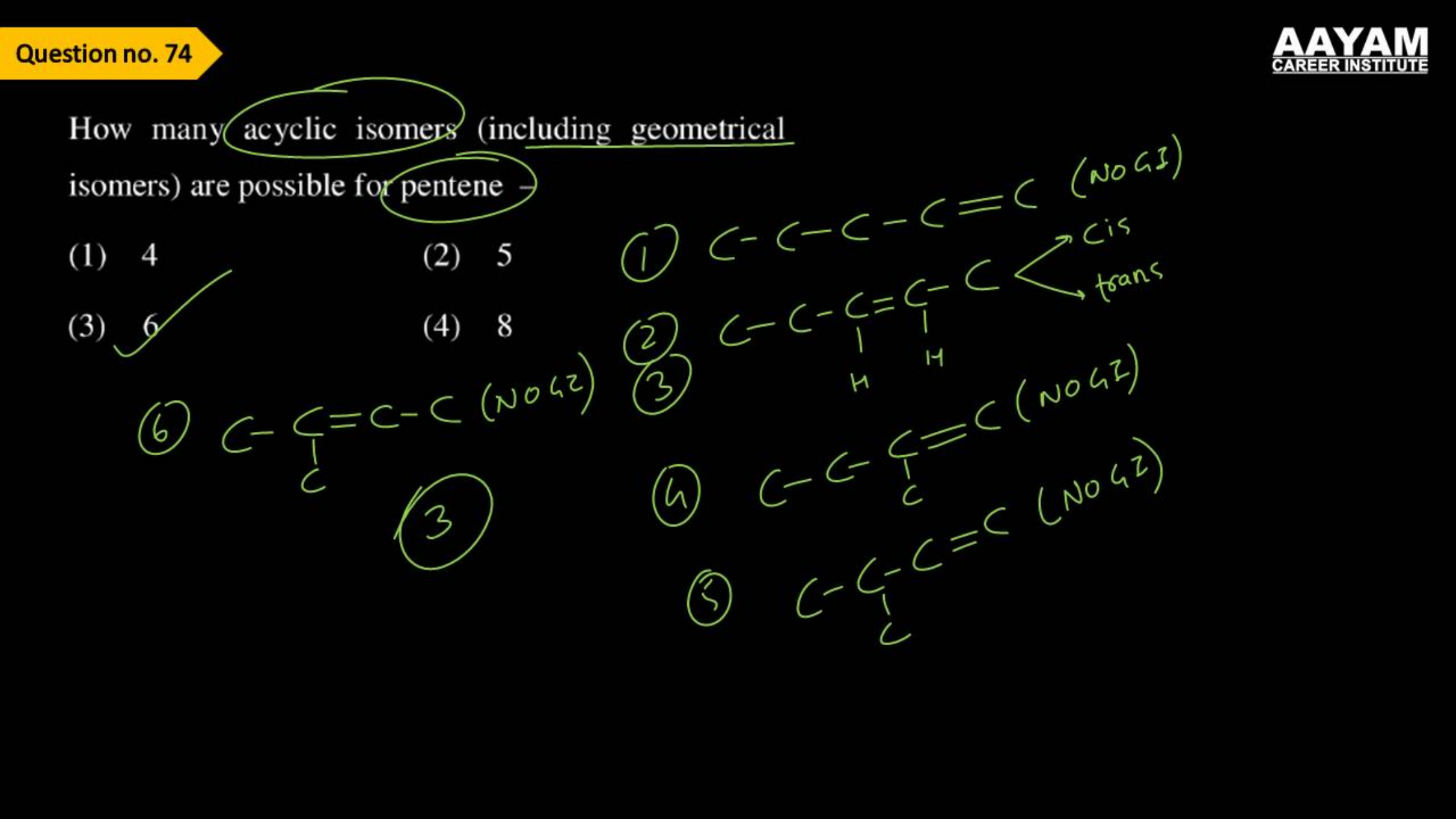
How many acyclic isomers (including geometrical isomers) are possible for pentene –

(1) 4

(2) 5

(3) 6

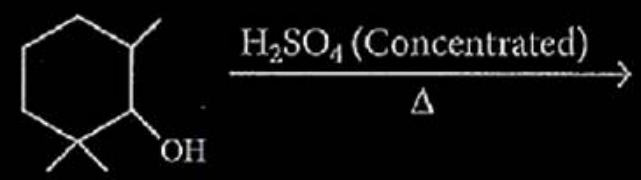
(4) 8

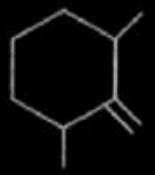


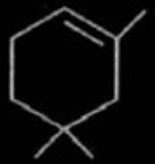
Question no. 75

AAYAM CAREER INSTITUTE

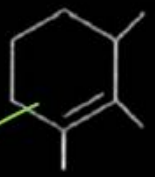
Find out the major product from the following reaction.

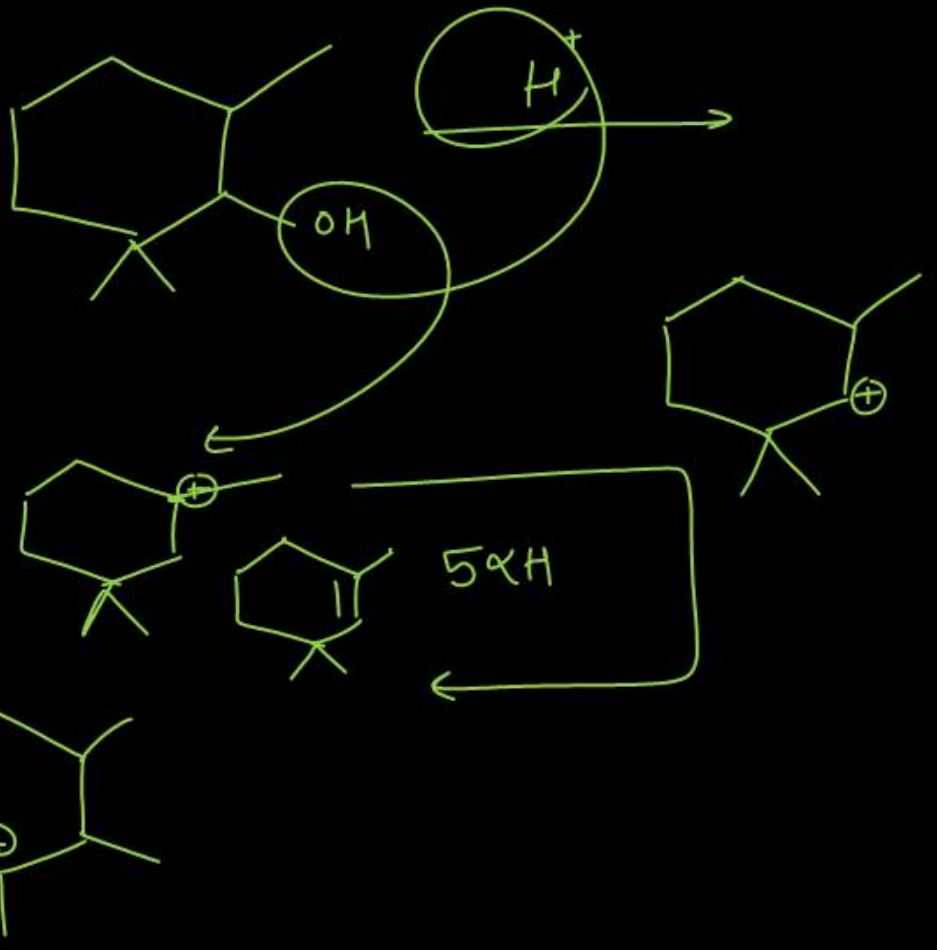


(1) 

(2) 

(3) 

(4) 



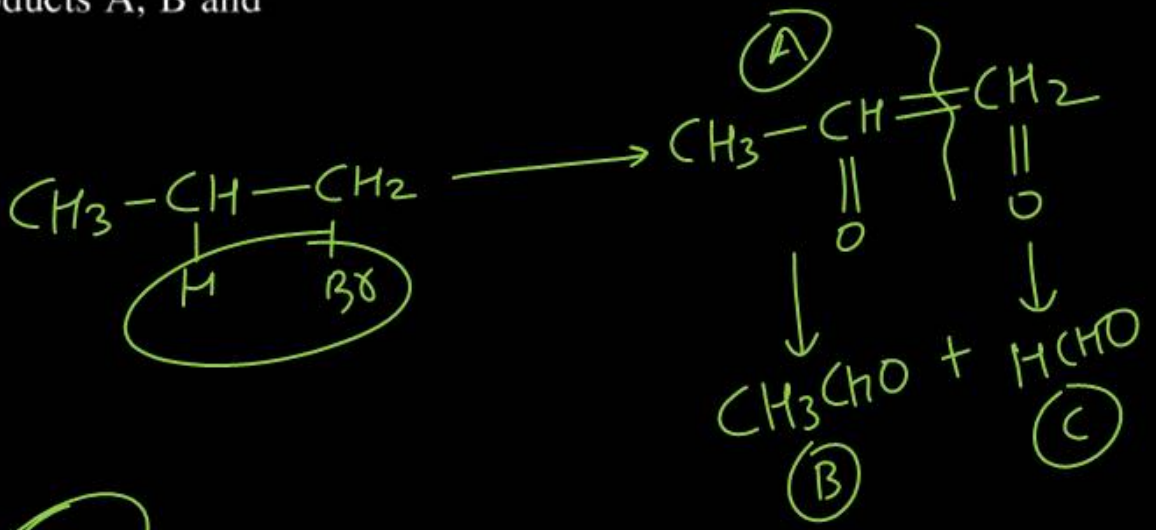
Question no. 76

AAYAM CAREER INSTITUTE

In the following reactions, identify products A, B and C–

$$CH_3CH_2CH_2Br \xrightarrow[\Delta]{\text{alc. KOH}} A$$

$$A \xrightarrow[(ii)Zn,H_2O]{(i)O_3} B + C$$



(1) Propene, acetone, formaldehyde

(2) Propene, ethanal, methanal

(3) Propyne, acetaldehyde, formaldehyde

(4) Propylene, propionaldehyde, formaldehyde

Question no. 77

Given below are two statements :

Statement I : Hyperconjugation is a permanent effect.

Statement II : Hyperconjugation in ethyl cation $(CH_3-\overset{+}{C}H_2)$ involves the overlapping of $C_{sp^2}-H_{1s}$ bond with empty 2p orbital of other carbon.

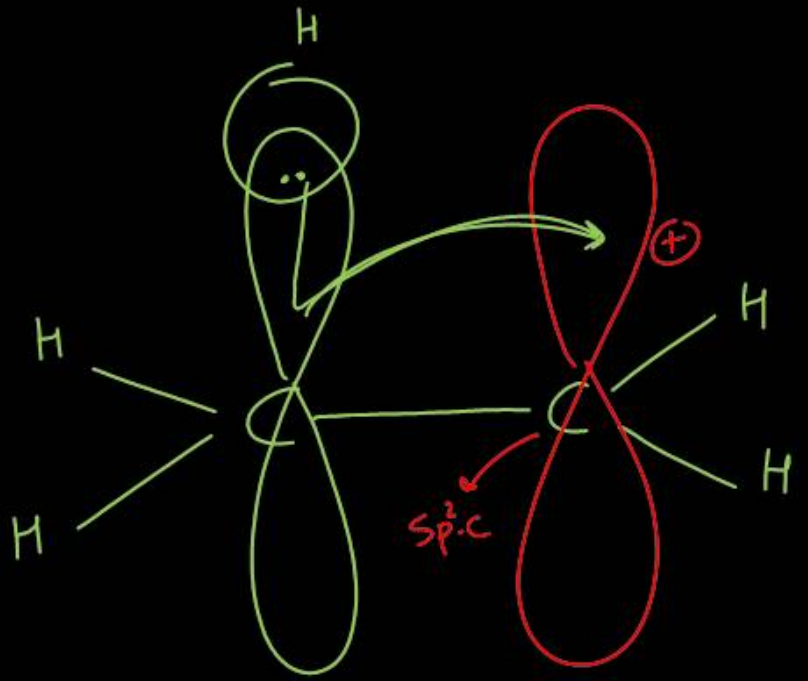
Choose the correct option.

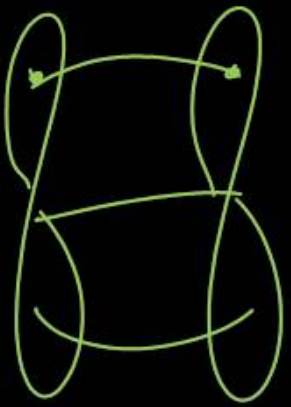
(1) Statement I is correct but statement II is incorrect.

(2) Both statement I and statement II are correct.

(3) Both statement I and statement II are incorrect.

(4) Statement I is incorrect but statement II is correct.





Question no. 78

AAYAM CAREER INSTITUTE

Select the compound from the following that will show intramolecular hydrogen bonding.

(1) 

(2) H_2O

(3) C_2H_5OH

(4) NH_3

Question no. 79

Consider the following reaction –

$$2N_2O_5(g) \longrightarrow 4NO_2(g) + O_2(g);$$

Given

$$-\frac{\Delta[N_2O_5]}{\Delta t} = k_1[N_2O_5];$$

$$\frac{\Delta[NO_2]}{\Delta t} = k_2[N_2O_5];$$

$$\frac{\Delta[O_2]}{\Delta t} = k_3[N_2O_5]$$

Identify correct relation between k_1, k_2, k_3

(1) $k_1 = k_2 = k_3$

(2) $2k_1 = k_2 = 4k_3$

(3) $2k_1 = 4k_2 = k_3$

(4) None of these

$$\frac{k_1}{2} = \frac{k_2}{4} = \frac{k_3}{1}$$

$$2k_1 = k_2 = 4k_3$$

Question no. 80

AAYAM CAREER INSTITUTE

The crystal field stabilisation energy (CFSE) for $[CoCl_6]^{4-}$ is 18000 cm^{-1}. The CFSE for $[CoCl_4]^{2-}$ will be

(1) 6000 cm^{-1}

(2) 16000 cm^{-1}

(3) 18000 cm^{-1}

(4) 8000 cm^{-1}

4

$$\Delta_t = \frac{4}{9}\Delta_O$$

$$= \frac{4}{9} \times 18000$$

$$= 8000$$

Question no. 81

AAYAM CAREER INSTITUTE

Arrange the following compounds in the order of decreasing K_a.

P. $F - CH_2CH_2COOH$

Q. $Cl - \underset{\displaystyle Cl}{\underset{|}{CH}} - CH_2 - COOH$

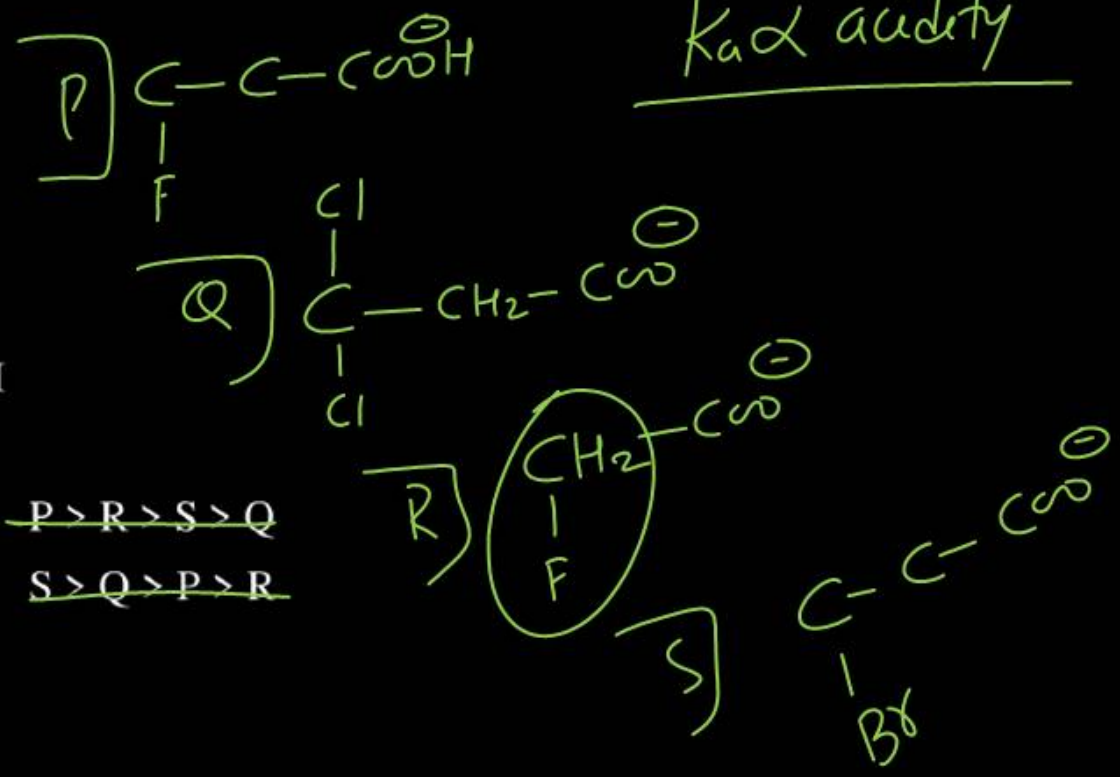
R. $F - CH_2 - COOH$

S. $Br - CH_2 - CH_2 - COOH$

Correct answer is

(1) ~~Q > S > P > R~~ (2) ~~P > R > S > Q~~

(3) R > Q > P > S (4) ~~S > Q > P > R~~



Question no. 82

AAYAM CAREER INSTITUTE

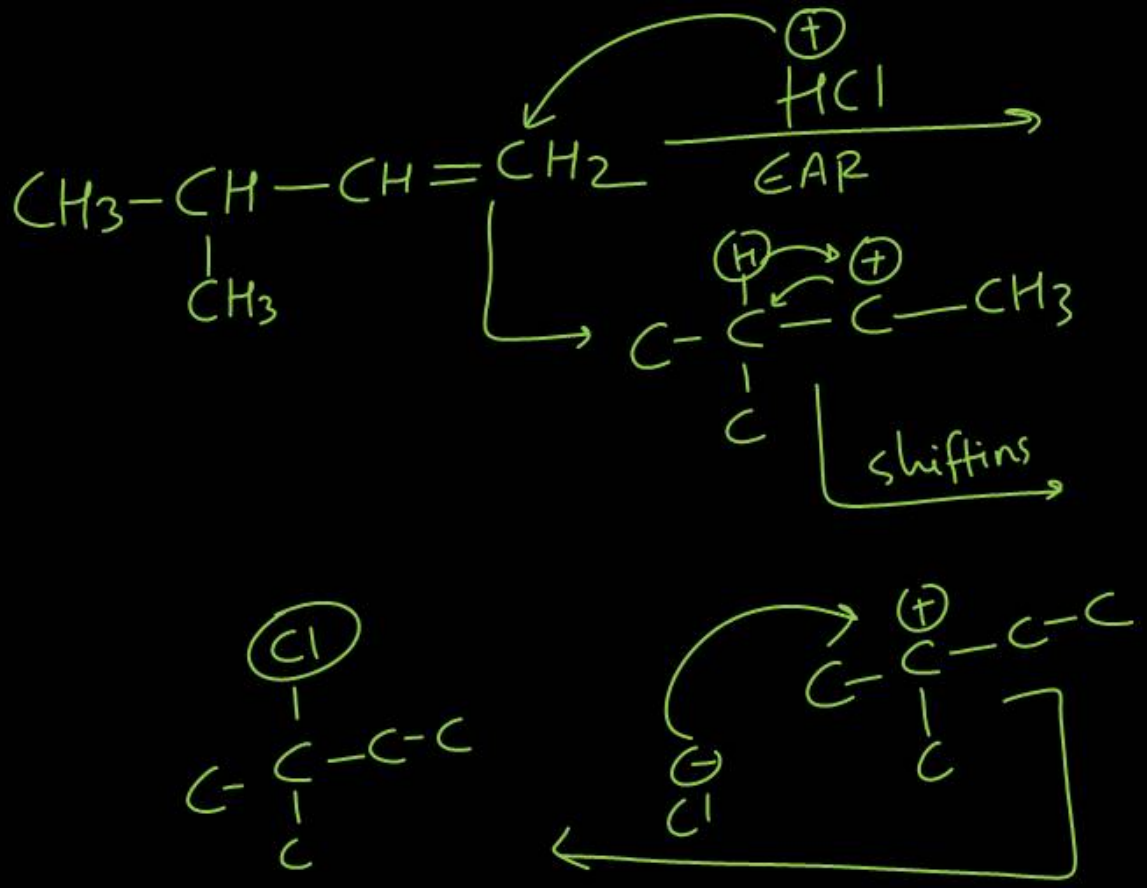
The major product obtained on reaction of 3-methylbutene with HCl is

(1) 2-chloro-2-methylbutane

(2) 3-chloro-2-methylbutane

(3) 1-chloro-2-methylbutane

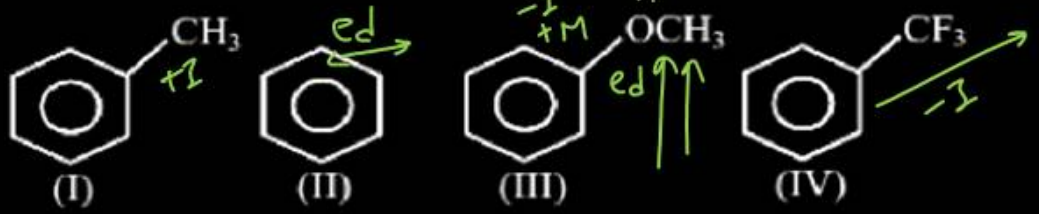
(4) 3-chloro-3-methylbutane



Question no. 83

AAYAM CAREER INSTITUTE

The correct arrangement for decreasing order of electrophilic substitution for below compounds is



Reactivity for ESR ∝ ed on ⬡ Ring

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

(2) III > IV > II > I

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

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

4

Question no. 84

AAYAM CAREER INSTITUTE

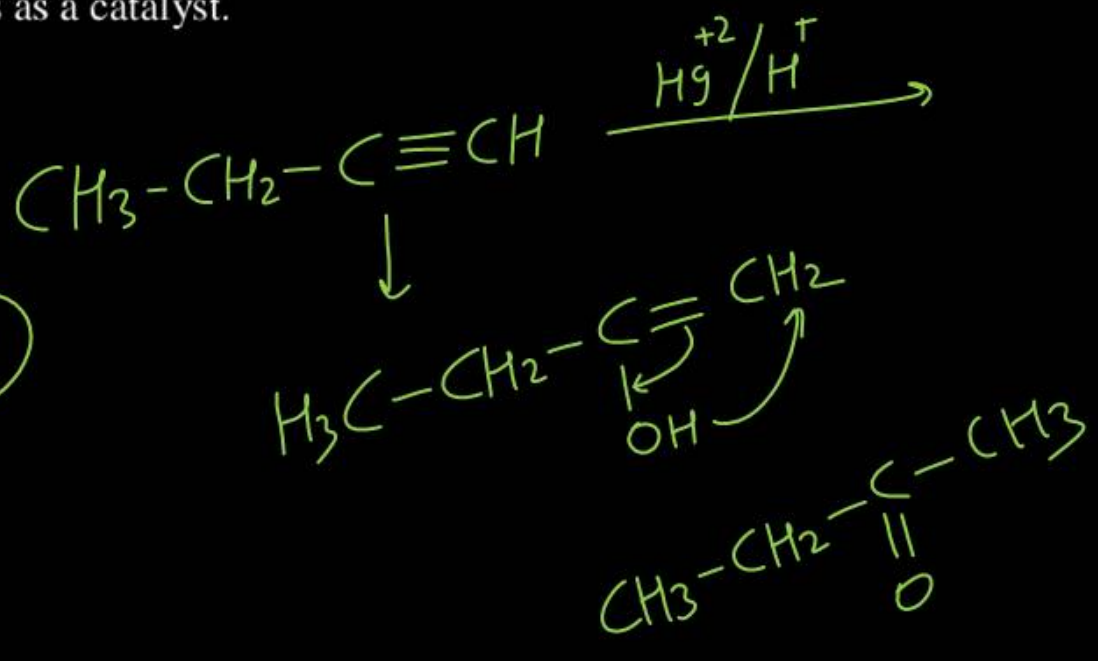
Addition of water to 1-butyne occurs in acidic medium and in the presence of Hg^{2+} ions as a catalyst. The compound obtained

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

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

(3) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-OH + CO_2$

(4) $CH_3-\overset{O}{\overset{\|}{C}}-OH + H-\overset{O}{\overset{\|}{C}}-H$

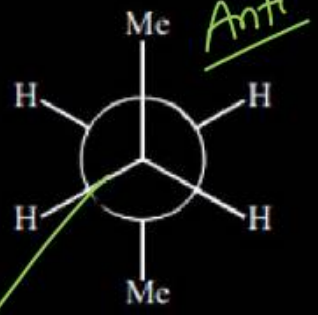


Question no. 85

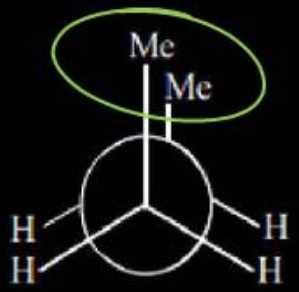
AAYAM CAREER INSTITUTE

Which of the following conformations will be the most stable?

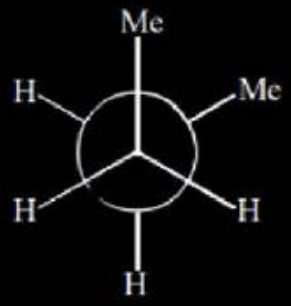
(1)



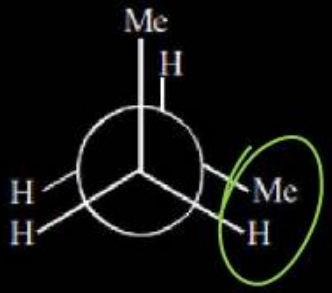
(2)



(3)

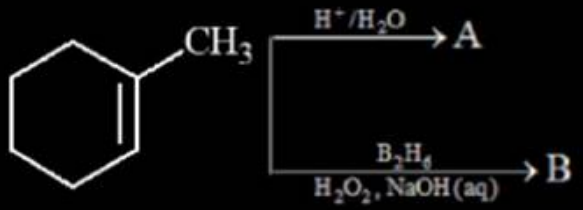


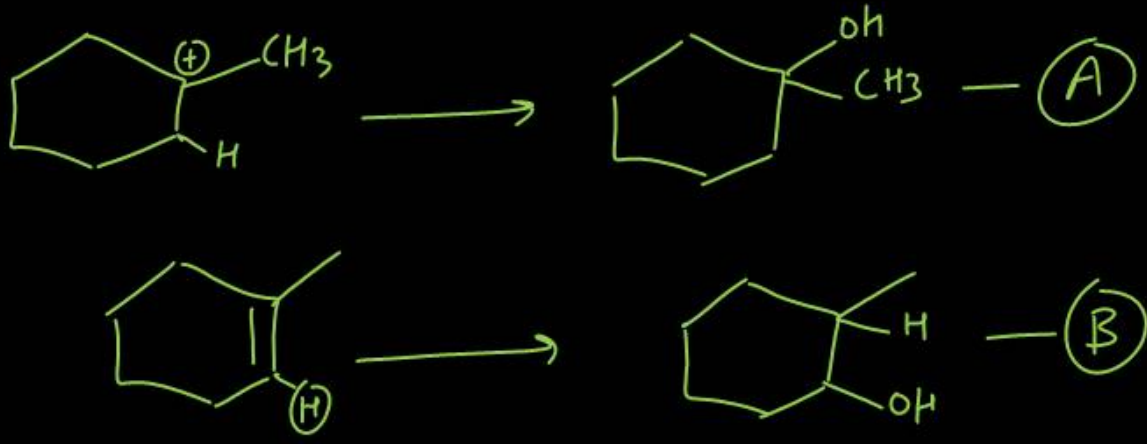
(4)

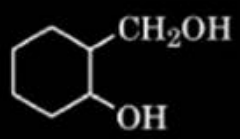


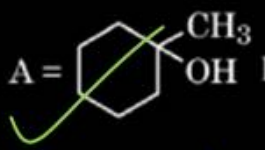
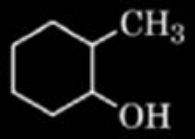
Question no. 86

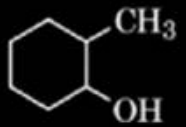
Major products A and B formed in the following set of reactions are

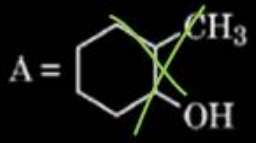
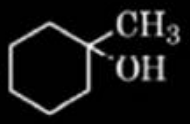




(1) A =  B = 

(2) A =  B = 

(3) A =  B = 

(4) A =  B = 

Question no. 87

AAYAM CAREER INSTITUTE

The stability of dihalides of Si, Ge, Sn and Pb increases steadily in the sequence

(1) $PbX_2 << SnX_2 << GeX_2 << SiX_2$

(2) $GeX_2 << SiX_2 < SnX_2 << PbX_2$

(3) $SiX_2 << GeX_2 << PbX_2 << SnX_2$

(4) $SiX_2 << GeX_2 << SnX_2 << PbX_2$

4

group-14 → +2, +4

Stability of +2 O.S. ↑ Down the group.

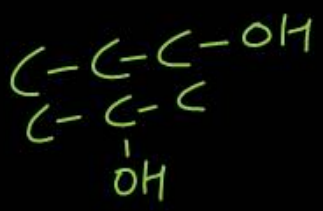
$SiX_2 < GeX_2 < SnX_2 < PbX_2$

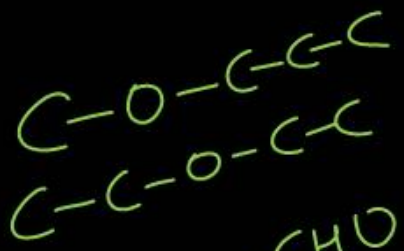
Question no. 88

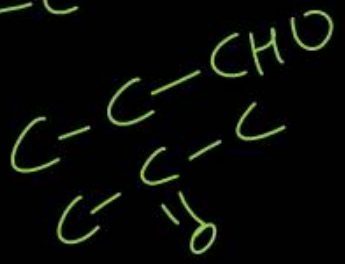
AAYAM CAREER INSTITUTE

Match List-I with List-II.

	List-I (Pair of compounds)		List-II (Isomerism)
A.	n-propanol and isopropanol	i.	Metamerism
B.	Methoxypropane and enthoxyethane	ii.	Chain isomerism
C.	Propanone and propanal	iii.	Position isomerism
D.	Neopentane and isopentane	iv.	Functional isomerism







Choose the correct answer from the options given below:

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

(2) A – III, B – I, C – IV, D – II

(3) A – III, B – I, C – II, D – IV

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

Question no. 89

AAYAM CAREER INSTITUTE

Match List–I with List–II.

	List–I (Spectral Series for Hydrogen)		**List–II** (Infrared Region / Higher Energy State)
A.	Lyman	I.	Infrared region
B.	Balmer	II.	UV region
C.	Paschen	III.	Infrared region
D.	Pfund	IV.	Visible region

Choose the correct answer from the options given below:

(1) A–II, B–III, C–I, D–IV

(2) A–I, B–II, C–III, D–IV

(3) A–I, B–III, C–II, D–IV

(4) A–II, B–IV, C–III, D–I

Question no. 90

AAYAM CAREER INSTITUTE

What would be the molality of 20% (w/w) aqueous solution of KI?

(molar mass of KI = 166 g mol^{-1})

(1) 1.51 (2) 1.08

(3) 1.48 (4) 1.35

→ 20 gm Solute in 100 gm soln

$W_B = 20$ gm, $W_A = 100 - 20 = 80$ gm

$$m = \frac{W_B \times 1000}{M_B \times W_A} = \frac{20 \times 1000}{166 \times 80} = \frac{1000}{166 \times 4} = \frac{250}{83} = \frac{15}{10}$$

$m = 1.51$

Question no. 91

AAYAM CAREER INSTITUTE

If two animals belong to same family then

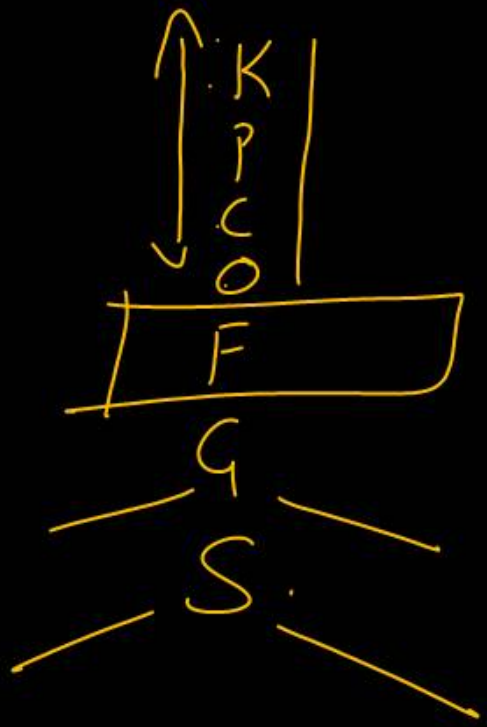
(1) Their species must be same

(2) Their genus must be same

(3) Their class must be same

(4) None of the above

3



Question no. 92

AAYAM CAREER INSTITUTE

Match column-I with column-II for house fly classification and select the correct option using the codes given below

	Column-I		Column-II
A.	Family	i.	Diptera
B.	Order	ii.	Arthropoda
C.	Class	iii.	Muscidae
D.	Phylum	iv.	Insecta

(1) A – iii, B – i, C – iv, D – ii

(2) A – iii, B – ii, C – iv, D – i

(3) A – iv, B – iii, C – ii, D – i

(4) A – iv, B – ii, C – i, D – iii

Question no. 93

AAYAM CAREER INSTITUTE

Pick the wrong statement

(1) Diatoms are the chief producers in ocean

(2) Diatoms are microscopic & float passively in water.

(3) Walls of diatoms are easily destructible

(4) Diatomaceous earth is formed by the cell-wall of diatoms

3

Question no. 94

AAYAM CAREER INSTITUTE

Which of the following are the characters of dinoflagellates?

(i) They are planktonic golden yellow algae with soap box like structure.

(ii) They are marine red biflagellated protista.

(iii) They appear yellow, green, brown, blue and red in colour.

(iv) They are biflagellated organisms with pellicle.

(v) They are saprophytic or parasitic unicellular forms.

(1) (ii) and (iii)

(2) (ii) and (v)

(3) (i),(ii) and (iii)

(4) (ii), (iv) and (v)

Question no. 95

AAYAM CAREER INSTITUTE

Which of the following pairs come under the group chrysophytes?

(1) Diatoms and Euglena

(2) Euglena' and Trypanosoma

(3) Diatoms and Desmids

(4) Paramecium and Plasmodium

3

Question no. 96

AAYAM CAREER INSTITUTE

Choose the correct statements.

i. All pteridophytes are homosporous.

ii. Selaginella is heterosporous.

iii. Heterospory leads to seed habit.

iv. Marsilea is homosporous.

(1) ii and iii

(2) i and iii

(3) i and iv

(4) ii and iv

Question no. 97

AAYAM CAREER INSTITUTE

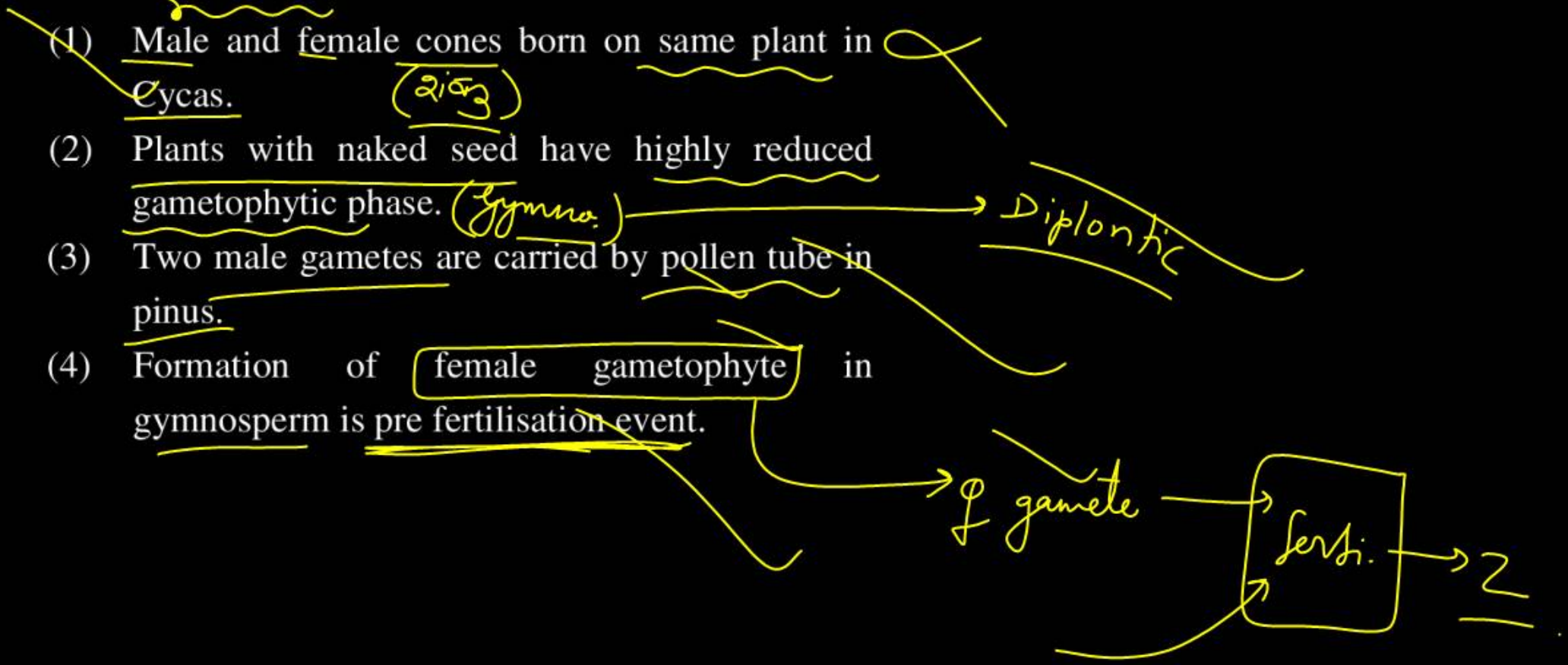
Find the incorrect statement -

(1) Male and female cones born on same plant in Cycas.

(2) Plants with naked seed have highly reduced gametophytic phase.

(3) Two male gametes are carried by pollen tube in pinus.

(4) Formation of female gametophyte in gymnosperm is pre fertilisation event.

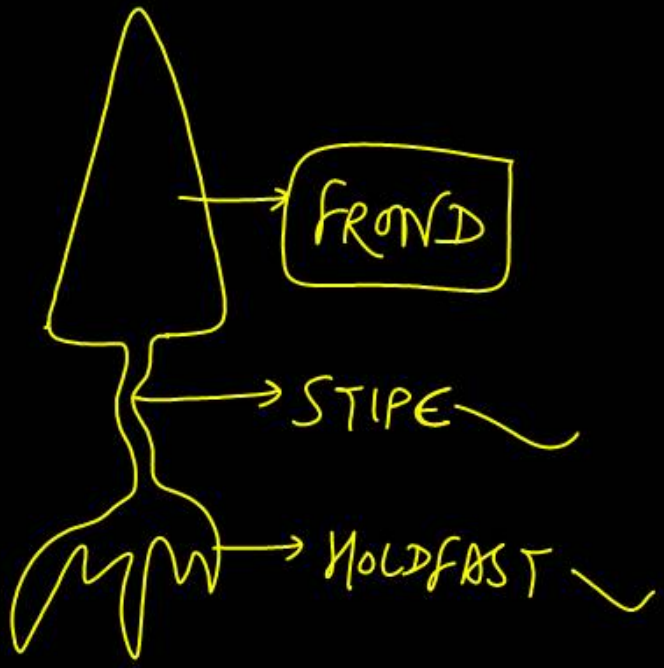


Question no. 98

AAYAM CAREER INSTITUTE

Which of the following is a leaf like photosynthetic organ in brown algae?

(1) Frond
(2) Stipe
(3) Holdfast
(4) Gemma



Question no. 99

AAYAM CAREER INSTITUTE

Refer to the given table and select the option which correctly fills up the table.

Name of algae	Product obtained
I. ECTOCARPUS	Alginic acid
II. CHLORELLA	Used by space travelers as a source of food
III. RED	Carrageen
IV. G E G.	Agar – Agar

(1) I – Porphyra, II – Volvox, III – Sargassum, IV – Chlorella

(2) I – Spirogyra, II – Fucus, III – Chlamydomonas, IV – Ectocarpus

(3) I – Ectocarpus, II – Chlorella, III – Red algae, IV – Gracilaria

(4) I – Ectocrapus, II – Chlorella, III – Brown algae, IV – Polysiphonia

Question no. 100

AAYAM CAREER INSTITUTE

The animal shown in the below figure belongs to which phylum.

→ Scorpion

3

(1) Annelida
(2) Echinodermata
(3) Arthropoda
(4) Aschelminthes

Question no. 101

AAYAM CAREER INSTITUTE

Which of the following phylum is not correctly matched with its characteristics:

(1) Aschelminthes – Muscular pharynx

(2) Arthropoda – Mostly oviparous

(3) Mollusca – Calcareous shell

(4) Echinodermata – Choanocytes

4

Porifera

Question no. 102

AAYAM CAREER INSTITUTE

Bony Fish → Cartilage Fish

Osteichthyes and Chondrichthyes are similar in which of the following features?

(1) Presence of two chambered heart

(2) Absence of paired fins. X

(3) Presence of bony endoskeleton X

(4) Presence of electric organs for defence. X

1

Question no. 103

AAYAM CAREER INSTITUTE

Which of the following characters is not associated with chordates?

(1) Presence of notochord

(2) Hollow nerve cord present, ventral to notochord

(3) Pharynx perforated by gill slits

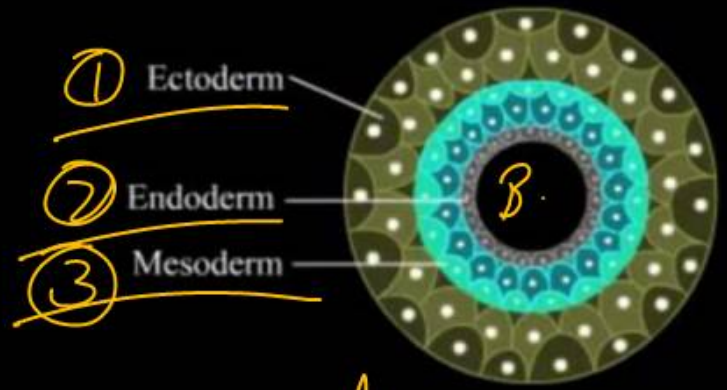
(4) Presence of post anal tail

2

Question no. 104

AAYAM CAREER INSTITUTE

The kind of coelom represented in the diagram given below is characteristic of



(1) Roundworm - As.
(2) Hydra - Coel.
(3) Tapeworm - Platy
(4) Cockroach

Eucoelomate.

4

Question no. 105

AAYAM CAREER INSTITUTE

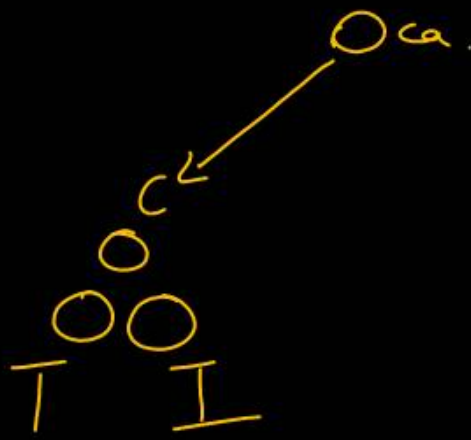
During muscle contraction Ca^{2+} attaches to: -

(1) Troponin and tropomyosin both

(2) Troponin only

(3) Troponin and actin

(4) Actin and myosin



Question no. 106

AAYAM CAREER INSTITUTE

Which one of the following has only bones of axial skeletal system?

(1) Sphenoid, Clavicle, pubis, Sternum

(2) Scapula, Radius, femur, Tibia

(3) Frontal, Maxilla, Clavicle, Radius

(4) Sternum, Sphenoid, Ribs, Mandible

4

Question no. 107

AAYAM CAREER INSTITUTE

Match the following and choose the correct option.

	Types of synovial joint		Bones involved
a.	Ball and socket	i.	Carpal and metacarpal of thumb
b.	Hinge	ii.	Atlas and axis
c.	Pivot	iii.	Frontal and parietal
d.	Saddle	iv.	Knee joint
		v.	Humerus and pectoral girdle

(1) A-(v), B-(iv), C-(ii), D-(i)

(2) A-(iv),B-(v),C-(iii),D-(ii)

(3) A-(v), B-(iii), C-(ii), D-(i)

(4) A-(iv),B-(ii),C-(i),D-(iii)

Question no. 108

AAYAM CAREER INSTITUTE

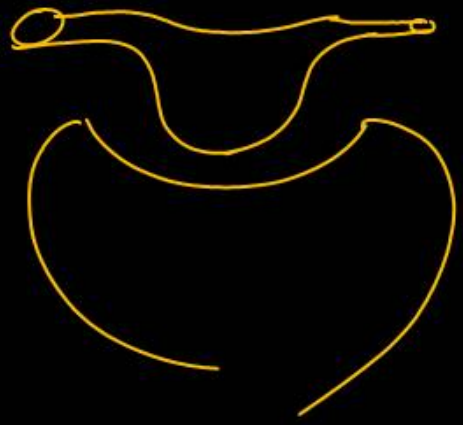
Malpighian body is constituted by

(1) Glomerulus only

(2) Glomerulus and efferent arteriole

(3) Glomerulus and afferent arteriole

(4) Glomerulus and Bowman's capsule



Question no. 109

AAYAM CAREER INSTITUTE

Most concentrated filtrate is found in

(1) PCT

(2) At the base of Henle's loop

(3) DCT

(4) Thick part of ascending limb

Question no. 110

AAYAM CAREER INSTITUTE

Uricotelic mode of excretion is found in

(1) Reptiles and birds

(2) Birds and annelids

(3) Amphibians and reptiles

(4) Insects and amphibians

Question no. 111

AAYAM CAREER INSTITUTE

Human urine is usually acidic because

(1) Potassium and sodium exchange generates acidity

(2) hydrogen ions are actively secreted into the filtrate

(3) The sodium transporter exchanges one hydrogen ion for each sodium ion, in peritubular capillaries.

(4) Excreted plasma proteins are acidic.

pH = 6.

:- Tubular secretion

H / A / K

(2)

Question no. 112

AAYAM CAREER INSTITUTE

Select the incorrect statement.

(a) Lower the taxon, more are the characteristics that the member within the taxon share.

(b) Order is an assemblage of genera which have a few similar characters.

(c) Cat and dog belong, to same family of Felidae.

(d) Binomial nomenclature was introduced by Carolus Linnaeus.

(1) a, b and c (2) b, c and d

(3) a and d (4) b and c

Question no. 113

AAYAM CAREER INSTITUTE

T.O. Dienner discovered a/an

(1) Free infectious DNA

(2) Infectious protein

(3) Bacteriophage

(4) Free infectious RNA

∴ Viroids

Free Naked SSRNA

(4)

Question no. 114

AAYAM CAREER INSTITUTE

Consider the following statements with respect to characteristic features of the kingdom.

(i) In animalia, the mode of nutrition is autotrophic.

(ii) In monera, the nuclear membrane is present.

(iii) In protista, the cell type is prokaryotic.

(iv) In plantae, the cell wall is present.

Of the above statements, which one is correct?

(1) (i) only (2) (ii) only

(3) (iii) only (4) (iv) only

Question no. 115

AAYAM CAREER INSTITUTE

How many are correct from the following statements regarding bacteria?

(A) Bacteria are sole members of the kingdom Protista. Monera ✗

(B) They are most abundant micro-organisms. ✓

(C) They also live in extreme habitats such as hot springs, deserts, snow and deep oceans.

(D) Many of them live in or on other organisms as parasites.

(1) One (2) Two

(3) Three (4) Four

3

Question no. 116

AAYAM CAREER INSTITUTE

Choose the correct statements.

i. Bryophytes are amphibians of the plant kingdom.

ii. Bryophytes require water for fertilization.

iii. Sporophyte is independent in bryophytes.

iv. Gametophyte is dominant in bryophytes.

(1) i, ii and iv

(2) i, iii and iv

(3) i and ii

(4) i, ii, iii and iv

Question no. 117

AAYAM CAREER INSTITUTE

Two unequal, lateral flagella can be observed in?

(1) Ulothrix

(2) Fucus

(3) Porphyra

(4) Volvox

Brown Algae

Question no. 118

AAYAM CAREER INSTITUTE

Find the correct sequence of events involved in life cycle liverworts. Start it from Dominant phase of life-

A – Meiosis, B – Gametogenesis, C – Gametophyte, D – Syngamy, E – Zygote, F – Sporophyte, G – Spore

(1) F → A → G → D → B → C → E

(2) F → A → G → C → E → B → D

(3) C → D → E → G → F → A → G

(4) C → B → D → E → F → A → G

युग्मकोद्भिद (GAMETOPHYTE)

(2n)

Question no. 119

AAYAM CAREER INSTITUTE

Find the correct option :

A. Marchantia shows asexual reproduction by gemmae.

B. In red algae, the reserve food is laminarin.

C. Liverworts have multicellular rhizoids and protonema.

D. Coralloid root is not a characteristic of all Gymnosperms.

(1) All are correct (2) One is incorrect

(3) Two are incorrect (4) Three are incorrect

Question no. 120

AAYAM CAREER INSTITUTE

Identify the animal in the below figure and mark unique character of the group it belongs to.

Coelenterata.

(1) Canal system for gathering of food

(2) Cnidocytes for capturing of prey.

(3) Bioluminescence for defense

(4) Dorso-ventrally flattened body

2

Question no. 121

AAYAM CAREER INSTITUTE

Match the columns and select right option:

	Column I		Column II
A.	Octopus	i.	Sea hare
B.	Aplysia	ii.	Tusk shell
C.	Dentalium	iii.	Devil fish
D.	Sepia	iv.	Cuttle fish

eg. of Mollusca

2

(1) A – ii, B – iii, C – iv, D – i

(2) A – iii, B – i, C – ii, D – iv

(3) A – i, B – ii, C – iv, D – iii

(4) A – iv, B – ii, C – i, D – iii

Question no. 122

AAYAM CAREER INSTITUTE

Which of the following is a common feature of prawn, butterfly and scorpion?

(1) Presence of jointed Appendages

(2) Body is covered by chitinous exoskeleton

(3) Flight mechanism with wings

(4) Both (1) and (2)

Question no. 123

AAYAM CAREER INSTITUTE

Which of the following is not a characteristic feature of Echinodermata?

(1) They are marine

(2) Larva having bilateral symmetry

(3) Water vascular system

(4) Stomochord in collar region

Hemi

4

Question no. 124

AAYAM CAREER INSTITUTE

Which of the following are correctly matched with respect to their taxonomic classification?

(1) Platypus, sea urchin, sea cucumber – Echinodermata

(2) Flying fish, cuttlefish, Jellyfish – Pisces

(3) Ascidia, Salpa, Amphioxus – Urochordata

(4) Butterfly, Scorpion, Kingcrab – Arthropoda

Question no. 125

AAYAM CAREER INSTITUTE

During muscle contraction which of the following will not occur: -

(1) Size of A-band remains the same

(2) Size of H-zone becomes smaller

(3) Size of I-band decreases

(4) Length of actin and myosin filament decreases

Question no. 126

AAYAM CAREER INSTITUTE

Head of humerus form joint with: -

(1) Glenoid cavity of coxal bone

(2) Acetabulum of scapula

(3) Glenoid cavity of scapula

(4) Acetabulum of coxal bone

3

Question no. 127

AAYAM CAREER INSTITUTE

Match the column:

	Column-I		Column-II
a.	Tarsals	i.	5 in number
b.	Metacarpals	ii.	8 in number
c.	Phalanges	iii.	14 in number
d.	Carpals	iv.	7 in number

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

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

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

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

Question no. 128

AAYAM CAREER INSTITUTE

Consider the following statements

A. Flame cells are excretory structures in flatworms

B. Green glands are excretory organs in crustacean

C. Columns of Bertini are the conical projections of renal pelvis into renal medulla between the renal pyramids

(1) B and C incorrect (2) A and B correct

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

Question no. 129

AAYAM CAREER INSTITUTE

Select the correct statement

(1) The ascending limb of the Henle's loop extends as the DCT

(2) The Juxtamedullary nephrons have reduced Henle's loop

(3) Vasa recta is well developed in cortical nephrons

(4) The glomerulus encloses the Bowman's capsule

Question no. 130

AAYAM CAREER INSTITUTE

The osmolarity gradient by counter current mechanism is caused by

(1) NaCl and K^+

(2) NaCl and H_2O

(3) NaCl and urea

(4) urea and K^+

3

Question no. 131

AAYAM CAREER INSTITUTE

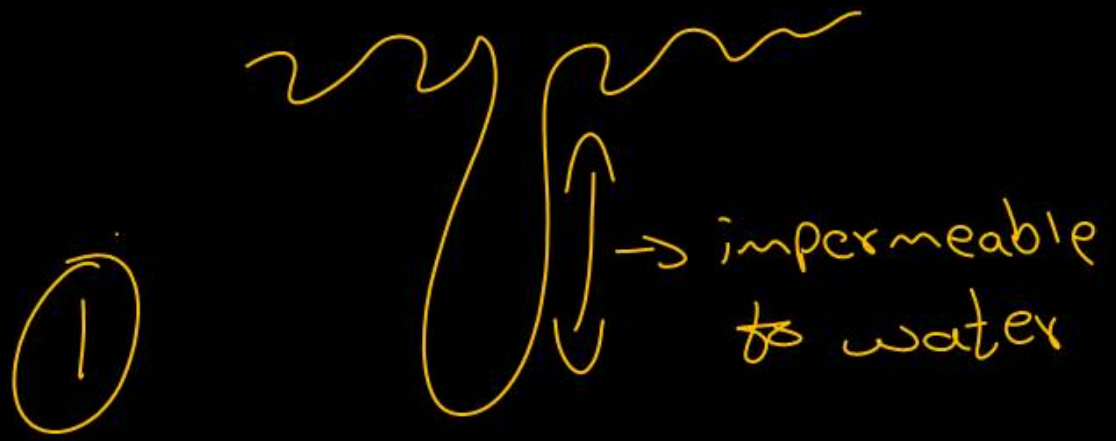
Water is reabsorbed in all parts of nephron except one

(1) Ascending limb of loop of Henle

(2) Disal convoluted tubule

(3) Proximal convoluted tubule

(4) Collecting duct



Question no. 132

AAYAM CAREER INSTITUTE

ICBN stands for

(1) International Classification of Biological Nomenclature

(2) International Class of Biological Nomenclature

(3) International Code for Botanical Nomenclature

(4) International Classification of Biological Naming

3

Question no. 133

AAYAM CAREER INSTITUTE

Among the following which is/are photosynthetic autotrophs?

(1) Archaebacteria
(2) Fungi
(3) Cyanobacteria
(4) All of the above

B.G.A.

3

Question no. 134

AAYAM CAREER INSTITUTE

Read the given statements and answer the question.

(i) It includes unicellular as well as multicellular fungi.

(ii) In multicellular forms, hyphae are branched and septate.

(iii) Conidiophore produces conidia (spores) exogenously in chain.

(iv) Sexual spores are produced endogenously in chain.

(v) They are coprophilous.

Identify the correct class of fungi which have all the above given characteristics.

(1) Phycomycetes (2) Sac fungi

(3) Club fungi (4) Fungi imperfecti

Question no. 135

AAYAM CAREER INSTITUTE

Match the class of fungi given in column I with their examples given in column II and choose the correct option

	Column-I (Class of fungi)		Column-II (Examples)
A.	Ascomycetes	I.	Rhizopus
B.	Basidiomycetes	II.	Penicillium
C.	Deuteromycetes	III.	Ustilago
D.	Phycomycetes	IV.	Alternaria

(1) A – iv, B – iii, C – i, D – ii

(2) A – ii, B – iii, C – iv, D – i

(3) A – iv, B – i, C – ii, D – iii

(4) A – iii, B – iv, C – ii, D – i

Question no. 136

AAYAM CAREER INSTITUTE

Which of the following are haploid in gymnosperm?

(1) Pollen grain, megaspore, root

(2) Pollen grain, megaspore, nucleus

(3) Megaspore mother cell, root, leaf

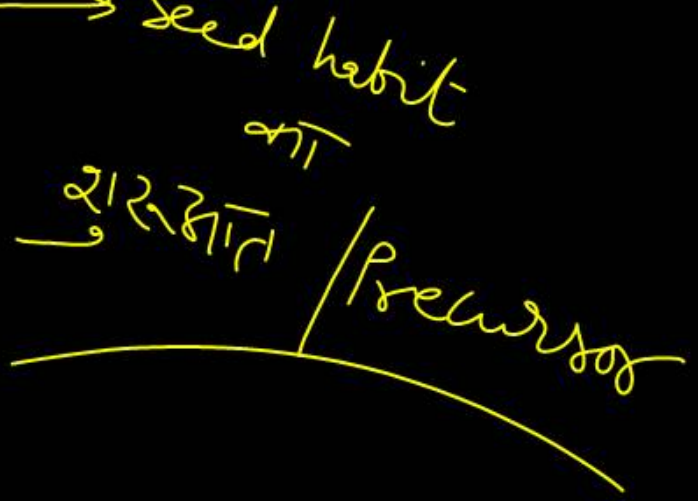
(4) Female gametophyte, Pollen grain, Megaspore

Question no. 137

AAYAM CAREER INSTITUTE

From evolutionary point of view, retention of female gametophyte with developing young embryo on the parent sporophyte for some time, is first observed in -

(1) Liverworts
(2) Mosses
(3) Pteridophytes
(4) Gymnosperms



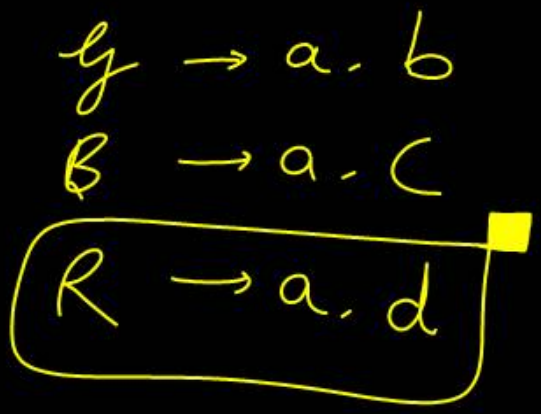
Question no. 138

AAYAM CAREER INSTITUTE

Which algae group has chlorophyll a and d?

(1) Chlorophyceae (2) Phaeophyceae

(3) Rhodophyceae (4) Xanthophyceae



Question no. 139

AAYAM CAREER INSTITUTE

Read the following statement carefully and choose the correct statement w.r.t. artifical system of classification –

A. It is based on morphology of chromosome.

B. Fossil evidence does not support this system.

C. They separated the closely related species.

D. Vegetative and Reproductive characters are easily affected by environment hence it is not acceptable.

(1) All are correct (2) Two are correct

(3) One is incorrect (4) All are incorrect

Question no. 140

AAYAM CAREER INSTITUTE

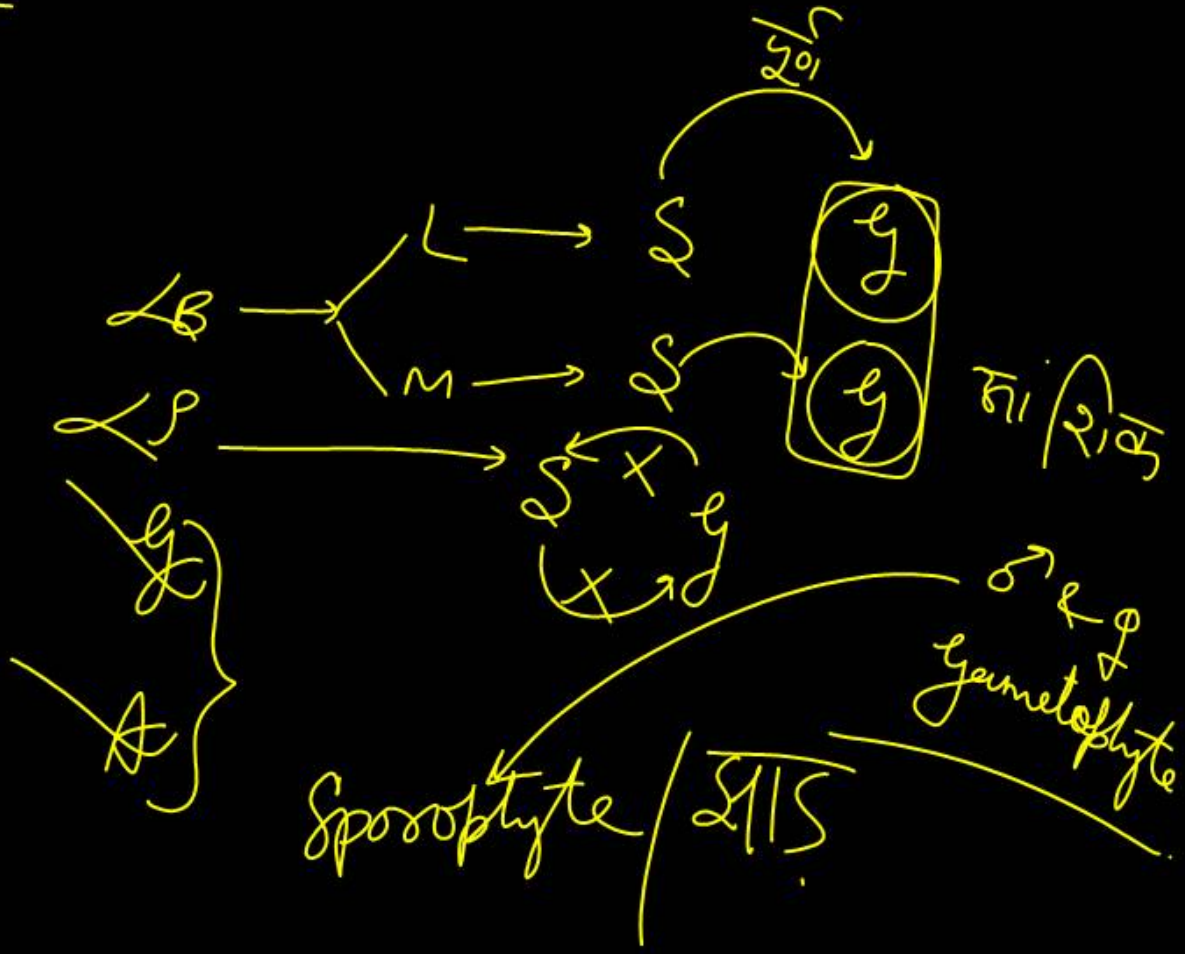
Gametophyte do not have independent free existence in -

(1) Pteridium

(2) Cycas

(3) Pinus

(4) Both (2) and (3)



Question no. 141

AAYAM CAREER INSTITUTE

Which of the following cannot be considered as character of osteichthyes.

Bony Fish

(1) Mouth is mostly terminal.

(2) Air bladder is present.

(3) In males pelvic fins bear claspers.

(4) Bony vertebral column.

3

Question no. 142

AAYAM CAREER INSTITUTE

Which one of the following statement is incorrect?

(1) All vertebrates are chordates but all chordates are not vertebrates.

(2) All vertebrates have 4 chambered heart.

(3) Kidneyes of vertebrates help in excretion and osmoregulation.

(4) Adult vertebrates have vertebral column.

Question no. 143

AAYAM CAREER INSTITUTE

Select the correct matching with respect to type of animals and their characteristic feature.

	Column I		Column II
A.	Ascidia	i.	Cutaneous respiration
B.	Osteichthyes	ii.	Tympanum represents ear
C.	Amphibians	iii.	Notochord present in tail
D.	Reptiles	iv.	Air bladder

(1) A – i, B – iv, C – ii, D – iii

(2) A – ii, B – i, C – iii, D – iv

(3) A – iii, B – iv, C – i, D – ii

(4) A – iv, B – i, C – iii, D – ii

Question no. 144

AAYAM CAREER INSTITUTE

Choose the correct option for the given table.

Organ	Phylum	Function
Parapodia	Annelida	A
B	Ctenophora	Locomotion
C	Mollusca	Rasping organ
Malpighian tubules	Arthropoda	D
Cnidoblasts	Coelenterata	E

(1) A – swimming, B – comb plates, C – radula, D – excretion, E – defence.

(2) A – defence, B – radula, C – comb plates, D – excretion, E – swimming.

(3) A – defence, B – radula, C – comb plates, D – swimming, E – excretion.

(4) A – protection, B – parapodia, C – visceral mass, D – locomotion, E – excretion.

Question no. 145

AAYAM CAREER INSTITUTE

Match the following list of animals (column I) with their level of organization (column II) and choose the correct option.

	Column I		Column II
A.	Organ level	i.	Pheretima
B.	Cellular level	ii.	Fasciola
C.	Tissue level	iii.	Spongilla
D.	Organ system level	iv.	Obelia

(1) A – iv, B – iii, C – i, D – ii

(2) A – iv, B – ii, C – iii, D – i

(3) A – ii, B – iv, C – iii, D – i

(4) A – ii, B – iii, C – iv, D – i

Question no. 146

AAYAM CAREER INSTITUTE

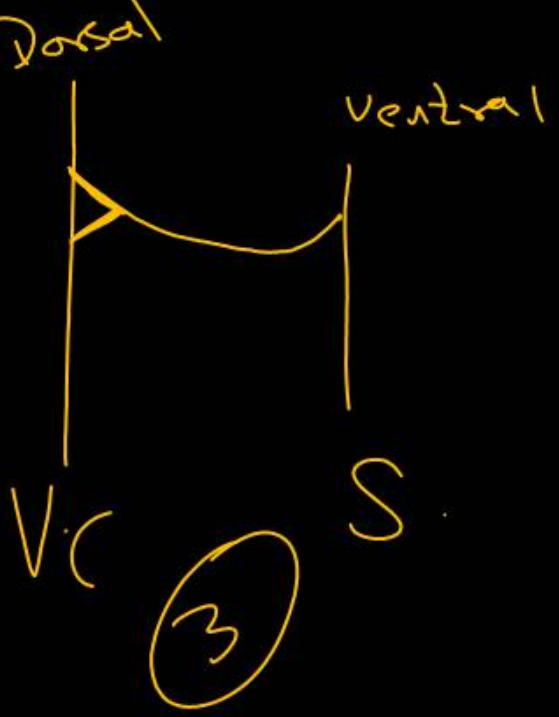
The human ribs are termed as bicephalic because:

(1) They have two articulations surfaces on their ventral end

(2) They have one articulation surface on their ventral end and one on dorsal end

(3) They have two articulations surfaces on their dorsal end

(4) They have two articulation surfaces on their ventral end and two on dorsal end



Question no. 147

AAYAM CAREER INSTITUTE

Identify the given figure and its labeling :-

(1) Thin filament

A - Troponin, B - F-actin, C - Tropomyosin

(2) Thick filament

A - Troponin, B -Tropomyosin, C - F-actin

(3) Thick filament,

A - Troponin, B - F-actin, C- Tropomyosin

(4) Thin filament

A - Troponin, B -Tropomyosin, C - F-actin

Troponin.

Actin / Thin Filament.

4

Question no. 148

AAYAM CAREER INSTITUTE

Choose the incorrect statement for myosin?

(1) It is formed by two polypeptide chain

(2) Its globular head has active ATPase enzyme.

(3) Myosin is made up of many monomeric proteins called meromyosin.

(4) Cross arm is present in HMM of myosin.

Question no. 149

AAYAM CAREER INSTITUTE

The characteristic that is shared by urea, uric acid and ammonia is/are

A. They are nitrogenous wastes

B. They all need very large amount of water for excretion

C. They all are equally toxic

D. They are produced in the kidneys

(1) A only (2) A and C

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

Question no. 150

AAYAM CAREER INSTITUTE

Mark the correct statement

(1) Maximum reabsorption takes place in the Henle's loop.

(2) The ascending limb of loop of Henle is permeable to water.

(3) Maximum reabsorption of Na^+ and water takes place in the DCT.

(4) Tubular secretion helps in maintaining pH and ionic balance.

Question no. 151

AAYAM CAREER INSTITUTE

Which one of the following statements in regard to the excretion by the human kidneys is correct?

(1) Descending limb of loop of henle is impermeable to water.

(2) Distal convoluted tubule is incapable of reabsorbing HCO_3^-.

(3) Nearly 99 percent of the glomerular filtrate is reabsorbed by the renal tubules.

(4) Ascending limb of loop of Henle is impermeable to electrolytes.

Question no. 152

AAYAM CAREER INSTITUTE

Which of the following is the correct name?

(1) Solanum tuberosum

(2) SolanumTubersoum

(3) Solamumtuberosum Linn

(4) All of the above

Question no. 153

AAYAM CAREER INSTITUTE

Number of common characters are highest in the category.

(1) Order
(2) Genus
(3) Family
(4) Kingdom

Question no. 154

AAYAM CAREER INSTITUTE

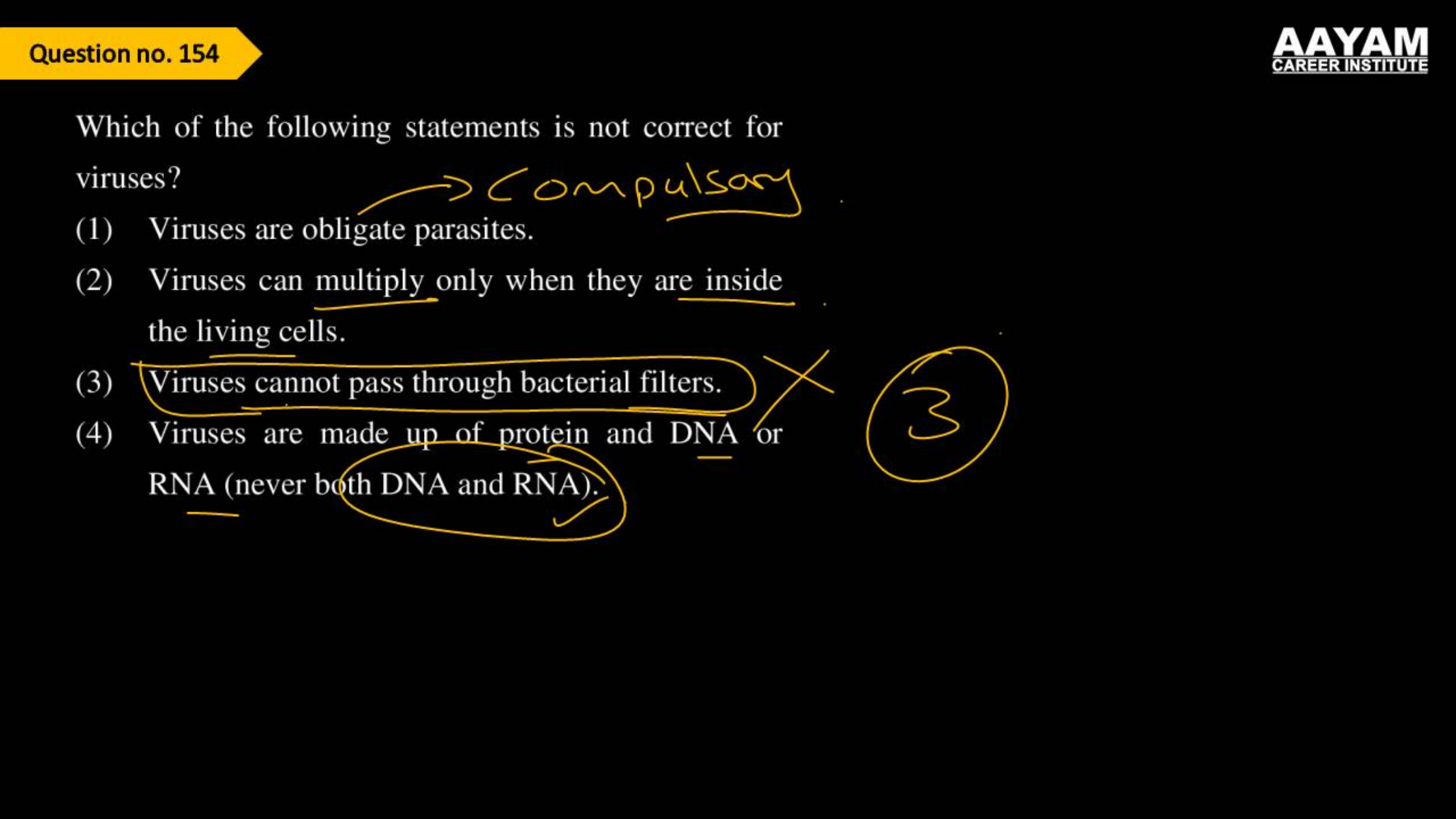
Which of the following statements is not correct for viruses?

(1) Viruses are obligate parasites.

(2) Viruses can multiply only when they are inside the living cells.

(3) Viruses cannot pass through bacterial filters.

(4) Viruses are made up of protein and DNA or RNA (never both DNA and RNA).



Question no. 155

AAYAM CAREER INSTITUTE

Which of the following group of kingdom Protista is being described in the statements given below?

(i) This group includes diatoms and golden algae.

(ii) They are microscopic and float passively in water currents (plankton).

(iii) Most of them are photosynthetic.

(iv) They have deposits in their habitat; this accumulation over billion of years is referred to as diatomaceous earth.

(1) Dinoflagellates (2) Chrysophytes

(3) Euglenoids (4) Slime moulds

Question no. 156

AAYAM CAREER INSTITUTE

Dikaryon formation is the characteristic feature of

(1) Ascomycetes and basidiomycetes.

(2) Phycomycetes and basidiomycetes.

(3) Ascomycetes and phycomycetes.

(4) Phycomycetes and zygomycetes.

Question no. 157

AAYAM CAREER INSTITUTE

Which of the following is not an example of mosses?

(1) Funaria

(2) Polytrichum

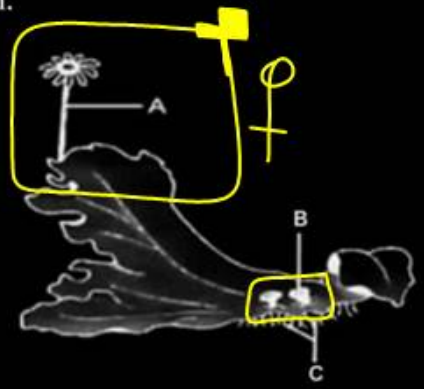
(3) Sphagnum

(4) Marchantia

Question no. 158

AAYAM CAREER INSTITUTE

Choose the correct labeling for the given below diagram.



(1) A – Antheridiophore, B – Gemma cup,
C – Rhizoids.

(2) A – Archegoniophore, B – Gemma cup,
C – Rhizoids.

(3) A – Antheridiophore, B – Gemma cup,
C – Roots.

(4) A – Archegoniophore, B – Capsule,
C – Dorsal surface.

Question no. 159

AAYAM CAREER INSTITUTE

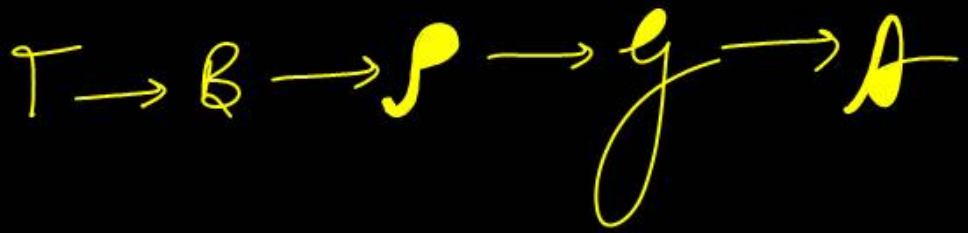
Which one is the most advanced from evolutionary point of view?

(1) Selaginella

(2) Funaria

(3) Chlamydomonas

(4) Pinus



Question no. 160

AAYAM CAREER INSTITUTE

Which of the following statement (s) is / are true false.

A. In gymnosperms, an external water is required for transport of male gametes.

B. Ginkgo has naked seeds.

C. In Cycas, stem is branched.

D. Coralloid roots have a symbiotic association with cyanobacteria like Nostoc and Anabaena.

(1) A and B are true, C and D are false.

(2) A and C are true, B and D are false.

(3) A and D are true, B and C are false.

(4) B and D are true, A and C are false.

Question no. 161

AAYAM CAREER INSTITUTE

Mark the options with wrong combination of the animal phylum and its unique characteristic.

(1) Porifera – water transport or canal system.

(2) Mullusca – Rasping organ for feeding called radula.

(3) Aschelminthes – Pseudocoelomate.

(4) Ctenophora – Polyp and medusa forms.

Coelen

Question no. 162

AAYAM CAREER INSTITUTE

Read the following statement and mark the option with correct statements.

A. Metagenesis is observed in helminthes.

B. Echinoderms are triploblastic and coelomate animals.

C. Round worms have organ system level of body organization.

D. Comb plates present in ctenophores help in defence.

E. Water vascular system is characteristic of Echinoderms.

(1) A, D and E

(2) C, D and E

(3) A, B and C

(4) B, C and E

Question no. 163

AAYAM CAREER INSTITUTE

The water vascular system of Echinodermates help in-

(1) Locomotion

(2) Capture and transport of food

(3) Respiration

(4) All of these

Question no. 164

AAYAM CAREER INSTITUTE

Which one of the following statement is correct regarding Aschelminthes.

(1) They all are viviparous ✗

(2) They are monoecious ✗

(3) They all have direct development and no larva ✗

(4) They have complete alimentary canal with a well developed muscular pharynx. ✓

Tube within Tube

Question no. 165

AAYAM CAREER INSTITUTE

Match the column I with column II and choose the correct answer.

	Column I		Column II
A.	Incomplete digestive system	i.	Sponges
B.	Cellular level of organization	ii.	Coelenterates
C.	Radial symmetry	iii.	Annelids
D.	Pseudocoelomate	iv.	Platyhelminthes
E.	Metamerism	v.	Aschelminthes

(1) A – iii, B – iv, C – i, D – ii, E – v

(2) A – iv, B – v, C – ii, D – iii, E – i

(3) A – iv, B – i, C – ii, D – v, E – iii

(4) A – i, B – ii, C – iii, D – iv, E – v

Question no. 166

AAYAM CAREER INSTITUTE

Which is correctly matched: -

(1) Heart - Involuntary, Unstriated muscle

(2) Blood vessels- Involuntary, Smooth muscle

(3) Biceps of forearm - Voluntary, Smooth muscle

(4) Limb muscles - Voluntary, Smooth muscle

2

Question no. 167

AAYAM CAREER INSTITUTE

Points which are correct with respect to cardiac muscle?

(i) Have dark and light bands

(ii) Involuntary in nature

(iii) Similar to smooth muscle in structure

(iv) Muscle fibres are branched.

(v) Get fatigued after a long period

(1) (i), (ii), (iii)

(2) (i), (ii), (iv)

(3) (iii), (iv), (v)

(4) (i), (iii), (v)

Question no. 168

AAYAM CAREER INSTITUTE

Mark the wrongly matched pair-

(1)	Red fibre	Less sarcoplasmic reticulum
(2)	White fibre	Anaerobic muscle
(3)	Light band	Myosin filaments
(4)	Dark band	Anisotropic band

Question no. 169

AAYAM CAREER INSTITUTE

If Henle's loop is removed from nephron which of the following is to be expected?

(1) The urine will be more diluted

(2) There will be no urine formation

(3) The urine will have more concentration

(4) There will be hardly any change in the quality and quantity of urine formed

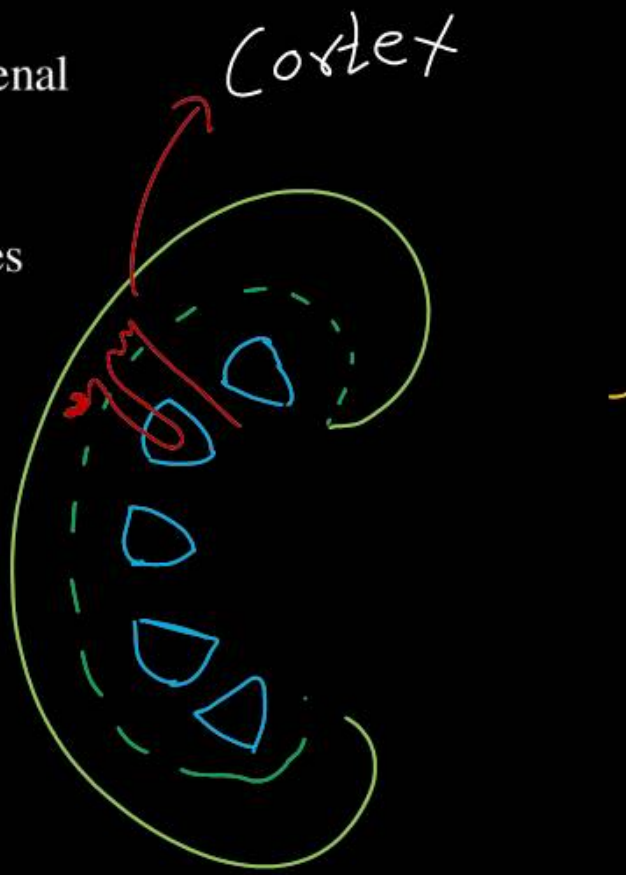
Question no. 170

AAYAM CAREER INSTITUTE

Which one of the following is not a part of a renal pyramid?

(1) Vasa Recta (2) Convoluted tubules

(3) Collecting ducts (4) Loop of Henle



Question no. 171

AAYAM CAREER INSTITUTE

Reabsorption of water through the tubules mainly occurs by

(1) Osmosis (2) Active transport

(3) Facilitated diffusion (4) Carrier transport

1

Question no. 172

AAYAM CAREER INSTITUTE

What is the correct sequence of taxonomic categories is?

(1) Class - Phylum - Order - Familiy - Genus -Species ✗

(2) Division - Class - Family – Order - Genus -Specie ✗

(3) Division - Class - Order - Familiy - Genus -Specie ✓

(4) Phylum - Order - Class - Familiy - Genus -Specie ✗

(3)

K P/D C O F G S

Question no. 173

AAYAM CAREER INSTITUTE

Select the incorrect statement about prokaryotic ribosomes.

(1) 50S and 30S subunits unit to form 70S ribosomes.

(2) Polysome/polyribosome consists of many ribosomes only.

(3) Ribosome is the site of protein synthesis.

(4) Polysome indicate the synthesis of identical polypeptide in multiple copies.

Protein

Question no. 174

AAYAM CAREER INSTITUTE

Which of the following is not currently a major cause of species extinctions?

(1) Habitat destruction

(2) Climate change

(3) Over-exploitation

(4) Introduction of alien species

Question no. 175

AAYAM CAREER INSTITUTE

The polymerase enzyme used in PCR is

(1) DNA polymerase I

(2) Taq polymerase

(3) Reverse transcriptase

(4) Restriction endonuclease

Question no. 176

AAYAM CAREER INSTITUTE

Given below are two statements:

Statement I : Parturition is induced by a complex neuroendocrine mechanism.

Statement II : Oxytocin acts on the uterine muscle and causes stronger uterine contractions.

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

(1) Both statement I and statement II are correct.

(2) Both statement I and statement II are incorrect.

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

(4) Statement I is incorrect but statement II is correct.

Question no. 177

AAYAM CAREER INSTITUTE

Read the statements regarding frog. Which of the statements is/are correct?

A. The medulla oblongata passes out through foramen magnum and continues into spinal cord.

B. Vasa efferentia are 10 – 12 in number that arise from testes.

C. Ovaries have no functional connection with kidneys.

D. Frogs are uricotelic.

E. A mature female can lay 250 to 300 ova at a time.

(1) B, C and E are true. (2) A and B are true.

(3) A, B and C are true. (4) B, C and D are true.

Question no. 178

AAYAM CAREER INSTITUTE

Select the correct route for the passage of sperms in male frogs :

(1) Testes → Vasa efferentia → Kidney → Seminal Vesicle → Urinogential duct → Cloaca

(2) Testes → Vasa efferentia → Bidder's canal → Ureter → Cloaca

(3) Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogential duct → Cloaca

(4) Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogential duct → Cloaca

3

Question no. 179

AAYAM CAREER INSTITUTE

Proventriculus of cockroach :

(1) Represents the muscular heart chamber

(2) Is gizzard

(3) Has an outer layer of thick circular muscles and also a thick inner cuticle.

(4) Both (2) and (3)

Malpighian tubules in cockroach

(1) Are attached to gizzard

(2) Convert nitrogenous waste products into uric acid so, are uricotelic.

(3) Lie at the junction of foregut and midgut

(4) Remain isolated from haemolymph

2