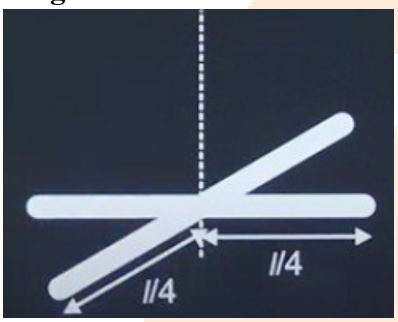
JEE-Main-02-04-2025 (Memory Based)
[MORNING SHIFT]

Physics

Question: The moment of inertia of a uniform rod of mass m and length l is α when rotated about an axis passing through centre and perpendicular to the length. If the rod is broken into equal halves and arranged as shown, than the moment of inertia about the given axis is



Options:
(a) 2α
(b) α/4
(c) 4α
(d) α
Answer: (b)

Question: The wavefront of a wave is a wave x + y + z = const. Find the angle which direction of wave of propagation makes with x axis
Options:
(a) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$
(b) $\cos^{-1}\left(\frac{1}{2\sqrt{3}}\right)$
(c) $\cos^{-1}\left(\frac{1}{\sqrt{2}}\right)$
(d) $\cos^{-1}\left(\frac{1}{2}\right)$
Answer: (a)

Question: Two point charges q and 9q are placed at distance of l form each other. Then the electric field is zero at a

Options:

(a) Distance $\frac{l}{4}$ from charge 9q

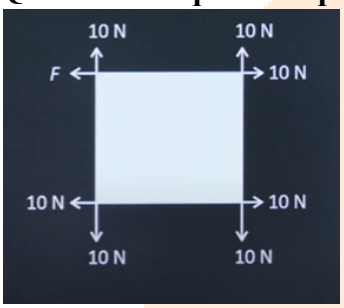
(b) Distance $\frac{3l}{4}$ from charge q

(c) Distance $\frac{l}{3}$ from charge 9q

(d) Distance $\frac{l}{4}$ from charge q

Answer (d)

Question: A square shape lamina of mass M kg is at rest. Find value of F (in N).



Options:

(a) 10 N

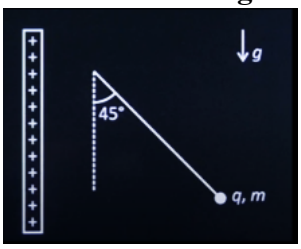
(b) 15 N

(c) 20 N

(d) 30 N

Answer: (a)

Question: The figure shows a infinite plane having uniform charge density σ and a small charged particle having charge q and mass m suspended by a light insulting thread. Find σ if the charge is in equilibrium.



Options:

(a) $\frac{2\varepsilon_0 mg}{q}$

(b) $\frac{\varepsilon_0 mg}{2q}$

(c) $\frac{2q}{\varepsilon_0 mg}$

(d) $\frac{2q\varepsilon_0}{mg}$

Answer: (a)

Question: Find the ratio of $\left(\gamma = \frac{C_p}{C_v}\right)$ **for two gases having degree of freedoms f = 3 and f = 5.**

Options:

(a) 21/25

(b) 3/7

(c) 25/21

(d) 7/3

Answer: (c)

Question: What is the SI unit of viscosity, intensity of work & pressure gradient?

Options:

(a) Pa.s, Watt, Pa/m²

(b) Watt, Pa/m, Pa

(c) Pa.s, Watt/m², Pa.m

(d) Pa.s, Watt/m², N/m³

Answer: (d)

Question: Find the ratio of magnetic field at the centre of circular coil to that at a distance of $\frac{3R}{4}$ **from the centre on the axis of the coil.**

Options:

(a) $\frac{64}{125}$

(b) $\frac{125}{64}$

(c) $\frac{8}{5}$

(d) $\frac{5}{8}$

Answer: (b)

Question: A current carrying wire is in form of a circle of radius R. Find ratio of magnetic field at centre to the magnetic field at axial point at a distance R from it's centre.

Options:

(a) 2

(b) $2\sqrt{2}$
(c) $\sqrt{3}$
(d) $\frac{1}{\sqrt{2}}$
Answer: (b)

Question: A Two SHMs are superimposed on a particle moving along x axis as x_1 = A sin ωt and x_2 = A sin(ωt + π/3) then acceleration of particle is (given ω = 5)
Options:
(a) -25 A sin(5t + π/3)
(b) -25 A sin(5t + π/6)
(c) -25√3 A sin(5t + π/6)
(d) 25√3 A sin(5t - π/6)
Answer: (c)

Question: There is a metal plate with work function Φ a photon of frequency v incident on it. An electron is rejected normally from point A with maximum Kinetic energy and a magnetic field perpendicular to initial velocity and parallel to metallic plate exists throughout the path. The electron strikes plate at B. Find the distance between point A & B
Options:
(a) $\frac{hv-\phi}{eB}$
(b) $\frac{\sqrt{2m(hv-\phi)}}{eB}$
(c) $\frac{2\sqrt{2m(hv-\phi)}}{eB}$
(d) $\frac{m(hv-\phi)}{eB}$
Answer: (c)

Question: What is the ratio of radius of nth orbit in H, He^+ and Li^{+2}? (Assume Bohr model is applicable)
Options:
(a) 6 : 3 : 1
(b) 6 : 3 : 2
(c) 3 : 6 : 2
(d) 4 : 3 : 2
Answer: (b)

Question: Find the dimension of $\frac{a}{b^2}$ from the given formula $\left(P+\frac{a}{V^2}\right)(V-b)=RT$ where symbols have their usual meaning.
Options:

(a) ML^3T^{-2}
(b) $ML^{-1}T^{-2}$
(c) ML^3T^{-1}
(d) MLT
Answer: (b)

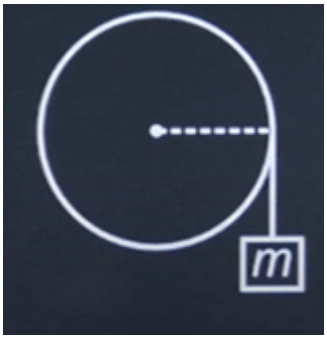
Question: Match the List-I with the List-II.

	List-I		List-II
(i)	Coefficient of viscosity	(a)	$M^0L^0T^0$
(ii)	Strain	(b)	$M^{-1}LT^2$
(iii)	Compressibility	(c)	$ML^{-2}T^{-2}$
(iv)	Pressure gradient	(d)	$ML^{-1}T^{-1}$

Options:
(a) (i)-(a), (ii)-(c), (iii)-(d), (iv)-(b)
(b) (i)-(d), (ii)-(a), (iii)-(b), (iv)-(c)
(c) (i)-(b), (ii)-(d), (iii)-(c), (iv)-(a)
(d) (i)-(c), (ii)-(b), (iii)-(d), (iv)-(a)
Answer: (b)

Question: Speed of a boat in still water is 27 km/hr and speed of river flow is 9 km/hr.If boat rows at angle 150° with the river flow and it takes 30 seconds to cross the river. Find width of the river.
Options:
(a) 56 m
(b) 100 m
(c) 225 m
(d) 112. 5 m
Answer: (d)

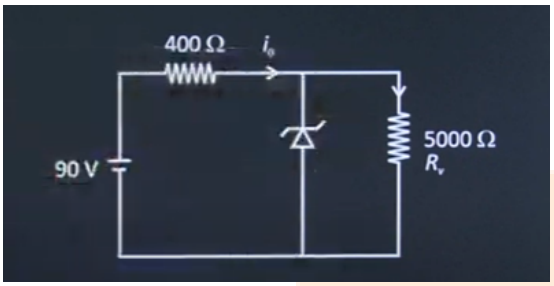
Question: The figure shows a dice of mass 5 kg and radius 10 cm having axis fixed and free to rotate about its axis. A 2 kg block is suspended with the help of a string wound the disc and released from rest. The angular velocity of the disc when the block moves by 0.2 m is (Take g = 10 ms^2)



Options:
(a) 40/9 rad/s

(b) 40/3 rad/s
(c) 30/7 rad/s
(d) 28/5 rad/s
Answer: (b)

Question: Zener the figure shows an electric diode with rotes circuit with a voltage $V_z = 30V$ find the current through the diode in mA



Options:
(a) 6 mA
(b) 150 mA
(c) 144 mA
(d) 154 mA
Answer: (c)

Question: In a single slit diffraction using light of wavelength λ, the 2nd minima is formed at θ_1 and 3rd maxima is at θ_2. If $\theta_1 + \theta_2 = 30°$, then the slit width is
Options:
(a) $\frac{66\lambda}{\pi}$
(b) $\frac{22\lambda}{\pi}$
(c) $\frac{33\lambda}{\pi}$
(d) $\frac{11\lambda}{\pi}$
Answer: (c)

Question: A wire having length 2 m having Young modulus Y = 2×10^{11} N/m². Axial strain is 0.2 and Poisson ratio is 0.01 for a deformation. Find energy density for elastic energy stored in rod.
Options:
(a) 2×10^9 J/m³
(b) 4×10^9 J/m³
(c) 10^9 J/m³
(d) 5×10^8 J/m³
Answer: (b)

Question: Correct relation between permeability of vacuum μ_0, relative permeability μ_r, permeability of medium μ and magnetic susceptibility ✗ is

Options:

(a) $\mu = ✗\mu_0$

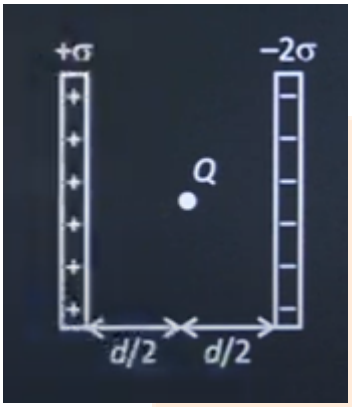
(b) $\mu = (\mu_{r+1})\mu_0$

(c) $\mu = (1 + ✗)\mu_0$

(d) $\mu = ✗(\mu_{r+1})$

Answer: (c)

Question: Two uniformly charged sheets are shown in the figure. Find net force on the charge Q placed symmetrically between the plates.



Options:

(a) $\frac{3\sigma Q}{\varepsilon_0}$

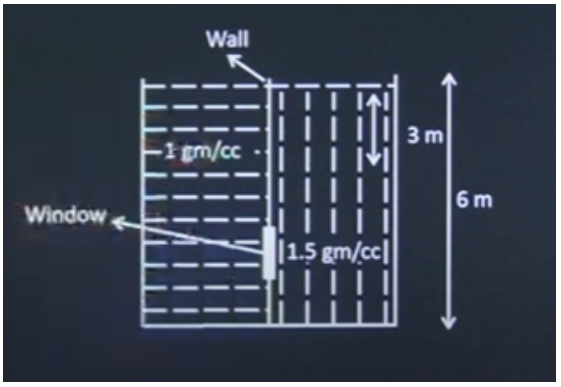
(b) $\frac{2\sigma Q}{\varepsilon_0}$

(c) $\frac{3}{2}\frac{\sigma Q}{\varepsilon_0}$

(d) Zero

Answer: (c)

Question: A concrete wall represents two liquids of densities 1 gm/cc and 1.5 gm/cc as shown. There is a square window of area 100 cm² of wood instead of concrete. Assuming no friction, find extend force needed to hold the window.



Options:

(a) 400 N
(b) 300 N
(c) 150 N
(d) 250 N
Answer: (c)

Question: The figure shows a spherical surface of radius 40 cm separating two mediums of refractive indices $\mu_1 = 1$ and $\mu_2 = 1.5$. A point object in the medium μ_1 at a distance 20 cm from the separation forms an image whose distance from the separation is ✘ cm, where ✘ is
Answer: (40)

JEE-Main-02-04-2025 (Memory Based)

[MORNING SHIFT]

Chemistry

Question: Which of the following is correct order of basic strength of amines in aqueous medium

Options:

(a) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3\ N > NH_3$

(b) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N > NH_3$

(c) $CH_3NH_2 > NH_3 > (CH_3)_2NH > (CH_3)_3N$

(d) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2 > NH_3$

Answer: (b)

Question: Which of the following statement(s) is correct is/are for the adiabatic process?

A. Molar heat capacity is zero.

B. Molar heat capacity is infinite.

C. Work done on gas is equal to increase in internal energy

D. The increase in temperature results in decrease in internal energy

Options:

(a) A and C only

(b) B and C only

(c) A and D only

(d) C & D only

Answer: (a)

Question: In group 17, which property does not follow a regular trend?

Options:

(a) Electron affinity

(b) Ionisation energy

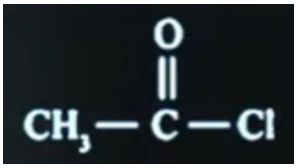
(c) Covalent radii

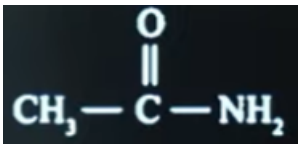
(d) Ionic radii

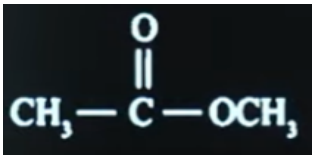
Answer (a)

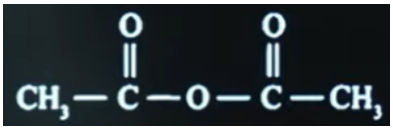
Question: Which of the following molecules hydrolysis fast

Options:

(a) 

(b) 

(c) 

(d) 

Answer: (a)

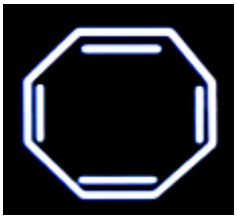
Question: Which is correct option about radius of nth orbit in hydrogen
Options:
(a) Radius of 3rd orbit is 9 times of radius 1st orbit
(b) Radius of 4th orbit is 4 times of radius of 1st orbit
(c) Radius of 8th orbit is 4 times of radius of 2nd orbit
(d) Radius of 6th orbit is 2 times of radius of 3rd orbit
Answer: (a)

Question: Among the given compounds
NH_3, NF_3, ClF_3, XeF_2, SO_2
Find the hybridisation of the compound which is polar highest number of lone pairs on central atom.
Options:
(a) sp^3d
(b) sp^3d^2
(c) sp^3d^3
(d) sp^3d^1
Answer: (a)

Question: Which of the following is antiaromatic?
Options:
(a) 

(b) 

(c) 

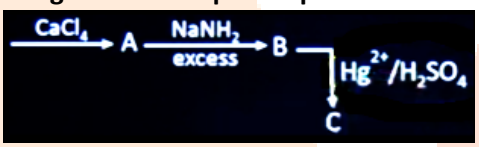
(d) 

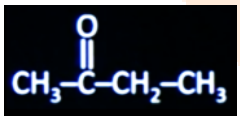
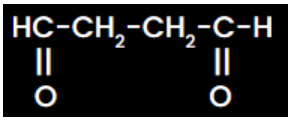
Answer: (b)

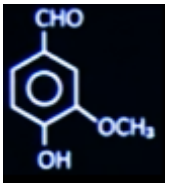
Question: Identify correct statement is:
Options:
(a) All Natural occurring amino acid are optically active
(b) All Natal occurring amino acid except Glycine have one chiral center.
(c) All Natural occurring amino acid except proline have primary amine Functional group
(d) All Natural occurring amino acid are neutral amino acid.
Answer: (c)

Question: What is the ratio of radius of n^{th} orbit in H, He^{+} and Li^{+2}? (Assume Bohr model is applicable)
Options:
(a) 6 : 3 : 1
(b) 6 : 3 : 2
(c) 3 : 6 : 2
(d) 4 : 3 : 2
Answer: (b)

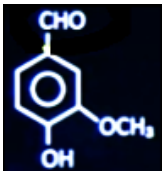
Question: In following reaction sequence product C is



But-2-ene + Br_2
Identity C,
Options:
(a) 
(b) CH_3-CH_2-CH_2-CHO
(c) CH_3-CH_2-CH_2-CH_2-OH
(d) 
Answer: (a)

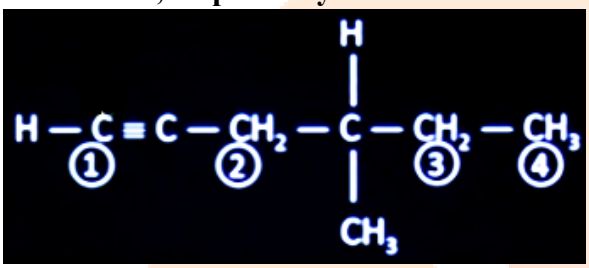
Question: Statement-I: 

reacts with NaOH to give a compound which gives positive Tollen's test.

Statement-II: 

react with NaOH to give self-aldol condensation reaction.
In the light of above statements, choose the correct options.
Options:
(a) Statement-I and Statement-II both are correct
(b) Statement-I is correct and Statement-II is incorrect
(c) Statement-II is correct and Statement-I is incorrect
(d) Statement-I and Statement-II both are incorrect
Answer: (d)

Question: Which of the following carbon atom, forms the least stable and most stable free radical, respectively.



Options:
(a) 1, 3
(b) 1, 4
(c) 1, 2
(d) 3, 4
Answer: (a)

Question: Consider the following statements
Statement-I: Metallic radius of AI is less than that of Ga.
Statement-II: Ionic radius of Al^{3+} is less than that of Ga^{3+}
Options:
(a) Statement-I and Statement-II both correct
(b) Statement-I and Statement-II both incorrect
(c) Statement-I is incorrect Statement-II is correct
(d) Statement-I and Statement-II, both one incorrect
Answer: (c)

Question: Given below are two statements.
Statement-I: All naturally occurring amino acids are optically active except glycine.
Statement-II: All amino acids are optically active. In light of the above statement, choose the most appropriate option
Options:
(a) Statement-I is true, Statement-II is false
(b) Both Statement-I and Statement-II are true
(c) Both Statement-I and statement-II are false
(d) Statement-I is false while statement-II is true
Answer: (a)

Question: In the complex $[M(CN_6)]^{4-}$. If M is Mn, Fe, Co calculate total number of electrons in e_g orbitals?
Options:

Answer: (1)

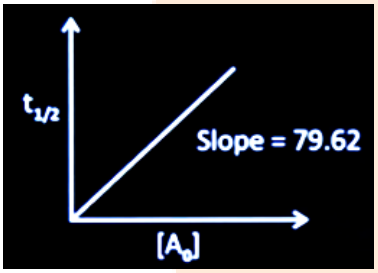
Question: Vapour pressure of pure liquid A is 200 mm Hg .
If 1 mol of A and 3 mol of B are mixed. Assuming solution to be ideal, find the vapour pressure of pure liquid 'B', if total pressure of solution is 500 mm Hg

Answer: (600)

Question: 100 g $CaCO_3$ when reacted with 0.19 mole of HCl then the moles of $CaCl_2$ formed is $P \times 10^{-3}$ mol.
Find P?

Answer: (95)

Question: In the following graph between $t_{1/2}$ and initial concentration $[A_0]$. If slope of the graph is 79.62 M^{-1} min. and initial concentration si 2.5 M. Find the concentration of A after 10 min



Answer: (2)

JEE-Main-02-04-2025 (Memory Based)

[MORNING SHIFT]

Maths

Question: Find the maximum value of n such that 50! is divisible by 3^n.

Options:

(a) 22

(b) 16

(c) 5

(d) 1

Answer: (22)

$$\left[\frac{50}{3}\right] + \left[\frac{50}{9}\right] + \left[\frac{50}{27}\right]$$

$$= 16 + 5 + 1 = 22$$

$$n = 22$$

Question: Let $P_n = \alpha^n + \beta^n$, $P_{10} = 123$, $P_9 = 76$, $P_8 = 47$ and $P_1 = 1$, the quadratic equation whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.

Options:

(a) $x^2 + x - 1 = 0$

(b) $x^2 - 2x + 1 = 0$

(c) $x^2 + x - 2 = 0$

(d) $x^2 - x - 2 = 0$

Answer: (a)

$ax^2 + bx + c = 0 \quad b = -a$

$x^2 - x + c = 0$

$123 - 76 + c(47) = 0 \quad (P_{10} - P_9 + cP_8 = 0)$

$c = -1$

$x^2 - x - 1 = 0$ (Equation with roots α & β)

$\text{Req eq} : x^2 + x - 1 = 0$ (Equation with roots $\frac{1}{\alpha}$ and $\frac{1}{\beta}$)

Question: The total number of 10 digits sequences formed by only {0, 1, 2} where 1 should be used at least 5 times and 2 should be used exactly three times, is

Options:

(a) 3250

(b) 3680

(c) 3480

(d) 3840

Answer (c)

$^{10}C_3 \times [^7C_5 + ^7C_6 + ^7C_7]$

$= \frac{10\times9\times8}{6}[21+7+1]$

$= 120 \times 29$

$= 3480$

Question: Let $a_1, a_2, a_3, ...$ is an A.P. and $\sum_{k=1}^{12} a_{2k-1} = -\frac{72}{5}a_1$ and $\sum_{k=1}^{n} a_{k=0}$. Then the value of n is

Options:

(a) 10

(b) 13

(c) 11

(d) 8

Answer: (c)

$a_1 + a_3 + a_5 - - + a_{23} = -\frac{72}{5}a_1$

$\frac{12}{2}[2a_1 + 11.2d] = -\frac{72}{5}a_1$

$10a_1 + 110\,d = -12\,a_1$

$22a_1 + 110\,d = 0$

$a_1 + 5d = 0$

$2a_1 + 10d = 0$

$\frac{n}{2}[2a + (n-1)d] = 0$

$n = 11$

Question: Number of solutions in [-2π,2π] for equation

$$2\sqrt{2}\cos^2\theta + \left(2-\sqrt{6}\right)\cos\theta - \sqrt{3} = 0.$$

Options:

(a) 4

(b) 2

(c) 6

(d) 8

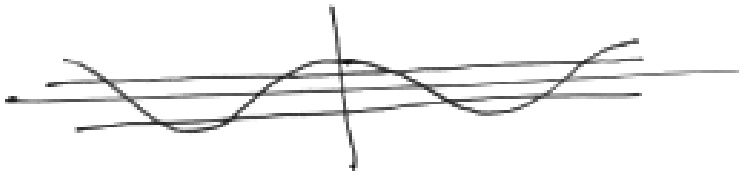
Answer: (d)

$$2\sqrt{2}c^2 + \left(2-\sqrt{6}\right)c - \sqrt{3} = 0$$

$$2c\left(\sqrt{2}c+1\right) - \sqrt{3}\left(\sqrt{2}c+1\right) = 0$$

$$c = \frac{\sqrt{3}}{2}, \frac{-1}{2}$$

= 8



Question:Given the equation of a hyperbola $H: \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and its directrix is $x = \sqrt{\frac{10}{81}}$ with a focus at (√10.0), then find the value of 9(e + l^2), where l is length of latus rectum is

Options:

(a) 2697
(b) 2597
(c) 2487
(d) 2587

Answer: (d)

$\frac{a}{e} = \sqrt{\frac{10}{81}}\ ae = \sqrt{10}$

$a^2 = \frac{10}{9},\ e^2 = \frac{9}{10} = 9$

$l = 2a\left(e^2 - 1\right) = 2 \times \sqrt{\frac{10}{9}}\,(8)$

$l^2 = 4 \times \frac{10}{9} \times 64$

$9\left(e + l^2\right) = 9\left[3 + \frac{2560}{9}\right] = 2587$

Question: If a twice differentiable function f satisfies *f'(x)=f(x)* such that *f(0)= ½ f'(0)*. Then find $f''\left(\frac{\pi}{3}\right)$.

Options:

(a) $e^{\frac{\pi}{3}}$

(b) $\frac{e^{\frac{\pi}{3}}}{2}$

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

(d) $\frac{e^{\frac{2\pi}{3}}}{2}$

Answer: (b)

$f'(x) = f(x)$

$\frac{dy}{dx} = y$

$dy = x + c$

$y = ke^x$

$f(x) = ke^x$

$f(0) = k = \frac{1}{2}$

$f(x) = e^{\frac{x}{2}}$

$f(0) = \frac{1}{2} = f\prime(0)$

$f\prime\prime(x) = ke^x$

$f\prime\prime\left(\frac{\pi}{3}\right) = ke^{\frac{\pi}{3}}$

$= \frac{e^{\frac{\pi}{3}}}{2}$

Question: Let the system of equations,3x - y + βz = 3, 2x + αy + z =-3 and x+ y+4z = 4 has infinite solutions, then 22β -9α equals to

Options:

(a) 165

(b) 164

(c) 163

(d) 162

Answer: (b)

$$\begin{vmatrix} 3 & -1 & 3 \\ 2 & \alpha & -3 \\ 1 & 1 & 4 \end{vmatrix} = 0$$

$$3(4\alpha + 3) + 1(11) + 3(2 - \alpha) = 0$$

$$12\alpha + 9 + 11 + 6 - 3\alpha = 0$$

$$9\alpha = -26$$

$$\begin{vmatrix} 3 & 3 & \beta \\ 2 & -3 & 1 \\ 1 & 4 & 4 \end{vmatrix} = 0$$

$$3(-12-4)-3(7)+\beta(11)=0$$

$$-48-21=-11\beta$$

$$\frac{-69}{-11}=\beta=\frac{69}{11},\ 22\beta=138$$

$$22\beta-9\alpha$$

$$=138+26$$

$$=164$$

Question: PQ is focal chord of $y^2 = 4x$ making an angle of 60° with positive x-axis. P lies in first quadrant & S is its focus. Circle with PS as diameter touches y-axis at (0, α), find α^2

Options:

(a) 1

(b) 2

(c) 3

(d) 4

Answer: (c)

$\alpha = t$

$\tan 60^o = \frac{t-0}{\frac{t^2+1}{2}-1} = \frac{2t}{t^2-1} = \sqrt{3}$

$2t = \sqrt{3}t^2 - \sqrt{3}$

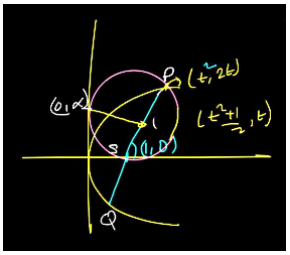
$\sqrt{3}t^2 - 2t - \sqrt{3} = 0$

$\left(t-\sqrt{3}\right)\left(\sqrt{3}\,t+1\right) = 0$

$t = \sqrt{3}$

$\alpha = \sqrt{3}$

$\alpha^2 = 3$



Question: If $y \geq |4 - x^2|$, $y \leq x^2$, $y \leq 4$, $x > 0$, then find the area bounded by inequalities.

Answer: ($\frac{40\sqrt{2}}{3} - 16$)

$A = \int_{\sqrt{2}}^{2} x^2 - (4 - x^2)dx + \int_{2}^{3\sqrt{2}} (4 - (x^2 - 4))dx$

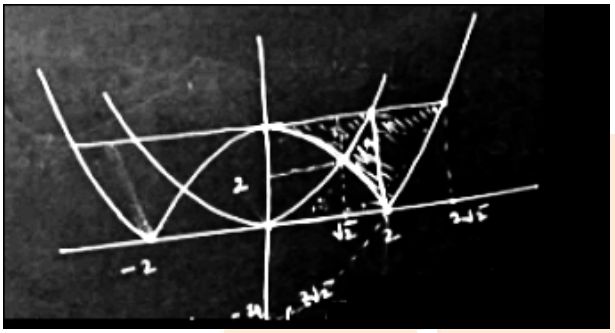
$= \int 2x^2 - 4\,dx + \int 8 - x^2 dx$

$= \frac{2x^3}{3} - 4x\Big|_{\sqrt{2}}^{2} + 8x - \frac{x^3}{3}\Big|_{2}^{2\sqrt{2}}$

$= \left(\frac{16}{3} - \frac{4\sqrt{2}}{3}\right) - 4\left(2 - \sqrt{2}\right) + \left(16\sqrt{2} - 16\right) - \left(\frac{16\sqrt{2} - 8}{3}\right)$

$= \frac{16}{3} - 8 - 16 + \frac{8}{3} + 4\sqrt{2} - \frac{4\sqrt{2}}{3} + 16\sqrt{2} - \frac{16\sqrt{2}}{3}$

$= \left(\frac{40\sqrt{2}}{3} - 16\right)$



Question: Let f(x) = $2x^3 + 9x^2a + 12a^2x + 1$. Local minima and local maxima occur at p & q respectively, such that $p^2 = q$. Then the value of f(3) is

Options:

(a) 30

(b) 35

(c) 32

(d) 37

Answer: (d)

$$6x^2 + 18ax + 12a^2$$

$$= 6\left[x^2 + 3ax + 2a^2\right] = 0$$

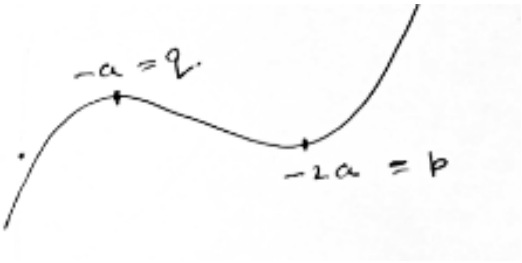
$$x = -a, \; -2a$$

$$a < 0 \quad 4a^2 = -a$$

$$a = \; -\frac{1}{4}$$

$$f(3) = 54 + 81\,a + 36a^2 + 1$$

$$55 - \frac{81}{4} + \frac{9}{4} = 55 - 18 = 37$$



Question: If $\int_0^{e^3}\left[\frac{1}{e^{x-1}}\right]dx = a - \log_e 2$, **where [.] is Greatest integer function, then** α^3 **equals to**

Options:

(a) 4

(b) 6

(c) 8

(d) 10

Answer: (c)

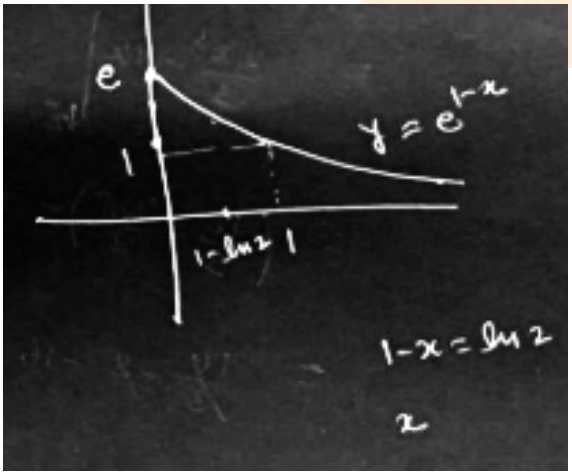
$$\int_0^{e^3}\left[\frac{1}{e^{x-1}}\right]dx$$

$$\int_0^{1-\ell nx} 2\,dx + \int_{1-\ell nx}^{1} 1\,dx$$

$$= 2(1-\ln 2) + (\ln 2)$$

$$= 2 - \ln 2$$

$$\alpha = 2 \quad \alpha^3 = 8$$



Question: If $\lim_{x\to 0}\frac{(\gamma-1)e^{x^2}+x^2\sin(\alpha x)}{\sin(2x)-\beta x}=3,$ **then** $\alpha + 2\beta + \gamma$ **is equal to**

Options:

(a) 0

(b) 1

(c) 3

(d) 5

Answer: (b)

$$\lim_{x\to 0}\frac{(\gamma-1)e^{x^2}+x^2\sin(\alpha x)}{\sin(2x)-\beta x}=3$$

$$\to \lim_{x\to 0}\frac{\alpha x^3}{\sin 2x-\beta x}=3 \qquad \gamma=1$$

$$\to \quad \frac{3\alpha x^3}{2\cos 2x-\beta}=3 \qquad \beta=2$$

$$\frac{6\alpha x^2}{-4\sin 2x}=\frac{6\alpha}{-8}=3 \to \alpha=-4$$

$$\alpha+2\beta+\gamma= \ -4+4+\gamma=1$$

Question: The term independent of x in the binomial expression of $\left(\frac{x+1}{x^{\frac{2}{3}}-x^{\frac{1}{3}}+1}-\frac{x-1}{x-x^{\frac{1}{2}}}\right)^{10}$ **is**

Options:

(a) 120

(b) 210

(c) 84

(d) 110

Answer: (b)

Term Independent at x

$\left[\frac{x+1}{\left(x^{\frac{1}{3}}+1-x^{\frac{1}{3}}\right)}-\frac{x-1}{x-x^{\frac{1}{2}}}\right]^{10}$

$(x+1)=\left(x^{\frac{1}{3}}+1\right)\left(x^{\frac{2}{3}}+1-x^{\frac{1}{3}}\right)$

$\left(x^{\frac{1}{3}}+1\right)-\frac{(\sqrt{x}+1)(\sqrt{x}-1)}{\sqrt{x}(\sqrt{x}-1)}$

$\left(x^{\frac{1}{3}}-x^{\frac{1}{2}}\right)^{10}$

${}^{10}C_r\left(x^{\frac{1}{3}}\right)^{10-r}\cdot\left(-x^{\frac{1}{3}}\right)^{r}$

$=\frac{10-r}{3}-\frac{r}{2}=0$

$20-2r=3r$

$4=r$

${}^{10}C_4=210$

Question: Let E be an ellipse such that $E:\frac{x^2}{18}+\frac{y^2}{9}=1.$ **Let point P lies on E such that S and S' are foci of ellipse. Then find the sum of min (PS.PS') + max (PS.PS')**

Options:

(a) 18

(b) 36

(c) 9
(d) 27
Answer: (d)

$\min(PS.PS\prime) + \max(PS.PS\prime)$

$PS.PS\prime = \left(a^2 - x^2e^2\right)$

$= \left(a^2 - x^2e^2\right) + a^2$

$= 2a^2 - e^2a^2$

$= 18\left(2 - e^2\right) = 18\left(2 - \frac{1}{2}\right) = 27$