

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

Question: What is the dimensional formula of $\sqrt{\frac{1}{\mu_0 \epsilon_0}}$ (where μ_0 is permeability and ϵ_0 is permittivity of free space)

Options:

- (a) LT^{-1}
- (b) L^2T^{-2}
- (c) MLT^{-1}
- (d) ML^2T^{-2}

Answer: (b)

Question: An equilateral prism is made of a material of refractive index $\sqrt{2}$. Find angle of incidence for minimum deviation of the light ray.

Options:

- (a) 60°
- (b) 30°
- (c) 37°
- (d) 45°

Answer: (d)

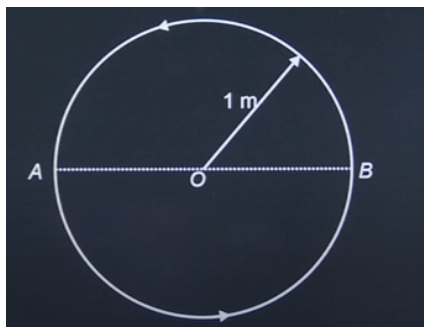
Question: The moment of inertia of a ring of mass M and radius R about an axis passing through tangential point in the plane of ring is

Options:

- (a) $\frac{5MR^2}{2}$
- (b) $\frac{3MR^2}{2}$
- (c) $\frac{4MR^2}{3}$
- (d) $\frac{2MR^2}{3}$

Answer (b)

Question: A particle moves on a circular path of radius 1 m. Find its displacement moves from $A \rightarrow B \rightarrow A \rightarrow B$. Also its distance are it moves from



Options:

- (a) Distance = 2 m, Displacement = 4π m
- (b) Distance = 2 m, Displacement = 5π m
- (c) Distance = 4π m, Displacement = 2 m
- (d) Distance = 5π m, Displacement = 2 m

Answer: (c)

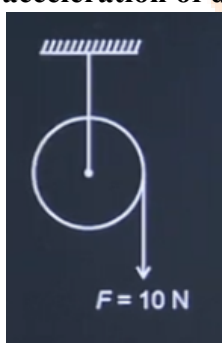
Question: Two water drops each of radius of r coalesce to form a bigger drop. If T is the surface tension, surface energy released in this process

Options:

- (a) $n^{\frac{1}{2}} r^{\frac{1}{2}}$
- (b) $n^{\frac{1}{3}} r$
- (c) $n^2 r^2$
- (d) $n r^{\frac{1}{2}}$

Answer: (b)

Question: A disc of mass M and radius 2 m is hinged keeping axis horizontal. If angular acceleration of disc is 2 rad/s^2 . Find moment of inertia



Options:

- (a) 10 kg m^2
- (b) 5 kg m^2
- (c) 6 kg m^2
- (d) 20 kg m^2

Answer: (a)

Question: There is a satellite which is revolving around earth in a circular orbit at a height $2R$ from the surface of earth. Find the kinetic energy of the satellite.

(R is radius of earth)

Options:

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

(b) $\frac{GMm}{3R}$

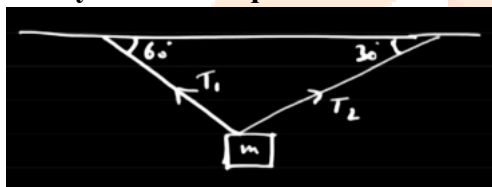
(c) $\frac{GMm}{6R}$

(d) $\frac{GMm}{9R}$

Answer: (c)

Question: There is a block of mass m by two massless strings which makes angle 60° and 30° respectively with the horizontal at the end which is connected to fixed support as shown in figure.

The system is in equilibrium. Find the ratio of T_1 & T_2



Options:

(a) 1 : 1

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

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

(d) 2 : 1

Answer: (b)

Question: Binding energy per nucleon in ${}^2_1\text{H}$ is x and for ${}^4_2\text{He}$ is y. Find energy released in the given reaction ${}^2_1\text{H} + {}^2_1\text{H} \rightarrow {}^4_2\text{He}$

Options:

(a) $2x - 2y$

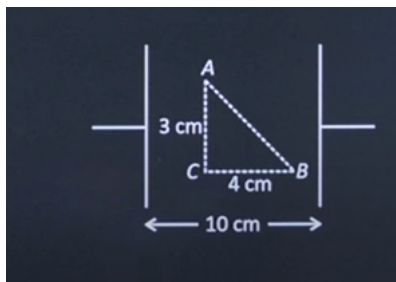
(b) $-4x + 4y$

(c) $4x - 4y$

(d) $2y - 4x$

Answer: (b)

Question: The figure shows the plates of a parallel plate capacitor with a separation 10 cm and charged to a potential difference V. Find the potential difference between B and A.



Options:

(a) $\frac{2V}{5}$

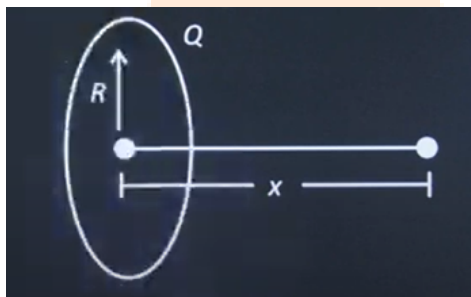
(b) $\frac{V}{2}$

(c) $\frac{3V}{5}$

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

Answer: (a)

Question: Figure shows a uniformly charged ring having charge Q and radius R . Find the distance from the centre on the axis of the ring where electric field is maximum



Options:

(a) $R\sqrt{2}$

(b) $\frac{R}{\sqrt{2}}$

(c) $2R$

(d) R

Answer: (b)

Question: Two galvanometers G_1 and G_2 are having resistors $R_1 = 5\Omega$ and $R_2 = 7\Omega$, number of turns $N_1 = 21$, $N_2 = 15$, magnetic fields $B_1 = 0.25$ T, $B_2 = 0.50$ T and area of coil $A_1 = 3.6 \times 10^{-3} \text{ cm}^2$ and $A_2 = 1.8 \times 10^{-3} \text{ cm}^2$. Find the ratio of their voltage sensitivity (same spring in both)

Options:

(a) $49/25$

(b) $7/5$

(c) $5/7$

(d) $49/20$

Answer: (a)

Question: A solenoid having area A and length ' l ' is filled with a material having relative permeability 2. The magnetic energy stored in the solenoid is

Options:

- (a) $\frac{B^2 Al}{\mu_0}$
- (b) $\frac{B^2 Al}{4\mu_0}$
- (c) $\frac{B^2 Al}{2\mu_0}$
- (d) $\frac{B^2 Al}{\mu_0}$

Answer: (b)

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

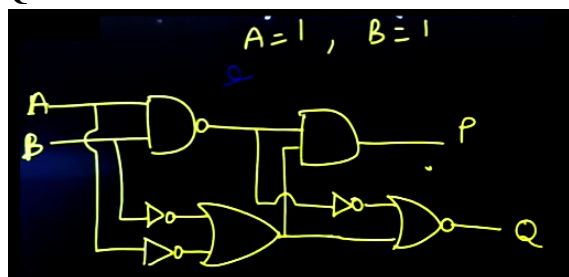
	List-I		List-II
(i)	Heat capacity	(a)	$\text{J kg}^{-1} \text{K}^{-1}$
(ii)	Specific heat capacity	(b)	J K^{-1}
(iii)	Latent heat	(c)	$\text{W m}^{-1}\text{K}^{-1}$
(iv)	Thermal conductivity	(d)	J kg^{-1}

Options:

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

Answer: (d)

Question: If P and Q is the output of the following logic gates combination. Find P and Q.



Options:

- (a) $P = 0, Q = 0$
- (b) $P = 0, Q = 1$
- (c) $P = 1, Q = 0$

(d) $P = 1, Q = 1$

Answer: (a)

Question: An electron with mass 'm' with an initial velocity ($t = 0$) $\vec{v} = v_0 \hat{i}$ ($v_0 > 0$) enters a magnetic field $\vec{B} = B_0 \hat{j}$. If the initial de-broglie wavelength at $t = 0$ is λ_0 . Then its value after time 't' would be.

Options:

(a) $\frac{\lambda_0}{\sqrt{1 + \frac{e^2 B_0^2 t^2}{m^2}}}$

(b) $\frac{\lambda_0}{\sqrt{1 - \frac{e^2 B_0^2 t^2}{m^2}}}$

(c) $\lambda_0 \sqrt{1 + \frac{e^2 B_0^2 t^2}{m^2}}$

(d) λ_0

Answer: (d)

Question: In a system of measurement, electric charge (Q), permeability (μ_0) and electric current (i) are considered as fundamental quantity. The dimension of linear momentum in this system is

Options:

(a) $[Q^2 \mu_0^2 i]$

(b) $[Q \mu_0 i]$

(c) $[Q \mu_0 i^2]$

(d) $[Q^2 \mu_0 i]$

Answer: (b)

Question: A satellite of mass 1000 kg is launched to revolve around the earth in an orbit at a height of 270 km from the earth's surface. Kinetic energy of the satellite in this orbit is $\times 10^{10}$ J.

(Mass of earth = 6×10^{24} kg, Radius of earth = 6400 Km, Gravitational constant = $6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$).

Options:

(a) 9

(b) 3

(c) 5

(d) 13

Answer: (b)

Question: Which of the following items (labelled i, ii, iii, iv and v) are true?

When an ideal gas undergoes adiabatic process, (symbols have their usual meaning)

(i) $\Delta U = 0$

(ii) $W = -\Delta U$

(iii) $PV = \text{Constant}$

(iv) $VT = \text{Constant}$

(v) $W \propto [T_1 - T_2]$

Options:

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

Answer: (b)

Question: A wave is travelling along a string. The wavelength (λ) of the wave is 7.5 m and amplitude is 2 cm. At $t = 0$, there is a crest at $x = 0$ and in 0.3 seconds it travels a distance of 12 cm in +ve x-direction. The equation of the wave is

Options:

- (a) $2 \sin \left(\frac{2\pi}{15}x + \frac{6\pi}{25}t \right) \text{cm}$
- (b) $2 \cos \left(\frac{4\pi}{15}x - \frac{8\pi}{75}t \right) \text{cm}$
- (c) $2 \cos \left(\frac{4\pi}{15}x + \frac{6\pi}{25}t \right) \text{cm}$
- (d) $2 \sin \left(\frac{4\pi}{15}x - \frac{8\pi}{75}t \right) \text{cm}$

Answer: (b)

Question: The internal energy of air in $4 \text{ m} \times 4 \text{ m} \times 3 \text{ m}$ sized room at 1 atmospheric pressure will be $\times 10^6 \text{ J}$. (Consider air as diatomic molecule).

Options:

- (a) 20
- (b) 15
- (c) 12
- (d) 9

Answer: (c)

Question: An equiconvex lens of radius $R = \frac{1}{6} \text{ m}$ is having power P. Another Bi convex lens of radii R_1 and R_2 is having same power P, then

Options:

- (a) $R_1 = \frac{1}{9} \text{ m}, R_2 = \frac{1}{3} \text{ m}$
- (b) $R_1 = \frac{1}{6} \text{ m}, R_2 = \frac{1}{3} \text{ m}$
- (c) $R_1 = \frac{1}{9} \text{ m}, R_2 = \frac{1}{4} \text{ m}$
- (d) $R_1 = \frac{1}{4} \text{ m}, R_2 = \frac{1}{5} \text{ m}$

Answer: (a)

Question: Two identical objects are placed in front of convex mirror and concave mirror having same radii of curvature of 12 cm, at same distance of 18 cm from the respective mirrors. The ratio of sizes of the images formed by convex mirror and by concave mirror is:-

Options:

- (a) 1/2
- (b) 3
- (c) 2
- (d) 1/3

Answer: (a)

Question: The radius of first Bohr orbit of Li^{2+} is $\frac{a_0}{X}$, where a_0 is the radius of the first Bohr orbit of H. Find X.

Options:

- (a) 4
- (b) 3
- (c) 5
- (d) 9

Answer: (b)

Question: The length of the string is 104 m when the tension in it is 5 N. The length becomes 1.56 m when the tension in it is 7 N. The natural length of the string is _____ m.

Options:

- (a) 2
- (b) 1
- (c) 10
- (d) 20

Answer: (a)

JEE-Main-02-04-2025 (Memory Based)**[EVENING SHIFT]****Chemistry**

Question: Correct order of electronegativity in below elements

- (a) $1s^2 2s^2 2p^3$ (b) $1s^2 2s^2 2p^4$
(c) $1s^2 2s^2 2p^5$ (d) $1s^2 2s^2 2p^5$

Options:

- (a) $a > b > c > d$
(b) $c > b > a > d$
(c) $d > c > b > a$
(d) $c > b > d > a$

Answer: (b)

Question: Nature of compounds TeO_2 and TeH_2 is _____ and _____ respectively

Options:

- (a) Oxidising and Reducing respectively
(b) Highly acidic and highly basic respectively
(c) Reducing and Basic respectively
(d) Basic and oxidising

Answer: (a)

Question: In 3, 3-dimethylhex-1-en-4-yne, the number of sp , sp^2 and sp^3 carbon atoms, respectively are

Options:

- (a) 2, 2, 4
(b) 2, 2, 2
(c) 1, 2, 2
(d) 2, 4, 2

Answer: (a)

Question: Statement-I: Melting point of neopentane is greater than that of n-pentane.

Statement-II: Neopentane give only one mono-substituted product

Options:

- (a) Both S-I and S-II are correct
(b) Both S-I and S-II are incorrect
(c) S-I is incorrect but S-II is correct
(d) S-I is correct but S-II is incorrect

Answer: (a)

Question: Sodium nitroprusside test is used for detection of which of the following species in organic compounds

Options:

- (a) SO_4^{2-}
(b) S^{2-}

- (c) Na^+
(d) PO_4^{3-}

Answer: (b)

Question: Which of the following is the correct order of enthalpy of atomisation of 3d-series?

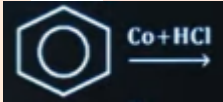
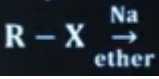
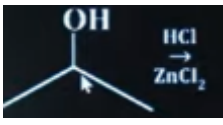
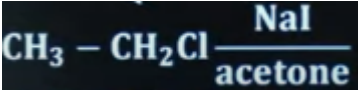
Options:

- (a) $\text{Ni} > \text{Cu} > \text{Mn} > \text{Zn}$
(b) $\text{Zn} > \text{Cu} > \text{Mn} > \text{Ni}$
(c) $\text{Cu} > \text{Mn} > \text{Ni} > \text{Zn}$
(d) $\text{Mn} > \text{Ni} > \text{Cu} > \text{Zn}$

Answer: (a)

Element	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
Atomic number	21	22	23	24	25	26	27	28	29	30
Electronic configuration										
M	$3d^1 4s^2$	$3d^2 4s^2$	$3d^3 4s^2$	$3d^5 4s^1$	$3d^5 4s^2$	$3d^6 4s^2$	$3d^7 4s^2$	$3d^8 4s^2$	$3d^{10} 4s^1$	$3d^{10} 4s^2$
M^+	$3d^1 4s^1$	$3d^2 4s^1$	$3d^3 4s^1$	$3d^5$	$3d^5 4s^1$	$3d^6 4s^1$	$3d^7 4s^1$	$3d^8 4s^1$	$3d^{10}$	$3d^{10} 4s^1$
M^{2+}	$3d^1$	$3d^2$	$3d^3$	$3d^4$	$3d^5$	$3d^6$	$3d^7$	$3d^8$	$3d^9$	$3d^{10}$
M^{3+}	[Ar]	$3d^1$	$3d^2$	$3d^3$	$3d^4$	$3d^5$	$3d^6$	$3d^7$	-	-
Enthalpy of atomisation, $\Delta_a H^\circ / \text{kJ mol}^{-1}$	326	473	515	397	281	416	425	430	339	126
Ionisation enthalpy/ $\Delta_i H^\circ / \text{kJ mol}^{-1}$										
$\Delta_i H^\circ$ I	631	656	650	653	717	762	758	736	745	906
$\Delta_i H^\circ$ II	1235	1309	1414	1592	1509	1561	1644	1752	1958	1734
$\Delta_i H^\circ$ III	2393	2657	2833	2990	3260	2962	3243	3402	3556	3837
Metallic/ionic radii/pm										
M	164	147	135	129	137	126	125	125	128	137
M^{2+}	-	-	79	82	82	77	74	70	73	75
M^{3+}	73	67	64	62	65	65	61	60	-	-
Standard electrode potential E° / V										
M^{2+}/M	-	-1.63	-1.18	-0.90	-1.18	-0.44	-0.28	-0.25	+0.34	-0.76
M^{3+}/M^{2+}	-	-0.37	-0.26	-0.41	+1.57	+0.77	+1.97	-	-	-
Density/ g cm^{-3}	3.43	4.1	6.07	7.19	7.21	7.8	8.7	8.9	8.9	7.1

Question: Match the column

Column-I	Column-II
(P) Finkelstein Reaction	(I) 
(Q) Lucas Reaction	(II) 
(R) Wurtz Reaction	(III) 
(S) Gattermannkoach reaction	(IV) 

Options:

- (a) P-IV, Q-III, R-II, S-I
(b) P-I, Q-II, R-III, S-IV

(c) P-II, Q-III, R-I, S-IV

(d) P-I, Q-II, R-I, S-IV

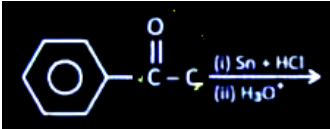
Answer: (a)

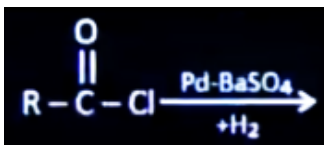
Question: Which of the following reactions given carboxylic acid

Options:

(a) $RCN \xrightarrow{H^+/H_2O}$

(b) $RCH_2OH \xrightarrow{PCC}$

(c) 

(d) 

Answer: (a)

Question: In adiabatic process, the magnitude of work done in case of one step & ∞ step follows order:

Options:

(a) $|W_{rev}|_{expansion} > |W_{irr}|_{expansion}$

(b) $|W_{rev}|_{expansion} < |W_{irr}|_{expansion}$

(c) $|W_{rev}|_{expansion} = |W_{irr}|_{expansion}$

(d) Can't be predicted

Answer: (a)

Question: The four different amino acids are given, A, B, C and D. Calculate the number of tetrapeptides formed including all the four amino acids

Options:

(a) 8

(b) 16

(c) 24

(d) 32

Answer: (c)

Question: Match the column

Column-I	Column-II
(P) fractional Distillation	(I) diesel. + petrol
(Q) Simple Distillation	(II) aniline + H_2O
(R) under. Reduce, P Distillation	(III) aniline + $CHCl_3$
(S) Steam Distillation	(IV) Glycerol pentyl

Options:

- (a) P-I; Q-III; R-IV; S-II
- (b) P-II; Q-II; R-III; S-II
- (c) P-III; Q-II; R-IV; S-I
- (d) P-I; Q-II; R-III; S-IV

Answer: (a)

Question: Among the following molecules which one has sp^3d hybridization having lone pair and having different bond length:

XeF_2 , XeF_4 , PF_5 , SF_4

Options:

- (a) XeF_2
- (b) XeF_4
- (c) PF_5
- (d) SF_4

Answer: (d)

Question: For the reversible reaction $A(g) \rightleftharpoons B(g) + C(g)$. The degree of dissociation is α at pressure P_T , then

Options:

- (a) If $P_T \gg K_p$, then $\alpha \approx 1$
- (b) If P_T increases, then α decreases
- (c) If P_T increases, then α increases
- (d) If $K_p \gg P_T$, then α tend to 0

Answer: (b)

Question: The number of unpaired electrons and hybridisation of $[Mn(CN)_6]^{3-}$, respectively are:-

Options:

- (a) 4 and $d^2 sp^3$
- (b) 4 and $sp^3 d^2$
- (c) 2 and $d^2 sp^3$
- (d) 2 and $sp^3 d^2$

Answer: (c)

Question: Consider the following statements

- (A) Value of l gives shape of orbital
- (B) Ψ represent wave function of an electron
- (c) Electron density of p_x orbital in xy plane is zero

(D) $2p_x$ orbital is



The correct statement(s) are

Options:

- (a) (A) and (D) only
- (b) (A), (C) and (D) only
- (c) (A), (B) and (D) only
- (d) (A), (B), (C) and (D) only

Answer: (c)

Question: The d-orbital electronic configuration of the complex among $[\text{Co}(\text{en})_3]^{3+}$, $[\text{Co}(\text{F})_6]^{3-}$, $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ and $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$ that has highest CFSE is

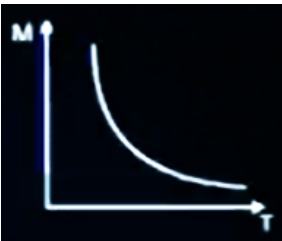

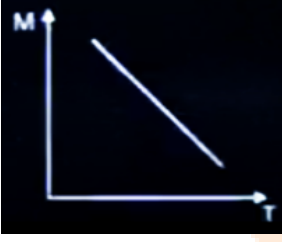
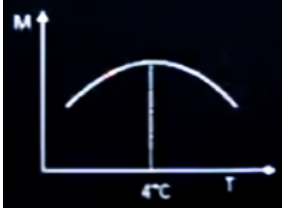
Options:

- (a) $t_{2g}^3 e_g^2$
- (b) $t_{2g}^6 e_g^4$
- (c) $t_{2g}^6 e_g^0$
- (d) $t_{2g}^4 e_g^2$

Answer: (c)

Question: 1 M NaCl solution is prepared at 0°C in H_2O . Now it is heated, then find correct graph between molarity and temperature

Options:

- (a) 
- (b) 
- (c) 
- (d) 

Answer: (d)

Question: Concentration Vs-time graph for first order reaction is given
Find out time required for concentration to become 2.5 M (in min) (Nearest integer)
Options:

Answer: (65)

Question: If the percentage w/v for NaOH is 0.2 and resistivity is 870 milliohm metre. Then, calculate Λ_m (in $\text{S cm}^2 \text{mol}^{-1}$)

Options:

Answer: (23)

Question: 0.5 g organic compound is heated with CuO in a CO_2 atmosphere at 300 K. The volume of N_2 gas collected over H_2O is 60 mL, if aqueous tension is 15 mm Hg at 300 K and pressure recorded is 715 mmHg, then calculate percentage of nitrogen in organic compound

Answer: (13%)



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

[EVENING SHIFT]

Maths

Question: Total number of terms in an A.P are even. Sum of odd terms is 24 and sum of even terms is 30. Last term exceeds the first term by $\frac{21}{2}$. Find the total number of terms.

Answer: (8)

$$t_1 + t_3 + \dots t_{2n-1} = 24$$

$$t_2 + t_4 + \dots t_{2n} = 30$$

$$\frac{n}{2} [2a + (n-1)2d] = 24 \dots \rightarrow (1)$$

$$\frac{n}{2} [2(a+d) + (n-1)2d] = 30 \dots \rightarrow (2)$$

$$2a + (n-1)d \cdot \frac{21}{2n-1} = \frac{24 \times 2}{n}$$

$$2a + n \cdot \frac{21}{2n-1} = \frac{30 \times 2}{n}$$

$$\frac{21}{2n-1} = \frac{60-2a}{n} = \frac{12}{n}$$

$$7n = 8n - 4$$

$$t_{2n} = t_1 + \frac{21}{2}$$

$$a + (2n-1)d = a + \frac{21}{2}$$

$$(2n-1)d = \frac{21}{2}$$

$$d = \frac{21}{2(2n-1)} \rightarrow (3)$$

$$\text{No of terms} = 8$$

Question: If the domain of the function is (a, b) then

$$f(x) = \frac{1}{\sqrt{3x+10-x^2}} + \frac{1}{\sqrt{x+|x|}} \quad (1+a)^2 + b^2 \text{ is equal to}$$

Options:

(a) 25

(b) 16

(c) 24

(d) 26

Answer: (d)

$$f(x) = \frac{1}{\sqrt{3x+10-x^2}} + \frac{1}{\sqrt{x+|x|}} \text{ is } (a, b)$$

$$3x + 10 - x^2 > 0 \quad x + |x| > 0$$

$$x^2 - 3x - 10 < 0 \quad |x| > -x$$

$$(x - 5)(x + 2) < 0 \quad x \in \mathbb{R}^+$$

$$-2 < x < 5$$

$$x \in (0, 5) \quad a = 0, b = 5$$

$$(1 + a)^2 + b^2 = 1 + 25 = 26.$$

Question: If $\theta \in \left[-\frac{7\pi}{6}, \frac{4\pi}{3}\right]$, then number of solutions of $\sqrt{3} \operatorname{cosec}^2 \theta - 2(\sqrt{3}-1)\operatorname{cosec} \theta - 4 = 0$, is _____.

Answer: (6)

$$\sqrt{3} \operatorname{cosec}^2 \theta - 2(\sqrt{3}-1) \operatorname{cosec} \theta - 4 = 0$$

$$\text{Let's assume } c = \operatorname{cosec} \theta$$

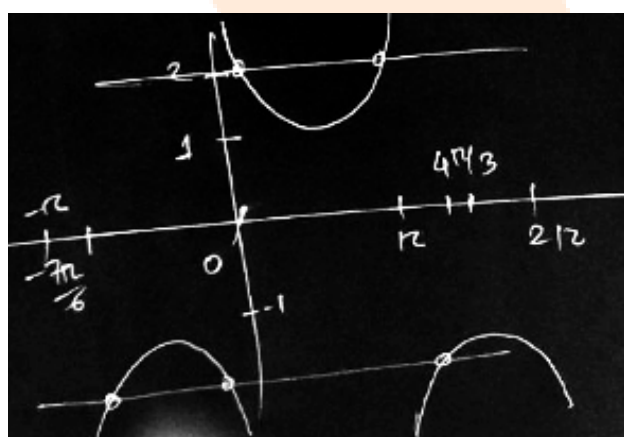
$$\sqrt{3}c^2 - 2(\sqrt{3}-1)c - 4 = 0$$

$$\Rightarrow \sqrt{3}c^2 - 2\sqrt{3}c + 2c - 4 = 0$$

$$\Rightarrow \sqrt{3}c(c-2) + 2(c-2) = 0$$

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

$$\text{no. of solution} = 6$$



Question: If $\frac{dy}{dx} + 2y \sec^2 x = 2 \sec^2 x + 3 \tan x$, $\sec^2 x$ and $f(0) = \frac{5}{4}$.

Then the value of ${}^{12}P\left(y\left(\frac{\pi}{4}\right) - \frac{1}{e^2}\right)$ equals to

Answer: (21)

Question: $\lim_{x \rightarrow 0} \frac{\cos(2x) + a \cos(4x) - b}{x^4}$ is finite, then $a + b =$

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

$$\lim_{n \rightarrow 0} \frac{\cos 2n + a \cos(4n) - b}{x^4}$$

$$\frac{\left(1 - \frac{(2x)^2}{2!} + \frac{(2x)^4}{4!} - \dots\right) + a \left(1 - \frac{(4x)^2}{2!} + \frac{(4x)^4}{4!} - \dots\right) - b}{x^4}$$

$$\frac{(1+a-b) + x^2(-2-8a) + x^4\left(\frac{2}{3} + \frac{32}{3}a\right)}{x^4}$$

$$1 + a - b = 0$$

$$1 - \frac{1}{4} - 4 = 0$$

$$-2 - 8a = 0$$

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

$$b = \frac{3}{4}$$

$$a + b = \frac{3}{4} - \frac{1}{4}$$

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

Question: Evaluate $\int_{-2}^2 \frac{9x^2}{1+5^x} dx$

Options:

(a) 12

(b) 24

(c) 30

(d) 15

Answer: (b)

$$I = \int_{-2}^2 \frac{9x^2}{1+5^x} dx$$

$$I = \int_{-2}^2 \frac{9(-x)^2}{1+5^{-x}} dx$$

$$I = \int_{-2}^2 (5^x) \frac{9x^2}{1+5^x} dx$$

$$2I = \int_{-2}^2 \frac{9x^2}{(1+5^x)} (1+5^x) dx$$

$$2I = 9 \int_{-2}^2 x^2 dx$$

$$I = 39 \left(\frac{x^3}{3} \right)_0^2$$

$$= 3(8 - 0)$$

$$I = 24$$

Question: Find the eccentricity of ellipse in which length of minor axis is equal to one fourth of the distance between foci

Options:

(a) $\frac{4}{\sqrt{17}}$

(b) $\frac{2}{\sqrt{17}}$

(c) $\frac{7}{\sqrt{17}}$

(d) $\frac{8}{\sqrt{17}}$

Answer: (a)

Question: If the mean and variance of eight observations a, b, 8, 12, 10, 6, 4, 15, is 9 and 9.25 respectively. Then $a + b + ab$ is equal to

Options:

- (a) 76
- (b) 83
- (c) 79
- (d) 93

Answer: (d)

Question: If two vectors \vec{a} and \vec{b} is given by $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$ and $\vec{b} = \hat{i} + 4\hat{j} + 8\hat{k}$ and the vectors \vec{c} and \vec{d} are related as $(\vec{a} - \vec{c}) \times \vec{b} = 5\hat{i} - 2\hat{j} + 3\hat{k}$ and $\vec{b} \times \vec{c} = \vec{d}$.

Then $|\vec{a} \cdot \vec{d}|$ is equal to

Options:

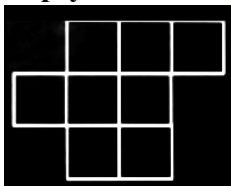
- (a) 12
- (b) 8
- (c) 10
- (d) 7

Answer: (c)

Question: Parabola $y^2 = 16x$ and point (1, -4) lies on the focal chord. Find the ratio in which focus divides the focal chord.

Answer: (4 : 1)

Question: In how many ways A, B, C, D, E has to be arranged such that no row is empty.



Answer: (5760)

Question: If the system of equations

$$2x + \lambda y + 3z = 5$$

$$3x + 2y - z = 7$$

$$4x + 5y + \mu z = 9$$

has infinitely many solutions, then

$(\lambda^2 + \mu^2)$ is equal to

Options:

- (a) 22
- (b) 18
- (c) 26
- (d) 30

Answer: (c)

Question: If $y = \cos\left(\frac{\pi}{3} + \cos^{-1}\left(\frac{x}{2}\right)\right)$, then which of the following is true.

Options:

(a) $x^2 - 2xy + 8y^2 = 2$

(b) $x^2 - 2xy + 4y^2 = 3$

(c) $x^2 - 3xy + 4y^2 = 3$

(d) $x^2 - 5xy + 4y^2 = 8$

Answer: (b)

Question: A variable line intersect co-ordinate axis at B & C such that area of triangle equal to 48. Find minimum value of $OB^2 + OC^2 = ?$

Answer: (192)

