



JEE (MAIN) 2025

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-1

DATE & DAY: 03rd April 2025 & Thursday

PAPER-1

Duration: 3 Hrs.

Time: 09:00 – 12:00 IST

SUBJECT: MATHEMATICS

Selections in JEE (Advanced)/
IIT-JEE Since 2002

52395

Selections in JEE (Main)/
AIEEE Since 2009

257576

Selections in NEET (UG)/
AIPMT/AIIMS Since 2012

22494

Admission Open for 2025-26

Target: JEE (Advanced) | JEE (Main) | NEET (UG) | PCCP (Class V to X)

100% Scholarship on the basis of Class 10th & 12th
& JEE (Main) 2025 %ile/ AIR

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TARGET: JEE (Adv.) 2024



**AIR
31**

JEE (Adv.) 2024
ISHAAN GUPTA

SCHOLARSHIP UPTO 100%

on the basis of Class 10th & 12th &
JEE (Main) 2025 %ile/ AIR

VISHESH COURSE

For 12th Passed Students

Course Features:

- Course Duration: **42 Weeks**
- Total No. of Lectures: **630** (P: 210 | C: 210 | M: 210)
- Duration of One Lecture: **1.5 Hrs.** (90 Minutes)
- Classroom Teaching Hours.: **945 Hrs.**
- Testing Duration: **51 Hrs.**
- Total Academic Hours.: **996 Hrs.**

*Tentative



CLASS STARTS
7th April 2025

TARGET: JEE (Main) 2026

ABHYAAS COURSE

For 12th Passed Students

Course Features:

- Course Duration: **39 Weeks**
- Total No. of Lectures: **577** (P: 192 | C: 193 | M: 192)
- Duration of One Lecture: **1.5 Hrs.** (90 Minutes)
- Classroom Teaching Hours.: **865 Hrs.**
- Testing Duration: **36 Hrs.**
- Total Academic Hours.: **901 Hrs.**

*Tentative

**AIR
102**

JEE (Main) 2024
RITAM BANERJEE



SCHOLARSHIP UPTO 100%

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JEE (Main) 2025 %ile/ AIR



CLASS STARTS
7th April 2025

PART : MATHEMATICS

1. $g(x)$ is a function such that $\int_0^x g(t) dt = x - \int_0^x t g(t) dt$ & $\frac{dy}{dx} - y \tan x = 2(x+1) g(x) \sec x$ such that

$y(0) = 0$ then $y\left(\frac{\pi}{3}\right) =$

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

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

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

(4) $\frac{5\pi}{3}$

Ans. (3)

Sol. $\int_0^x g(t) dt = x - \int_0^x t g(t) dt$

diff. w.r.t x both side

$$g(x) = 1 - x g(x)$$

$$(1+x)g(x) = 1 \quad g(x) = \frac{1}{1+x}$$

$$(1+x)g(x)=1 \Rightarrow g(x)=\frac{1}{1+x}$$

$$\therefore \frac{dy}{dx} - y \tan x = 2 \sec x$$

$$\text{I.F.} = e^{-\int \tan x dx} = e^{-\ln \sec x} = \cos x$$

$\therefore$ Solution is

$$y \cos x = \int 2 \sec x \cdot \cos x dx + c$$

$$y \cos x = 2x + c$$

$$y(0) = 0 \therefore 0 = 0 + c \Rightarrow c = 0$$

$$\therefore y = 2x \sec x$$

$$\therefore y\left(\frac{\pi}{3}\right) = 2 \cdot \frac{\pi}{3} \cdot \sec \frac{\pi}{3} = \frac{4\pi}{3}$$

2. Let A be 3×3 matrix such that $\det(A) = 5$ if $\det(2 \operatorname{adj}(3A \cdot \operatorname{adj}(2A))) = 2^\alpha \times 3^\beta \times 5^\gamma$ then $\alpha + \beta + \gamma$ is equal to

Ans. (27)

Sol. $\det(2 \operatorname{adj}(3A \cdot \operatorname{adj}(2A)))$

$$= 2^3 |\operatorname{adj}(3A \cdot \operatorname{adj}(2A))|$$

$$= 8 |3A \cdot \operatorname{adj}(2A)|^2$$

$$= 8 \times 3^6 |A \operatorname{adj}(2A)|^2$$

$$= 2^3 \times 3^6 |A|^2 |\operatorname{adj}(2A)|^2$$

$$= 2^3 \times 3^6 \times 5^2 |2A|^4$$

$$= 2^3 \times 3^6 \times 5^2 \cdot 2^{12} |A|^4$$

$$= 2^{15} \times 3^6 \times 5^2 \times 5^4$$

$$= 2^{15} \times 3^6 \times 5^6$$

$$\alpha + \beta + \gamma = 27$$

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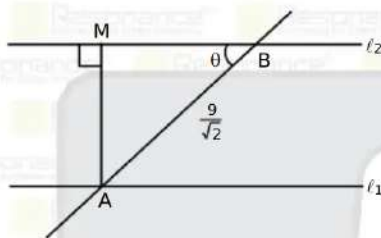
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3. A line with slope =1 cuts line $L_1 : 2x + y - 6 = 0$ at A & $L_2 : 4x + 2y - p = 0$, $p > 0$ at B such that $AB = \frac{9}{\sqrt{2}}$. A perpendicular AM from A drawn to line ℓ_2 meets at M then $\frac{AM}{BM}$ is equal to

Ans. (3)

Sol.



$$\tan \theta = \left| \frac{-2-1}{1+(-2)(1)} \right| = \frac{3}{1}$$

$$\sin \theta = \frac{3}{\sqrt{10}}$$

$$AM = \frac{3}{\sqrt{10}} \times \frac{9}{\sqrt{2}} = \frac{27}{\sqrt{20}} = \frac{27}{2\sqrt{5}}$$

$$\text{dis. between } \ell_1 \text{ \& } \ell_2 \text{ AM} = \left| \frac{-p}{2} + 6 \right| \sqrt{5}$$

$$6 - \frac{p}{\sqrt{5}} = \pm \frac{27}{2}$$

$$6 + \frac{27}{2} = \frac{p}{2}$$

$$p = 39 \text{ as } p > 0$$

$$BM = \sqrt{\frac{81}{2} - \left(\frac{27}{2\sqrt{5}}\right)^2}$$

$$= \sqrt{\frac{810 - 729}{20}} = \sqrt{\frac{81}{20}} = \frac{9}{2\sqrt{5}}$$

$$\text{Now } \frac{AM}{BM} = \frac{\frac{27}{2\sqrt{5}}}{\frac{9}{2\sqrt{5}}} = 3$$

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4. Let $f(x) = \int x^3 \sqrt{3-x^2} dx$ such that $5f(\sqrt{2}) = -4$ then $f(1) =$

- (1) $-\frac{3\sqrt{2}}{5}$ (2) $-\frac{4\sqrt{2}}{5}$ (3) $-\frac{6\sqrt{2}}{5}$ (4) $\frac{6\sqrt{2}}{5}$

Ans. (3)

Sol. $f(x) = \int x^3 \sqrt{3-x^2} dx = \int x^2 \sqrt{3-x^2} x dx$

Let $3-x^2 = t \therefore -2x dx = dt$

$$\therefore f(x) = \int (3-t) \sqrt{t} \left(-\frac{1}{2} dt\right) + c$$

$$= \frac{1}{2} \int (t^{3/2} - 3t^{1/2}) dt + c$$

$$= \frac{1}{2} \frac{t^{5/2}}{5/2} - \frac{3}{2} \frac{t^{3/2}}{3/2} + c$$

$$= \frac{t^{5/2}}{5} - t^{3/2} + c$$

$$= \frac{(3-x^2)^{5/2}}{5} - \frac{(3-x^2)^{3/2}}{1} + c$$

Put $x = \sqrt{2}$

$$\therefore f(\sqrt{2}) = -\frac{4}{5} = \frac{1}{5} - 1 + c$$

$$-\frac{4}{5} = -\frac{4}{5} + c \Rightarrow c = 0$$

$$\therefore f(x) = \frac{(3-x^2)^{5/2}}{5} - (3-x^2)^{3/2}$$

$$\therefore f(x) = \frac{2^{5/2}}{5} - 2^{3/2}$$

$$= \sqrt{2} \left(\frac{4}{5} - 2 \right)$$

$$= \sqrt{2} \left(-\frac{6}{5} \right) = -\frac{6\sqrt{2}}{5}$$

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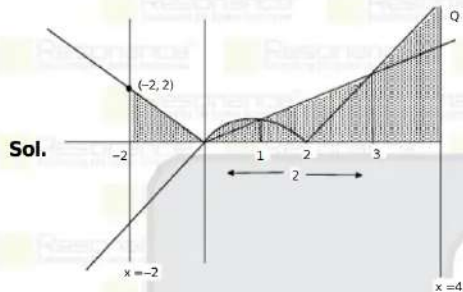
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5. Area between x-axis and curve $y = \max. \{|x|, |x-2|\}$ from $x = -2$ to $x = 4$ is

Ans. (12)



$$\begin{aligned} \text{Required area} &= \frac{1}{2} \times 2 \times 2 + \int_0^1 (2x - x^2) dx \\ &\quad + \frac{1}{2} (2)(1+3) + \int_3^4 (x^2 - 2x) dx \\ &= 2 + \left(x^2 - \frac{x^3}{3} \right)_0^1 + 4 + \left(\frac{x^3}{3} - x^2 \right)_3^4 \\ &= 2 + \left(1 - \frac{1}{3} \right) + 4 + \left(\frac{64}{3} - 16 \right) - (9 - 9) \\ &= \frac{8}{3} + 4 + \frac{16}{3} = 12 \end{aligned}$$

6. Sum of all rational terms in expansion of $(2 + \sqrt{3})^8$

Ans. (18817)

Sol. $T_{r+1} = {}^8C_r \cdot 2^{8-r} \cdot 3^{r/2}$

for rational terms $r = 0, 2, 4, 6, 8$.

$$\text{sum} = {}^8C_0 \cdot 2^8 \cdot 3^0 + {}^8C_2 \cdot 2^6 \cdot 3^1 + {}^8C_4 \cdot 2^4 \cdot 3^2 + {}^8C_6 \cdot 2^2 \cdot 3^3 + {}^8C_8 \cdot 2^0 \cdot 3^4$$

$$= 256 + 28 \times 64 \times 3 + 70 \times 16 \times 9 + 28 \times 4 \times 27 + 81$$

$$= 16[16 + 336 + 360 + 189] + 81$$

$$= 16 \times 1171 + 81$$

$$= 18817$$

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7. $\sum_{r=1}^9 \frac{r+3}{2^r} {}^9C_r =$

(1) $\frac{3^{10}}{2^8} + 3$

(2) $\frac{3^{10}}{2^8} - 3$

(3) $\frac{3^{10}}{2^8} - 5$

(4) $\frac{3^{10}}{2^8} + 5$

Ans. (2)

Sol. $= \sum_{r=1}^9 \frac{r}{2^r} {}^9C_{r-1} + \sum_{r=1}^9 \frac{3}{2^r} {}^9C_r$

$$= \frac{9}{2} \sum_{r=1}^9 {}^8C_{r-1} \frac{1}{2^{r-1}} + 3 \sum_{r=1}^9 \frac{{}^9C_r}{2^r}$$

$$= \frac{9}{2} \left(1 + \frac{1}{2}\right)^8 + 3 \left[\left(1 + \frac{1}{2}\right)^9 - 1\right]$$

$$= \frac{9}{2} \times \frac{3^8}{2^8} + 3 \times \frac{3^9}{2^9} - 3$$

$$= \frac{3^{10}}{2^9} + \frac{3^{10}}{2^9} - 3$$

$$= \frac{3^{10}}{2^8} - 3$$

8. $y = \begin{vmatrix} \sin x & \cos x & \sin x + \cos x + 1 \\ 26 & 27 & 26 \\ 1 & 1 & 1 \end{vmatrix}$ then $\frac{d^2y}{dx^2} + y =$

(1) 0

(2) 1

(3) -1

(4) 2

Ans. (3)

Sol. $y = \begin{vmatrix} \sin x & \cos x & \sin x + \cos x + 1 \\ 26 & 27 & 26 \\ 1 & 1 & 1 \end{vmatrix}$

$$= \sin x (27 - 26) - \cos x (26 - 26) + (\sin x + \cos x + 1) (26 - 27)$$

$$= \sin x - 0 - \sin x - \cos x - 1$$

$$y = -\cos x - 1$$

$$\therefore \frac{dy}{dx} = \sin x \quad \therefore \frac{d^2y}{dx^2} = \cos x$$

$$\therefore \frac{d^2y}{dx^2} = \cos x - \cos x - 1 = -1 \text{ ans}$$

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9. Let α, β are roots of $x^2 + \sqrt{3}x - 16 = 0$ & γ, δ are roots of $x^2 + 3x - 1 = 0$ and let $P_n = \alpha^n + \beta^n$ & $Q_n = \gamma^n + \delta^n$ the find value of $\frac{P_{25} + \sqrt{3}P_{24}}{2P_{23}} + \frac{Q_{24} - Q_{22}}{Q_{23}}$

Ans. (5)

Sol. α, β are roots of $x^2 + \sqrt{3}x - 16 = 0$

$$\therefore \alpha^n + \sqrt{3} \alpha^{n-1} - 16 \alpha^{n-2} = 0$$

$$\beta^n + \sqrt{3} \beta^{n-1} - 16 \beta^{n-2} = 0$$

$$P_n + \sqrt{3} P_{n-1} - 16 P_{n-2} = 0$$

$$\therefore P_{25} + \sqrt{3} P_{24} - 16 P_{23} = 0$$

$$\Rightarrow \frac{P_{25} + \sqrt{3}P_{24}}{2P_{23}} = 8$$

Similarity

$$Q_n + 3Q_{n-1} - Q_{n-2} = 0$$

$$\therefore Q_{24} + 3Q_{23} - Q_{22} = 0$$

$$\Rightarrow \frac{Q_{24} - Q_{22}}{Q_{23}} = -3$$

$$\therefore \frac{P_{25} + \sqrt{3}P_{24}}{2P_{23}} + \frac{Q_{24} - Q_{22}}{Q_{23}} = 8 - 3 = 5$$

10. The radius of smallest circle touches both parabolas externally $x^2 + 2 = y$ & $y^2 + 2 = x$

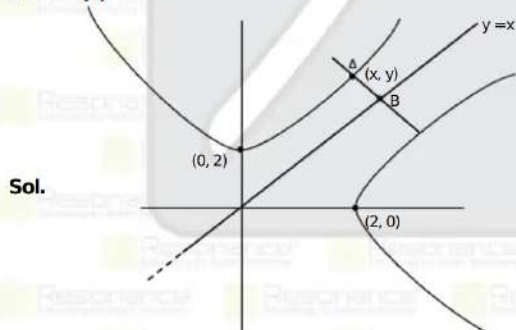
(1) $\frac{7}{4\sqrt{2}}$

(2) $\frac{7}{2\sqrt{2}}$

(3) $\frac{7}{3\sqrt{2}}$

(4) $\frac{7}{5\sqrt{2}}$

Ans. (1)



Sol.

$$x^2 + 2 = y \text{ \& \; } y^2 + 2 = x$$

are inverse of each other

Let $A(x_1, y_1)$ lies on $x^2 + 2 = y$

then normal at A is

$$y - y_1 = -\frac{1}{2x_1}(x - x_1)$$

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$$\text{Slope of normal} = -\frac{1}{2x_1} = -1$$

$$x_1 = \frac{1}{2}$$

$$\text{Put in } x^2 + 2 = y$$

$$1 + 2 = y$$

$$\frac{-}{4} + 2 = y$$

$$y = \frac{9}{4}$$

$$\text{radius AB} = \left| \frac{\frac{1}{2} - \frac{9}{4}}{\sqrt{2}} \right|$$

$$= \frac{7}{4\sqrt{2}}$$

11. Let positive numbers $a_1, a_2, a_3, \dots$ are in G.P. such that $a_3 a_5 = 729$ & $a_2 + a_4 = \frac{111}{4}$, then $a_1 + a_2 + a_3 =$

(1) $\frac{41}{8}$

(2) $\frac{43}{8}$

(3) $\frac{45}{8}$

(4) $\frac{47}{8}$

Ans. (2)

Sol. Let $a_1, a_2, a_3, \dots$ are in G.P.

$$a_3 a_5 = 729 \Rightarrow ar^2 \cdot ar^4 = 729$$

$$\Rightarrow a^2 r^6 = 729 \Rightarrow ar^3 = 27$$

$$\& a_2 + a_4 = \frac{111}{4} \Rightarrow ar + ar^3 = \frac{111}{4}$$

$$ar = \frac{111}{4} - 27 = \frac{111 - 108}{4} = \frac{3}{4}$$

$$\therefore \frac{ar^3}{ar} = 27 \times \frac{4}{3} = 9 \times 4$$

$$r^2 = 36 \quad \therefore r = 6 \quad \therefore a = \frac{3}{4} \times \frac{1}{6} = \frac{1}{8}$$

$$\therefore a = \frac{1}{8}, r = 6$$

$$\therefore a_1 + a_2 + a_3 = a + ar + ar^2 = a(1 + r + r^2)$$

$$= \frac{1}{8} (1 + 6 + 36) = \frac{43}{8}$$

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12. The sum of $1 + 3 + 11 + 25 + \dots$ upto 20 terms is

Ans. (7240)

Sol. $S = 1 + 3 + 11 + 25 + \dots$

$$t_n = an^2 + bn + c$$

$$t_1 = a + b + c = 1$$

$$t_2 = 4a + 2b + c = 3$$

$$t_3 = 9a + 3b + c = 11$$

$$\therefore 5a + b = 8$$

$$3a + b = 2$$

$$2a = 6 \quad \therefore a = 3 \quad \therefore b = -7, c = 5$$

$$\therefore t_n = 3n^2 - 7n + 5$$

$$\therefore S_n = \sum t_n = 3 \cdot \sum n^2 - 7 \sum n + \sum 5$$

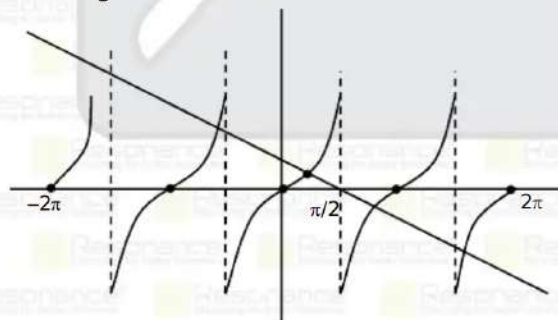
$$S_n = 3 \cdot \frac{n(n+1)(2n+1)}{6} - 7 \cdot \frac{n(n+1)}{2} + 5n$$

$$\begin{aligned}\therefore S_{20} &= 3 \cdot \frac{20 \cdot 21 \cdot 41}{6} - \frac{7}{2} \cdot 20 \cdot 21 + 100 \\ &= 8610 - 1470 + 100 \\ &= 7240\end{aligned}$$

13. Number of solutions of equation $2x + 3\tan x = \pi$, $\{x: x \in (2n-1)\frac{\pi}{2}, x \in [-2\pi, 2\pi]\}$ is

Ans. (5)

Sol. $\tan x = \frac{\pi - 2x}{3}$



Total 5 solutions

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14. Domain of $f(x) = \sin^{-1}\left(\frac{3-2x}{5+4x}\right) + \sin^{-1}\left(\frac{4-3x}{2-x}\right)$ is $[a, b]$ then $a^2 + b^2$ is

(1) $\frac{13}{2}$

(2) $\frac{13}{8}$

(3) $\frac{13}{4}$

(4) $\frac{11}{2}$

Ans. (3)

Sol. $\frac{3-2x}{5+4x} > 0$

$$x \in \left(-\frac{5}{4}, \frac{3}{2}\right) \quad (1)$$

$$\& \quad -1 \leq \frac{4-3x}{2-x} \leq 1$$

$$0 \leq \frac{2-x+4-3x}{2-x} \quad \& \quad \frac{4-3x-2+x}{2-x} \leq 0$$

$$0 \leq \frac{6-4x}{2-x} \quad \& \quad \frac{2-2x}{2-x} \leq 0$$

$$x \in \left(-\infty, \frac{3}{2}\right) \cup (2, \infty) \quad x \in [1, 2)$$

by. (1) $\cap$ (2) $\cap$ (3)

$$\text{Domain } x \in \left[1, \frac{3}{2}\right)$$

$$\text{Now } a^2 + b^2 = 1 + \frac{9}{4} = \frac{13}{4}$$

15. A relation R is defined on Set A = {-3, -2, -1, 0, 1, 2, 3}. R = {(x, y)} : $0 \leq x^2 + 2y \leq 4$. If n(R) = m and minimum number of elements are added to R so that it becomes reflexive is n then m + n is

Ans. (18)

Sol. for reflexive $x = y$

$$0 \leq x^2 + 2x \leq 4$$

$$x \in (-\infty, -2] \cup [0, \infty) \text{ and } x^2 + 2x - 4 \leq 0$$

$$x \in [-1 - \sqrt{5}, -1 + \sqrt{5}]$$

So R has $(-3, -3), (-2, -2), (0, 0), (1, 1)$

So 3 elements has to add for reflexive hence $n = 3$

also when $x = 0, y = 0, 1, 2 \Rightarrow 3$ elements

when $x = \pm 1, y = 0, 1 \Rightarrow 4$ elements

when $x = \pm 2, y = -2, -1, 0 \Rightarrow 6$ elements

when $x = \pm 3, y = -3 \Rightarrow 2$ elements

So total elements $m = 15$

So $m + n = 15 + 3 = 18$

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16. Let $f(x) = \begin{cases} (1+ax)^{\frac{1}{x}}, & x < 0 \\ b+1, & x = 0 \\ \frac{(x+4)^{\frac{1}{2}} - 2}{(x+c)^{\frac{1}{3}} - 2}, & x > 0 \end{cases}$ be a function. If $f(x)$ is continuity at $x = 0$ then $e^a \times bc =$

Ans. (48)

Sol. $f(x) = \begin{cases} (1+ax)^{\frac{1}{x}}, & x < 0 \\ b+1, & x = 0 \\ \frac{(x+4)^{\frac{1}{2}} - 2}{(x+c)^{\frac{1}{3}} - 2}, & x > 0 \end{cases}$

Hence $f(0) = b+1$

$$\text{RHL} = \lim_{x \rightarrow 0^+} \frac{(x+4)^{\frac{1}{2}} - 2}{(x+c)^{\frac{1}{3}} - 2} \quad (\text{for } \div \text{ form } c^{1/3} - 2 = 0, c = 8)$$

$$\begin{aligned} &= \lim_{x \rightarrow 0} \frac{2\left(1 + \frac{x}{4}\right)^{\frac{1}{2}} - 2}{\left(1 + \frac{x}{8}\right)^{\frac{1}{3}} - 2} \\ &= \lim_{x \rightarrow 0} \frac{1 + \frac{x}{8} - 1}{1 + \frac{x}{8} \cdot \frac{1}{3} - 1} = \frac{\frac{1}{8}}{\frac{1}{8} \cdot \frac{1}{3}} = 3 \end{aligned}$$

$$\therefore b+1 = 3 \Rightarrow b = 2$$

$$\text{LHL} = \lim_{x \rightarrow 0} (1+ax)^{\frac{1}{x}} = \lim_{x \rightarrow 0} e^{\frac{1+ax-1}{x}} = e^a = 3$$

$$\therefore e^a \cdot bc = 3 \cdot 2 \cdot 8 = 48$$



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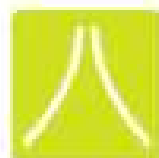
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MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-1

DATE & DAY: 03rd April 2025 & Thursday

PAPER-1

Duration: 3 Hrs.

Time: 09:00 – 12:00 IST

SUBJECT: CHEMISTRY

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PART : CHEMISTRY

1. In the reaction $A + B \rightarrow C$

Both reactant A and B react according to 1st order reaction initially $[A]_0 = 8[B]_0$ and half-life of A is 10 min and half-life of B is 40 min then time after which concentration of a become equal to B is _____ min.

Ans. (40)

Sol.

$$C_A = C_0 e^{-k_A t}$$

$$(C_{tA}) = (C_t)_B$$

$$A_0 e^{-k_A t} = [B]_0 e^{-k_B t}$$

$$\Rightarrow 8[B]_0 e^{-\left(\frac{\ln 2}{10}\right)t} = [B]_0 e^{-\left(\frac{\ln 2}{40}\right)t}$$

$$\Rightarrow e^{-\left(\frac{\ln 2}{10}\right)t} = e^{-\left(\frac{\ln 2}{40}\right)t}$$

$$\Rightarrow (2)^t = 2^{\left(\frac{1}{30} - \frac{1}{40}\right)t}$$

$$\Rightarrow t = 40 \text{ min}$$

2. For the following complex



Correct order of λ absorbed is :

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

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

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

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

Ans. (1)

Sol.

Stronger the ligand, higher is splitting and greater of energy of photon absorbed and smaller will be λ of absorbed light.

3. Correct matching of List-I with List-II is :

	List - I		List - II
(a)	PF_5	(i)	sp^2d
(b)	$[\text{PtCl}_4]^{2-}$	(ii)	dsp^2
(c)	SF_6	(iii)	sp^3
(d)	$[\text{Ni}(\text{CO})_4]$	(iv)	sp^3d^2

(1) a - I, b - II, c - III, d - IV

(2) a - I, b - II, c - IV, d - III

(3) a - II, b - I, c - III, d - IV

(4) a - I, b - III, c - IV, d - II

Ans. (2)

Sol.

(a)	PF_5	sp^2d
(b)	$[\text{PtCl}_4]^{2-}$	dsp^2
(c)	SF_6	sp^3d^2
(d)	$[\text{Ni}(\text{CO})_4]$	sp^3

4. Correct decreasing molar conductivity order of following ion H^+ , Ca^{2+} , Mg^{2+} , Na^+ , Li^+ is

(1) $\text{H}^+ > \text{Ca}^{2+} > \text{Mg}^{2+} > \text{Na}^+ > \text{Li}^+$

(2) $\text{Ca}^{2+} > \text{Mg}^{2+} > \text{Na}^+ > \text{Li}^+ > \text{H}^+$

(3) $\text{Ca}^{2+} > \text{Mg}^{2+} > \text{H}^+ > \text{Li}^+ > \text{Na}^+$

(4) $\text{Mg}^{2+} > \text{Ca}^{2+} > \text{H}^+ > \text{Li}^+ > \text{Na}^+$

Ans. (1)

Sol.

Molar conductivity depends on size and charge of ion, in aqueous solution H^+ ion have highest molar conductivity.

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5. Solution-I is prepared as

Solution-I

10 mole of A
+
10 lit H₂O

From solution-I, 1 lit. solution is taken and prepared solution-II as

Solution-II

1 Lit. solution A
+
1 mole of A
+
1 mole H₂O

Then which of the following quantity will change.

(1) molar heat capacity

(2) Gibb's free energy

(3) Density

(4) Concentration

Ans. (2)

Sol. Density, concentration and molar heat capacity remain same as these are intensive property while Gibb's free energy is extensive quantity. So it will change.

6. 2 mole each of ethylene glycol and glucose added to 500 gram of water then final boiling point of the mixture is _____. [Given : $k_b(\text{H}_2\text{O}) = 0.52 \frac{\text{kg}}{\text{mole}}$]

(1) 377.16

(2) 277.16

(3) 177.16

(4) 360.16

Ans. (1)

Sol. $\Delta T_b = i k_b \times m$

$$\Delta T_b = 1 \left[0.52 \times \left(\frac{4}{0.5} \right) \right]$$

$$\Delta T_b = 0.52 \times 8$$

$$T_b - 373 = 4.16$$

$$T_b = 377.16 \text{ K}$$

7. For reaction



Then number of terminal oxygen in C is _____

Ans. (6)

Sol. $\text{CrO}_2\text{Cl}_2 + \text{NaOH} \longrightarrow \text{CrO}_2\text{Cl}_2 + \text{NaCl} + \text{H}_2\text{O}$



Structure of $\text{CrO}_2\text{O}^{2-}$ is



so terminal oxygen is -6.

8. For the reaction



Fe obtained as a complex ion A, then number of optical isomer of complex A is _____

Ans. (2)

Sol. $\text{FeCl}_3 + \text{H}_2\text{C}_2\text{O}_4 + \text{KOH} \longrightarrow [\text{Fe}(\text{C}_2\text{O}_4)_3]^-$

for $[\text{M}(\text{AA})_3]$ total number of optical isomer = 2.

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9. From following statement

- (a) Ionisation energy of Be is higher than B.
(b) Li is most electropositive element.
(c) Electronegativity of C in CCl_4 and CH_4 is 2.5.

(1) a, b only (2) b, c only (3) a, c only (4) a, b, c

Ans. (3)

Sol. Cs is most electro positive.

10. 0.5 gram of organic compound on complete combustion give 1.46 gram of CO_2 and 0.90 gram of water, then % of carbon in organic compound is _____. (Nearest integer)

Ans. (80)

Sol. $C_xH_y + \left(x + \frac{y}{4}\right) O_2 \longrightarrow xCO_2(g) + \frac{y}{2} H_2O(l)$

0.5 gram	1.46 g	0.90 g
----------	--------	--------

$$(W_c)_{\text{in CO}_2} = \left[\frac{1.46}{44} \right] 12$$

$$\% \text{ of C in organic compound} = \left[\frac{1.46}{44} \right] \times \frac{12}{0.5} \times 100 = 79.63$$

11. If separately we take 10^{-6} gram each of Pr, Pt, Pb, Po, then which one have maximum number of atom.

(1) Pr (2) Pt (3) Pb (4) Po

Ans. (1)

Sol.	Element	Atomic number
------	---------	---------------

Pt 59

Pt 85

Pd B2

Po

So P₁ have maximum number of atom.

12. **Statement – I :** N–N bond is weaker and longer than P–P bond.

Statement – II : Member of group 15 in +3 oxidation state can easily under disproportionation reaction.

- (1) Both statement I and statement II are true.
(2) statement I is true and statement II is false.
(3) statement I is false and statement II is true.
(4) Both statement I and statement II are false.

Ans. (3)

Sol. N–N bond is weaker than P–P bond but N–N bond length is smaller than P–P bond.

13. Correct enthalpy of formation of $C_2H_2(g)$ is _____ kJ/mole (Nearest integer)

given (i) $\Delta H_{\text{sublimation}}(\text{C, graphite}) = 717 \text{ kJ/mol}$

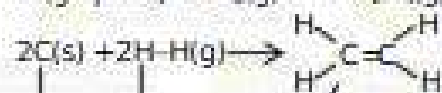
(ii) $\Delta H(C \equiv C) = 346 \text{ kJ/mole}$

(ii) $\Delta H(\text{H}-\text{H}) = 436 \text{ kJ/mole}$

$$(b) \Delta H_{\text{HCl-H}} = 474 \text{ kJ/mole}$$

Ans. (304)

Sol. $2\text{C}(\text{graphite}) + 2\text{H}_2(\text{g}) \rightleftharpoons \text{C}_2\text{H}_2(\text{g})$



$$\begin{aligned}\Delta H &= 2\Delta H_{\text{sub}}(\text{C, graphite}) + 2E_{\text{H-H}} - 4E_{\text{C-H}} - E_{\text{C-C}} \\ &= 2 \times 717 + 2 \times 436 - 4 \times 414 - 346 \\ &= 2306 - 2002 \\ &= 304 \text{ kJ/mole}\end{aligned}$$

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14. For equilibrium reaction



In equilibrium mixture 'Xe' is added at fixed temperature and pressure then at new equilibrium.

- (1) Partial pressure of PCl_5 increase. (2) Partial pressure of PCl_5 decrease.
(3) Number change at equilibrium. (4) Partial pressure of Cl_2 increases.

Ans. (2)

Sol. $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$

$$K_p = \frac{(P_{\text{PCl}_3}) (P_{\text{Cl}_2})}{(P_{\text{PCl}_5})}$$

on adding 'Xe' equilibrium shift forward direction so partial pressure of each species decrease.

15. From the following ion



how many of the above ion have magnetic moment (spin only) = 4.9 BM.

- (1) 4 (2) 5 (3) 3 (4) 6

Ans. (1)

Sol. Ion Number of unpaired electron

Cr^{2+} 4

Mn^{2+} 5

Co^{2+} 3

Fe^{2+} 4

Mn^{3+} 4

Co^{3+} 4

Fe^{3+} 5

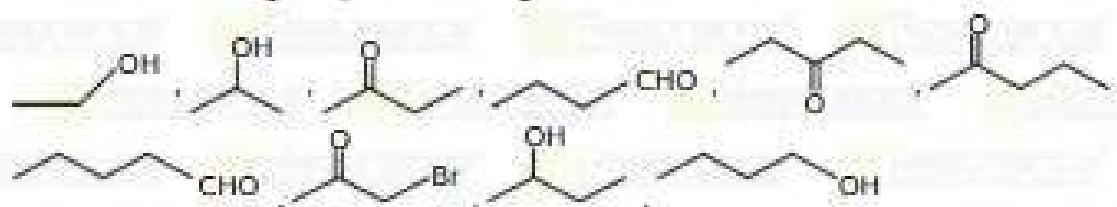
16. Which of the following Bohr's postulate does not obey quantum mechanical model of atom.

- (1) Electron moves in definite circular path around nucleus.
(2) When electron moves in its stationary orbit it does not exist electro magnetic wave.
(3) In each orbit electron have definite energy that's why its transition energy quantize.
(4) Angular moment of electron in each orbit is $\left(mvr = \frac{nh}{2\pi} \right)$ is quantize.

Ans. (1)

Sol. According to quantum mechanical model of atom electron does not move in definite circular path.

17. Which of the following compounds donot give Haloform reaction.



Ans. (4)

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18. Observer the following reaction sequence.



Which of the following options has correct structure of (A) and (B) respectively.

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

Ans. (1)



19. Which one of the following compounds is most acidic ?

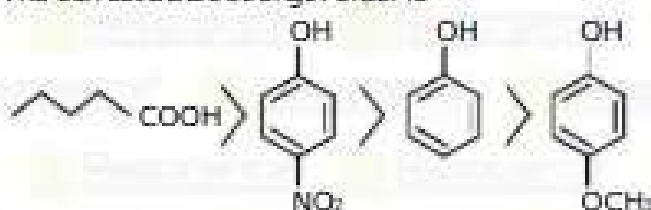
- (1)  (2) 
 (3)  (4) 

Ans. (1)

Sol. Carboxylic acid is more acidic than phenol and the given phenol derivatives because carboxylate anion has two equi-energetic resonating structures



The correct acidic strength order is



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20. 3-methyl-5-oxoheptanal, will be formed after ozonolysis of

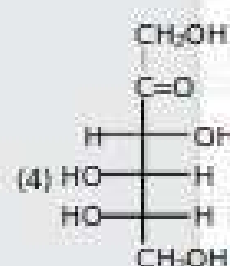
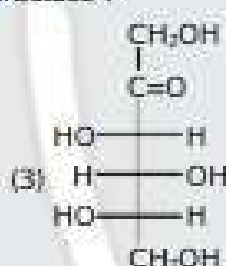
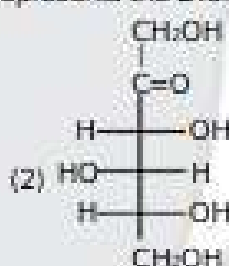
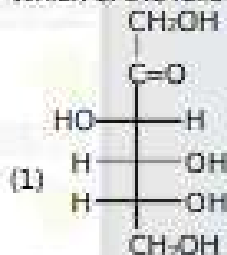


Ans. (3)

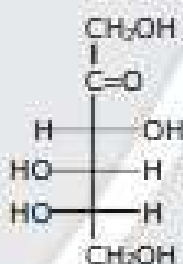


Sold.

21. Which of the following represents the L-form of fructose?



Ans. (4)



Sol. L-form of fructose is

22. Which of the following is/are correct ?

- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_3$ and $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$ metamers
(b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$ position isomers
(c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_3\text{CH}_2\text{NHCH}_2\text{CH}_3$ homologues
(d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CN}$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NC}$ functional isomers

Ans. (1) (1) (a) and (b) (2) (a) and (c) (3) (b) and (c) (4) (b) and (d)

Ans. (1)

Sol. (1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{CH}_3$ and $\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)(\text{CH}_2\text{CH}_3)_2$ are metamers.

(2) $\text{CH}_3\text{CH}:\text{CH}_2-\text{CH}_2-\text{OH}$ and $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}=\text{CH}_2$ are different compounds (homologues)

(3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ and $\text{CH}_3\text{CH}_2\text{N}(\text{H})\text{CH}_2\text{CH}_3$ are functional isomers

(4) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CN}$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NC}$ are functional isomers

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23. 0.42 g of the following compound (x) is subjected to analysis for estimation of volume of N_2 gas by Duma's method



What is the volume of N_2 gas evolved in mL at STP (1 atm pressure and 273 K temperature) to the nearest integer

Ans. (109)

Sol. Mass of (X) = 0.42 g

Number of moles of (X) $\frac{0.42}{86}$

Volume of N_2 gas at STP

$$= \frac{0.42}{86} \times 22.400 \text{ mL} = 109.4 = 109 \text{ mL}$$

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MEMORY BASED QUESTIONS & TEXT SOLUTION

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PART : PHYSICS

1. A straight wire is converted into circle as shown in figure find resistance between A & B



$$A = 5 \text{ mm}^2$$

$$l = 25 \text{ m}$$

$$\rho = 5 \times 10^{-6} \Omega \cdot \text{m}$$

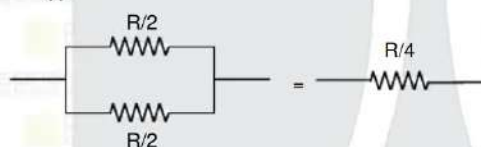
Ans. (1) 125
(4)

(2) 100

(3) 50

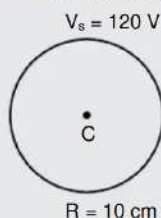
(4) 6.25

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



$$R_{\text{eq}} = \frac{1}{\frac{1}{R/2} + \frac{1}{R/2}} = \frac{1}{\frac{2}{R}} = \frac{R}{2} = \frac{5 \times 10^{-6} \times 25}{2} = 6.25$$

2. The electric potential at the surface of a shell of radius 10 cm is 120 V. Find the potential at its center (V_1), at $r = 5$ cm from center (V_2) and at $r = 15$ cm from center (V_3)



	V_1	V_2	V_3
(1)	120	120	80
(2)	40	40	80
(3)	80	80	120
(4)	80	120	80

Ans. (1)
Sol.

$$V_s = V_1 = 120 \text{ V}$$

$$V_2 = V_s = 120 \text{ V}$$

$$\frac{KQ}{R} = 120$$

$$Q = \frac{R}{K} 120$$

$$\therefore V_3 = \frac{KQ}{15} = \frac{R(120)}{15} = \frac{10}{15} \times 120 = 80$$

$$V_3 = 80 \text{ V}$$

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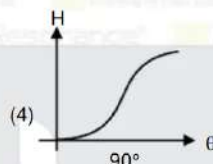
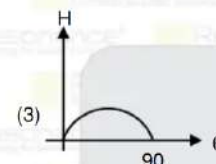
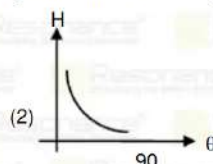
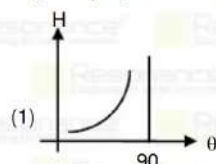
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3. Angle of projection Vs maximum height curve is given. Choose correct graph



Ans. (4)

Sol. $H = \frac{u^2 \sin^2 \theta}{2g}$

$$H \propto \sin^2 \theta$$

4th is correct option

4. Find the colour corresponding to photons of energy 3eV.

(1) Blue

(2) Yellow

(3) Green

(4) Violet

Ans. (4)

Sol. $\lambda_{th} = \frac{12400}{E} \text{ e.v. } \text{\AA}$

$$= \frac{12400}{3} \text{ \AA}$$

$$= 4130 \text{ \AA}$$

For violet color $3800 \text{ \AA} < \lambda < 4500 \text{ \AA}$

So color is violet

5. $I_1 = 4 \text{ I}$, $I_2 = 9 \text{ I}$. Find $I_{\max}/I_{\min}$

(1) 5

(2) 10

(3) 15

(4) 25

Ans. (4)

Sol. $\frac{I_{\max}}{I_{\min}} = \left(\frac{\sqrt{9I} + \sqrt{4I}}{\sqrt{9I} - \sqrt{4I}} \right)^2 = \left(\frac{3\sqrt{I} + 2\sqrt{I}}{3\sqrt{I} - 2\sqrt{I}} \right)^2 = \frac{25}{1} = 25$

6. The radii of the curvature for a thin convex lenses are 10 cm and 15 cm respectively. The focal length of the lens is 12 cm. The refractive index of the lens material is

(1) 1.2

(2) 1.8

(3) 1.4

(4) 1.5

Ans. (4)

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Sol. $\frac{1}{f} = \left(\frac{\mu_l}{\mu_s} - 1 \right) \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$

$$\frac{1}{12} = (\mu - 1) \left(\frac{1}{10} - \frac{1}{-15} \right)$$

$$\frac{1}{12} = (\mu - 1) \left(\frac{3+2}{30} \right)$$

$$(\mu - 1) = \frac{1}{12} \times \frac{30}{5}$$

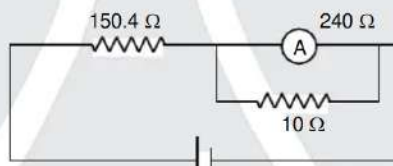
$$\mu - 1 = \frac{1}{2}$$

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

$$\mu = \frac{3}{2}$$

$$\mu = 1.5 \text{ Ans.}$$

7. An ammeter having resistance 240Ω is connected in the given circuit as shown. Find current through the ammeter.



(1) 1 mA (2) 5 mA (3) 100 mA (4) 2.5 mA

Ans. (2)

Sol. $R_{eq} = 150.4 + \frac{10 \times 240}{240 + 10}$

$$R_{eq} = 150.4 + \frac{240}{25}$$

$$R_{eq} = 160 \Omega$$

$$i = \frac{V}{R_{eq}} = \frac{20}{160}$$

$$i = \frac{1}{8} \text{ A}$$

Current through ammeter is

$$i_{ami} = \frac{1}{8} \times \frac{10}{240 + 10}$$

$$i = \frac{10}{8 \times 250}$$

$$i = 5 \text{ mA}$$

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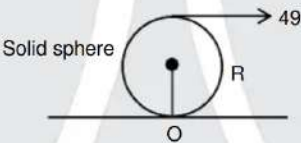
8. An ideal gas with an adiabatic exponent 1.5. Initially at 27°C is compressed adiabatically from 800 CC to 200 CC. The change in temperature of the gas is :

(1) 600 K (2) 300 K (3) 450 K (4) 273 K

Ans. (2)

Sol. $PV^\gamma = \text{constant}$
 $TV^{\gamma-1} = \text{constant}$
 $T_1 V_1^{\gamma-1} = T_2 V_2^{\gamma-1}$
 $(300) (800)^{\gamma-1} = T_2 (200)^{\gamma-1}$
 $T_2 = 300 \left(\frac{800}{200} \right)^{\gamma-1}$
 $T_2 = 300 (4)^{1/2}$
 $T_2 = 300 \times 2$
 $T_2 = 600 \text{ K}$
 Change in temperature = 600 – 300 = 300 K

9. A solid sphere of mass 20 kg is pulled with force of 49 N as shown in diagram. Acceleration of sphere assuming no slipping



(1) 2.5 m/s² (2) 2.8 m/s² (3) 1.4 m/s² (4) 3.5 m/s²

Ans. (4)

Sol. $\tau_O = I_O \alpha$

$$49 \times 2R = \frac{7}{5} MR^2 \times \frac{a}{R}$$

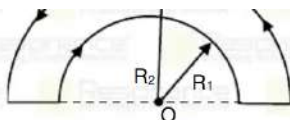
$$a = \frac{49 \times 2 \times 5}{7 \times 20}$$

$$a = \frac{7}{2}$$

$$= 3.5 \text{ m/s}^2 \text{ Ans.}$$

10. A current carrying wire is bent as shown in the figure. Find magnetic field at centre O of the semi-circles (Take $R_1 = 4\Omega$ and $R_2 = 6\Omega$)





- Ans. (1) $1 \times 10^{-8} \text{ T}$ (2) $1 \times 10^{-4} \text{ T}$ (3) $1 \times 10^{-3} \text{ T}$ (4) $1 \times 10^{-7} \text{ T}$

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Sol. $B_1 = \frac{\mu_0 I}{4R_1} \otimes$

$B_2 = \frac{\mu_0 I}{4R_2} \odot$

$B_{\text{net}} = \frac{\mu_0 I}{4R_1} - \frac{\mu_0 I}{4R_2}$

$= \frac{\mu_0 I}{4} \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$

$B_{\text{net}} = \frac{4\pi \times 10^{-7} \times 12}{4\pi} \left(\frac{1}{4} - \frac{1}{6} \right)$

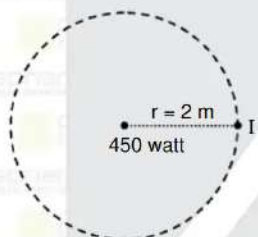
$\Rightarrow \frac{4\pi \times 10^{-7}}{4\pi}$

$\Rightarrow 1 \times 10^{-7} \text{ Tesla}$

11. Power of point source is 450 watt. Radiation pressure on a perfectly reflecting surface at a distance of 2m is :

- Ans. (1) 1.5×10^{-8} (2) 3×10^{-8} (3) 0 (4) 6×10^{-8}

Sol.



$I = \frac{P}{\text{Area}}$

$I = \frac{P}{4\pi r^2}$

[P = 450 watt]

[r = 2 m]

Radiation pressure = $\frac{2I}{c}$

$= \frac{2 \times 450}{4\pi \times 2^2 \times 3 \times 10^8}$

$= \frac{900}{16\pi \times 3 \times 10^8}$

$\Rightarrow 6 \times 10^{-8}$

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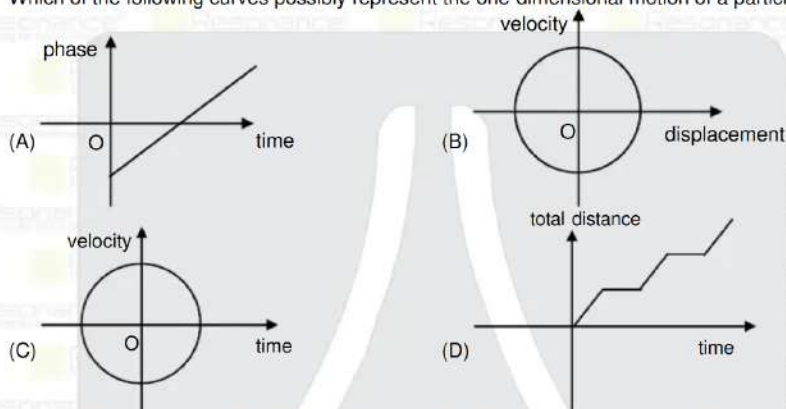
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12. Choose the correct option.

- | | |
|------------------------------------|------------------------------------|
| (a) Gravitational potential | (i) $M^{-1} L^3 T^{-2}$ |
| (b) Gravitational constant | (ii) $M L^2 T^{-2}$ |
| (c) Acceleration due to gravity | (iii) $M^0 L^2 T^{-2}$ |
| (d) Potential energy | (iv) $M^0 L T^{-2}$ |
| (1) a (iii), b (ii), c (iv), d (i) | (2) a (iii), b (i), c (iv), d (ii) |
| (3) a (ii), b (i), c (iv), d (iii) | (4) a (ii), b (iv), c (i), d (iii) |

Ans. (2)

13. Which of the following curves possibly represent the one-dimensional motion of a particle?

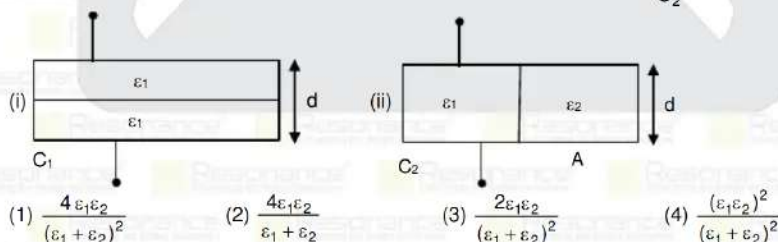


- (1) A and B (2) A, B, D (3) A, B, C (4) A, C, D

Ans. (2)

Sol. For 'B' option @
 $v^2 = \omega^2 (A^2 - x^2)$
 {if $\omega = 1$ }
 $v^2 = A^2 - x^2$
 $v^2 + x^2 = A^2$ this is equation of circle

14. Capacitors with dielectric are shown in figure (symmetric situation). Find $\frac{C_1}{C_2}$



Ans. (1)

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Sol. $C_1 = \frac{\left(\frac{A\epsilon_1}{d/2}\right)\left(\frac{A\epsilon_2}{d/2}\right)}{\left(\frac{A\epsilon_1}{d/2}\right) + \left(\frac{A\epsilon_2}{d/2}\right)} \Rightarrow \frac{\left(\frac{2A\epsilon_1}{d}\right)\left(\frac{2A\epsilon_2}{d}\right)}{\frac{2A}{d}(\epsilon_1 + \epsilon_2)}$

$\Rightarrow \frac{2A\epsilon_1\epsilon_2}{d(\epsilon_1 + \epsilon_2)} \dots(1)$

$C_2 = \frac{A\epsilon_1}{2d} + \frac{A\epsilon_2}{2d}$

$\Rightarrow \frac{A}{2d}(\epsilon_1 + \epsilon_2) \dots(2)$

Ratio

$\frac{C_1}{C_2} = \frac{\frac{2A\epsilon_1\epsilon_2}{d(\epsilon_1 + \epsilon_2)}}{\frac{A}{2d}(\epsilon_1 + \epsilon_2)} \Rightarrow \frac{2A\epsilon_1\epsilon_2}{d(\epsilon_1 + \epsilon_2)} \times \frac{2d}{A(\epsilon_1 + \epsilon_2)} = \frac{4\epsilon_1\epsilon_2}{(\epsilon_1 + \epsilon_2)^2}$

15. An object is dropped from height S. At a point its kinetic energy is three times its potential energy. Find its height from ground and speed at that point

(1) $\frac{3S}{4}, \sqrt{\frac{3gS}{2}}$

(2) $\frac{S}{4}, \sqrt{\frac{3gS}{2}}$

(3) $\frac{S}{2}, \sqrt{gS}$

(4) $\frac{S}{4}, \sqrt{\frac{3gS}{4}}$

Ans.

Sol. (2)

Kinetic Energy = 3U

$E = KE + PE$

$= 3U + U$

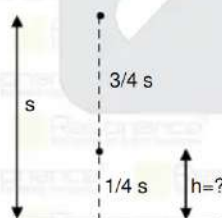
$= 4U$

$mgs = 4U$

$U = \frac{mgs}{4}$

$mgh = \frac{mgs}{4}$

height from the ground $h = \frac{s}{4}$



$KE = 3U$

$KE = 3 \cdot \frac{mgs}{4}$

$\frac{1}{2}mv^2 = \frac{3mgs}{4}$

Speed of the particle $v = \sqrt{\frac{3gs}{2}}$

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16. Find force (in millinewton) on current carrying wire of length $\ell = 4$ m, and current of 8A placed perpendicular to the magnetic field of $B = 0.15$ tesla.

(1) 4600 mN

(2) 4800 mN

(3) 4900 mN

(4) 4400 mN

Ans.

(2)

Sol.

$F = I(\vec{l} \times \vec{B})$

$F = B I L$

$= 0.15 \times 8 \times 4$

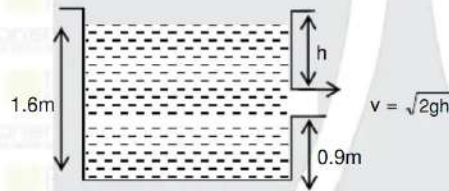
$$= 0.6 \times 8$$

$$= 4.8 \text{ N}$$

$$= 4800 \text{ mN}$$

17. A container of height 1.6 m is having a small hole at height of 0.9m from ground then find speed of efflux from the hole (take $g = 9.8 \text{ m/s}^2$)
 (1) 3.71 m/s (2) 2.97 m/s (3) 4.12 m/s (4) 5.79 m/s

Ans. (1)
 Sol.



$$V = \sqrt{2 \times 9.8 \times 0.7}$$

$$= 3.71 \text{ m/s}$$

18. Given below are two statements about x-ray spectra of elements :

Statement (i) : A plot of $\sqrt{\nu}$ (ν = frequency of x-ray emitted) vs atomic mass is a straight line.

Statement (ii) : A plot of ν (ν = frequency of x-ray emitted) vs atomic number is straight line .

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

- (1) Statement (i) is true but statement (ii) is false
 (2) Statement (i) is false but statement (ii) is true
 (3) Statement (i) and statement (ii) are false
 (4) Statement (i) and statement (ii) are true

Ans. (3)

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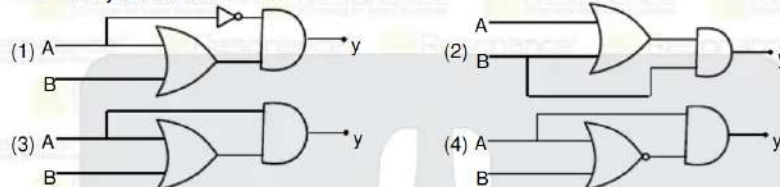


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19. Truth table of logical circuit given

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

The Identify the correct circuit :

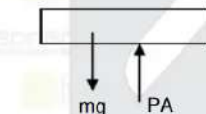


Ans. (3)

20. Given $F_{sp} = -kx$ when x is elongation in spring. If gas is heated isothermally at temperature T then find change in kinetic energy of piston when it moves for L_0 to L_1 . Initially spring is natural length.

Ans. $-\frac{nRT}{L_0}(L_1 - L_0) - \frac{K}{4}(L_1 - L_0)^4 + nRT/n\left(\frac{L_1}{L_0}\right) = \Delta KE$

Sol.



$$F = -kx^3$$

$$dU = -dW$$

$$U = \frac{Kx^4}{4} + C$$

$$W_{\text{spf}} = U_i - U_f$$

$$U_i = C$$

$$U_f = \frac{K}{4}(L_1 - L_0)^4 + C \quad \text{as } x = L_1 - L_0$$

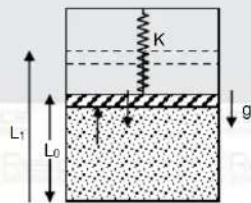
$$W_{\text{spf}} = -\frac{1}{4}K(L_1 - L_0)^4$$

$$W_{\text{gas}} = nRT/n\left(\frac{L_1}{L_0}\right)$$

$$W_g = -mg(L_1 - L_0)$$

$$mg = PA \quad PAL_0 = nRT$$

$$mg = \frac{nRT}{L_0}$$



Applying work energy theorem on piston

$$W_g + W_{\text{spf}} + W_{\text{gas}} = \Delta KE$$

$$-mg(L_1 - L_0) - \frac{1}{4}K(L_1 - L_0)^4 + nRT/n\left(\frac{L_1}{L_0}\right) = \Delta KE$$

$$-\frac{nRT}{L_0}(L_1 - L_0) - \frac{K}{4}(L_1 - L_0)^4 + nRT/n\left(\frac{L_1}{L_0}\right) = \Delta KE$$

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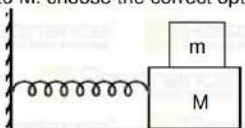
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21. The figure below an oscillating system of two blocks and a spring. The horizontal surface is smooth and the contact between the blocks is rough with coefficient of static friction μ . Considering that the blocks of mass m is always stationary relative to M . choose the correct option regarding the statement below.



- (A) Maximum frictional force between blocks is μmg
 (B) Time period of oscillation is $2\pi \sqrt{\frac{m+M}{k}}$
 (C) Friction, between the blocks at any instant in $\mu(m+m)g$
 (1) Only A is correct
 (2) Only B is correct
 (3) A,B and C is correct
 (4) A and B are correct

Ans. (2)

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RITAM BANERJEE



SCHOLARSHIP UPTO **100%**

on the basis of Class 10th & 12th &
JEE (Main) 2025 %ile/ AIR