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STUDY CENTRE, PALA

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VIDEO SOLUTION
APRIL 06, 2026
MONDAY

MEMORY BASED QUESTIONS

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06-04-2026 | SHIFT 1-MORNING

MEMORY BASED QUESTIONS

PHYSICS

QN In AC circuit supply voltage $V_{(rms)} = 100$ volts; $R = 80\,\Omega$; $X_L = 80\ \Omega$ and source frequency $f = 50$ Hz. Find the power factor.

1) $\frac{1}{\sqrt{2}}$ 2) $\frac{1}{2}$ 3) $\frac{3}{4}$ 4) $\frac{\sqrt{3}}{2}$

QN An expression of potential energy $= \frac{A\sqrt{x}}{B+x}$ is given. Then dimensions of (A.B) will be (x is positive here)

1) MLT^{-1} 2) $M^{1/2}L^{2/3}T^{-2}$ 3) $ML^{3.5}T^{-2}$ 4) $ML^{1/2}T^{-2}$

QN A block of mass m is released from height h on smooth plane. If normal force on top of the circular part is 3 mg. Find h.

1) 5 R 2) 4R 3) 3.5 R 4) 3R

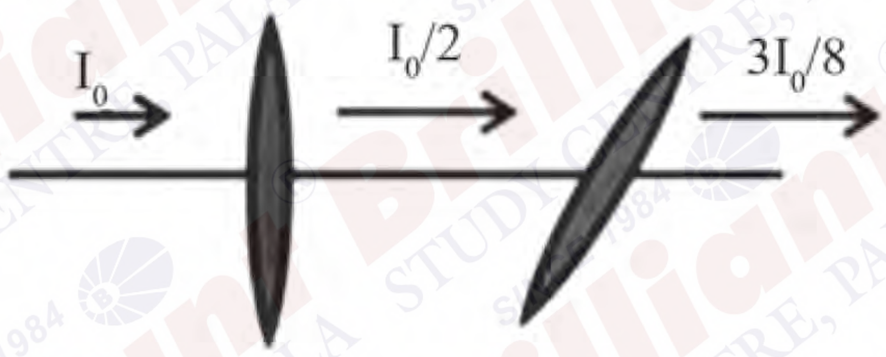
QN Electric field at centre of semi-circular ring of radius 10 cm is 100 v/m. Find charge on the ring if charge distribution is uniform.

1) $4\varepsilon_0$ 2) $20\varepsilon_0$ 3) $25\varepsilon_0$ 4) $30\ \varepsilon_0$

QN A point charge particle Q = 3C is placed at point A(0, –2, –5) and taken to point B(2, 1, 3) in the electric field $\vec{E} = \left(2x\hat{i} + 3y^2\hat{j} + 4\hat{k}\right)$. Find work done by electric field.

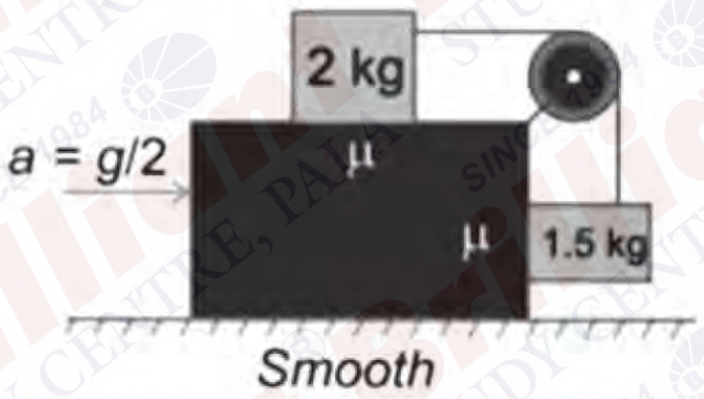
1) 75 Joule 2) 135 Joule 3) 89 Joule 4) 105 Joule

QN Unpolarised light with intensity I_0 incident on polariser. Find angle between axis of polariser and analyser, so that intensity of emergent light is $\frac{3I_0}{8}$.



1) 45° 2) 60° 3) 37° 4) 30°

QN Find least value of μ such that system more together without slipping.



1) $\frac{2}{11}$ 2) $\frac{3}{2}$ 3) $\frac{1}{7}$ 4) $\frac{5}{7}$

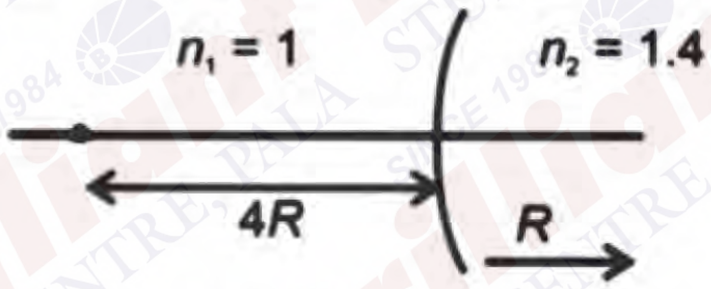
QN Time period of SHM of a particle is 16 sec. Find minimum time to move from $x = A$ to $x = \frac{A}{\sqrt{2}}$

QN A small cubical region of side 1 mm is placed and the centre of current I = 1 A carrying circular loop of radius a = 1 m. Find magnetic energy stored in the cube

1) $\Delta u = \pi \times 10^{-15}$ Joule 2) $\Delta u = \frac{\pi}{2} \times 10^{-15}$ Joule

3) $\Delta u = 2\pi \times 10^{-16}$ Joule 4) $\Delta u = 2\pi \times 10^{-15}$ Joule

QN A spherical refracting surface separating the media with refractive index $n_1 = 1$ and $n_2 = 1.4$ as shown. Object is placed at 4R from surface and R is curvature radius as shown.



1) $|m| = \frac{5}{3}$ 2) $|m| = \frac{4}{3}$ 3) $|m| = \frac{3}{5}$ 4) $|m| = \frac{3}{4}$

QN Ratio of wavelengths of 1st and 2nd line of Balmer series in hydrogen atom spectra is

1) $\frac{11}{13}$ 2) $\frac{15}{28}$ 3) $\frac{20}{27}$ 4) $\frac{13}{17}$

QN Power drawn by resistance $1\ k\Omega$ is 4 mW. Find value of R_S.

1) $2\,k\Omega$ 2) $500\ \Omega$ 3) $1k\Omega$ 4) $750\ \Omega$

QN A solid uniform sphere of mass m and radius R initially rotating with angular speed of $\omega = 2000$ rpm . If it stops in 10 sec when subjected to same constant retarding torque, then find number of revolutions and magnitude of torque.

1) $200; \frac{8\pi}{3} mR^2$ 2) $500; \frac{10\pi}{3} mR^2$

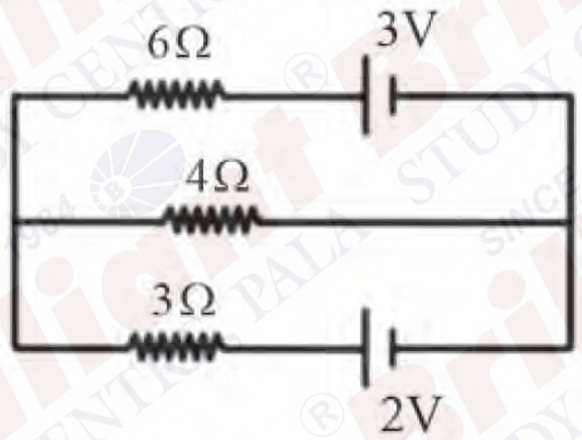
3) $\frac{500}{3}; \frac{8\pi}{3} mR^2$ 4) $400; \frac{10\pi}{3} mR^2$

QN Mass and radius of a solid sphere is measured with uncertainty of 1% and 2% respectively uncertainty (in percent) in calculation of density is

QN A one mole sample of gas undergoes an isothermal process in which volume changes from 3 litre to 1 litre. Find work done on the gas if initial pressure was 3×10^7 Pa

1) 270 ln3 2) 900 ln3 3) 3000 ln3 4) 9000 ln3

QN Heat dissipation in 6Ω resistance in 54 sec is $\frac{\alpha}{9}$J, then α



QN Two wires (A and B) of same cross sectional area are subjected to equal tensile forces gets elongated by same amount. The ratio of young's modulus of two material is $\frac{Y_A}{Y_B} = \frac{20}{11}$. Find the ratio of lengths of the wire $\frac{\ell_A}{\ell_B}$?

1) $\frac{10}{11}$ 2) $\frac{20}{11}$ 3) $\frac{11}{10}$ 4) $\frac{11}{20}$

QN YDSE, path difference for two points P and Q are $\frac{\lambda}{3}$ and $\frac{\lambda}{6}$ respectively. Ratio of intensities at P and Q is

1) $\frac{1}{4}$ 2) $\frac{1}{3}$ 3) 4 4) 2

QN Consider nuclear reaction, $P + {}^7_3Li \rightarrow 2{}^4_2He$. Energy absorbed in the process is (m_p = 1.0080u, $m_{L_1} = 7.0173u$, $m_{He} = 4.0201u$)

1) 14 MeV 2) 24 MeV 3) 18 MeV 4) 11 MeV

QN Match the following

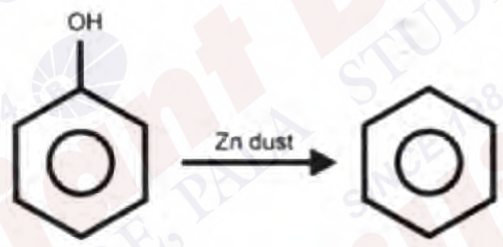
List – I	List – II
A) Scurvy	I) Pyriodixine
B) Convulsions	II) Vitamin - A
C) Cheilosis	III) Ascorbic Acid
D) Xeropthalmia	IV) Riboflavin

1) A-III; B-I; C-IV; D-II
2) A-I; B-III; C-IV; D-II
3) A-I; B-III; C-II; D-IV
4) A-III; B-I; C-II; D-IV

QN An oxide of iron contains 69.9% iron. Find the empirical formula. (Given Atomic masses Fe = 56, O = 16)

1) Fe_3O_4
2) Fe_2O_3
3) FeO_3
4) FeO

QN



47g

From the above reaction, find the number of moles of benzene formed (if efficiency of reaction is 60%)

1) 0.05
2) 0.06
3) 0.03
4) 0.04

QN When 0.25 moles of a non-volatile, non-ionizable solute was dissolved in 1 mole of a solvent the vapour pressure of solution was x% of vapour pressure of pure solvent. What is the x%?

1) 50%
2) 80%
3) 60%
4) 70%

QN Match the following

Column - I		Column - II	
Orbitals		Radial Nodes (RN) & Nodal Planes (NP)	
A	2s	P	1 R·N + two N·P
B	3s	Q	1 R·N + one N·P
C	3p	R	2 R·N + No N·P
D	4d	S	1 R·N + No N·P

1) A-S; B-R; C-Q; D-P
2) A-R; B-S; C-Q; D-P
3) A-Q; B-P; C-S; D-R
4) A-S; B-Q; C-R; D-P

QN Arrange the following in increasing order of their boiling point

A) n-C_4H_9OH B) n-$C_4H_9NH_2$ C) n-C_4H_{10} D) $C_2H_5NHC_2H_5$

1) D < C < B < A 2) D < B < A < C 3) C < D < B < A 4) C < B < A < D

QN If the shortest wavelength of hydrogen atom in Lyman series is x, then longest wavelength in Balmer series of He^+ is .....

1) 36x/5 2) 2x/5 3) x/4 4) 9x/5

QN Sucrose hydrolyses in acidic medium to form glucose and fructose which follows first order kinetics. If the half-life of sucrose is 3 hrs. The percentage of sucrose left after 7 hrs is .....

QN Statement-I : 3-phenyl pro-1-ene react with HBr give 1° bromide as a major product

Statement-II : Propene react with HBr in the presence of peroxide give 1° bromide as a major product

1) Statement-I is correct but statement-II is incorrect

2) Statement-I is incorrect but statement-II is correct

3) Both statement-I and statement-II are correct

4) Both statement-I and statement-II are incorrect

QN Which of the following can be used to form CH_4 gas

1) Kolbe's electrolysis 2) From CH_3MgBr

3) By Wurtz reaction 4) By reduction of CH_3CH_2Cl

QN Electrolytes are given $BaCl_2$, H_2SO_4 and HCl. And their molar conductivity are given X_1, X_2, X_3 respectively. Calculate the solubility product of $BaSO_4$.

1) $K_{sp} = \left(\frac{\kappa \times 1000}{X_1 + X_2 - 2X_3}\right)^2$ 2) $K_{sp} = \left(\frac{\kappa \times 1000}{X_1 + X_2 - 2X_3}\right)^4$

3) $K_{sp} = \left(\frac{\kappa \times 1000}{X_1 - X_2 + X_3}\right)^2$ 4) $K_{sp} = \left(\frac{\kappa \times 1000}{X_1 - X_2 + X_3}\right)^4$

QN Find the limiting molar conductivity of $BaSO_4$

[Given : $\Lambda_m^\circ(HCl) = x_1, \Lambda_m^o(H_2SO_4) = x_2, \Lambda_m^o(BaCl_2) = x_3$]

1) $x_2 + x_3 - 2x_1$ 2) $2x_2 + x_3 - 2x_1$ 3) $x_2 + x_3 - x_1$ 4) $x_2 + x_3 + 2x_1$

QN Statement-I : 3-phenyl prop-1-ene will react with HBr and give an alkyl halide major product having 1 chiral C-atom.

Statement-II : Aryl chloride and aryl cyanide both can be formed by Gattermann and Sandmeyer reaction.

1) Statement-I is correct, statement-II is incorrect

2) Statement-I is incorrect, statement-II is correct

3) Both statement-I and statement-II are correct

4) Both statement-I and statement-II are incorrect

QN 2-Methyl propene is added into a solvent (misture of ethyl acetate and ether) and the R_f value is found to be 0.42. If the same 2-methyl propene is reacted with dilute H_2SO_4 the major product obtaiend is x. Find the value of x

1) 0.12 2) 0.42 3) 0.65 4) 0.84

QN **Consider the Levis dot structure; in following pair.**

(A) SO_3^{2-} and CO_3^{2-}
(B) O_2 and F_2
(C) NH_3 and H_3O^+
(D) CN^- and CO

1) A and C only 2) A, C, D only 3) B, C and D only 4) C and D only

QN Match compounds in column I with column II

	Column-I		**Column-II**
(a)	Lysine	(i)	Hinsberg Test
(b)	Glutamine	(ii)	Hoffmann Bromamide (starting material)
(c)	Serine	(iii)	Ceric ammonium sulphate
(d)	Tyrosine	(iv)	Neutral $FeCl_3$ test

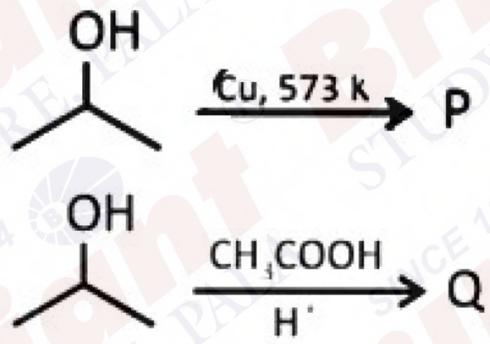
1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

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

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

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

QN



Compound P and Q are respectively.

1) CH_3COCH_3, $(CH_3)_2CHOOCCH_3$

2) $CH_3COOCH_2CH_2CH_3$, $CH_3–CH=CH_2$

3) C_2H_5CHO, $CH_3COOC_2H_5$

4) $CH_3CH_2CH_3$, $CH_3COOC_3H_7$

QN Choose the correct option of order of energy square planar complex

1) $dxz = dyz < dx^2 - y^2$

2) $dxy = dxz > dz^2$

3) $dxy = dyz = dxz$

4) $dxy < dz^2 < dx^2 - y^2$

QN For the reaction,

$A(g) \rightleftharpoons B(g) + C(g)$

Consider the data

$\log K_p$	3.5	2.5
$\frac{I}{T}(K^{-1})$	0.04	0.05

Calculate the value of $\frac{\Delta H}{R}$ (in K) based on above data

QN Consider the Levis dot structure, in following pair

A) SO_3^{2-} and CO_3^{2-} B) O_2 and F_2 C) NH_3 and H_3O^+ D) CN^- and CO

1) A and C only 2) A, C, D only 3) B, C and D only 4) C and D only

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MEMORY BASED QUESTIONS

MATHEMATICS

QN The value of $1^3-2^3+3^3+.....+15^3$ is equal to

1) 1856 2) 1854 3) 1786 4) 1826

QN In the expansion of $(1+ax)^{26}$ and $(1-ax)^{28}$, the coefficient of middle term is same, then the value of a is

1) $\frac{7}{22}$ 2) $\frac{7}{27}$ 3) $\frac{5}{27}$ 4) $\frac{5}{22}$

QN If $x_1, x_2....., x_{25}$ be 25 observations such that $\sum_{i=1}^{25}(x_i+5)^2=2500$ and $\sum_{i=1}^{25}(x_i-5)^2=1000$. Then, the ratio Mean and standard deviation of the given observations is

1) $\frac{1}{4}$ 2) $\frac{1}{2}$ 3) $\frac{2}{3}$ 4) $\frac{1}{5}$

QN $\int_{\frac{-\pi}{4}}^{\frac{\pi}{4}} \frac{32\cos^4\theta}{1+e^{\sin\theta}}d\theta$ is equal to

1) $3\pi+8$ 2) $3\pi+4$ 3) $4\pi+8$ 4) $4\pi+4$

QN The value of $\lim_{x\to 0}\frac{x^2\sin^2 x}{x^2-\sin^2 x}$ is equal to

QN $a_1, a_2, a_3, ...a_n$ are in A.P and sum of first 10 terms is 160, $g_1, g_2, g_3, ...g_n$ are in G.P where $g_1+g_2=8$ If the first term of A.P is equal to common ratio of G.P and first term of G.P is equal to common difference of A.P then sum of all possible values of g_1 is equal to

1) $\frac{34}{9}$ 2) $\frac{28}{9}$ 3) $\frac{23}{3}$ 4) $\frac{28}{5}$

QN Consider e_1 and e_2 be roots of the equation $x^2-ax+2=0$. Set of values of a for which e1 and e_2 are eccentricities of hyperbolas then $a\in[\alpha,\beta]$ and set of values of a for which e1 and e2 are eccentricity of a hyperbola and an ellipse is (γ,∞) then $\alpha^2+\beta^2+\gamma^2$ is equal to

1) 26 2) 24 3) 18 4) 32

QN There are (n+1) coins 'n' coins are unbiased coins and one coin has two heads. A coin is randomly chosen and tossed once. If the probability of getting head is $\frac{9}{16}$ then the value of n is

1) 5 2) 6 3) 7 4) 8

QN If $1+\cos x=\sqrt{3}\sin x$ where $x\in(-2\pi,2\pi)$. then the sum of all the values of x satisfy the given equation is

1) 5π 2) $\frac{4\pi}{3}$ 3) 4π 4) $\frac{-4\pi}{3}$

QN If $\tan^{-1}(1-\alpha)+\tan^{-1}(1-\beta)=\frac{\pi}{4}\ \&\ \beta=\frac{1}{3\alpha}$ then the value of $6(\alpha+\beta)$ is equal to

1) 7 2) 9 3) 8 4) 6

QN The number of 4 letter words which can be made using the letters of the word INCONSEQUINTAL without repetition using 2 vowels and 2 consonants is equal to

1) 3460 2) 3600 3) 4200 4) 2400

QN Points P and Q lie on the parabola $y^2=12x$. The ratio of their y-coordinates is 1:2 and the length of line segment PQ is $3\sqrt{13}$. If line PQ makes an angle θ with positive x-axis in anticlockwise direction, $\theta\in(0,\pi)$ then sin θ is equal to

1) $\frac{1}{\sqrt{13}}$ 2) $\frac{3}{\sqrt{13}}$ 3) $\frac{2}{\sqrt{13}}$ 4) $\frac{1}{\sqrt{12}}$

QN Find the area bounded by $0\le y\le 6-x, y^2+3\le 4x$ and x>0, is

QN $-(K^2-15K+27)x^2+9(K-1)x+8=0$. If equation has two roots and one root is twice of other then find length of Latus rectum of parabola $y^2=6kx$

QN Let of $f:\{1,2,3,4\}\to\{1,e,e^2,e^3\}$ is a strictly increasing and bijective function and $g:\{1,e,e^2,e^3\}\to\left\{1,\frac{1}{2},\frac{1}{3},\frac{1}{4}\right\}$ strictly decreasing and bijective function. If $\phi(x)=\left[f^{-1}\left(g^{-1}\left(\frac{1}{2}\right)\right)\right]^x$ then find $\int_0^1(\phi(x)-x^2)dx$

1) $\frac{1}{\log 2}-\frac{1}{3}$ 2) $\frac{3}{\log 2}-\frac{1}{3}$ 3) $\frac{2}{\log 2}-\frac{1}{3}$ 4) $\frac{4}{\log 2}-\frac{1}{3}$

QN The domains of the function $f(x)=\sin^{-1}\left(\frac{x+[x]}{3}\right)$ is $[\alpha,\beta)$. The value of $\alpha^2+\beta^2$ is equal to

(where [.] represents G.I.F)

1) 4 2) 5 3) 3 4) 2

QN If the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1, a, b>0$ with eccentricity e passes through point $P\left(6,4\sqrt{3}\right)$ and $15\left(e^2+1\right)=(34)e$ then length of latus rectum of hyperbola $\frac{x^2}{b^2}-\frac{y^2}{2\left(a^2+1\right)}=1$ is

1) 10 2) 12 3) 14 4) 18

QN If $\vec{a}.\vec{c}=3, \vec{b}=\hat{j}-\hat{k}, \vec{a}=\hat{i}+\hat{j}+\hat{k}$ $\vec{a}\times\vec{c}=\vec{b}$, find $\vec{c}\ \left(2\vec{a}-\vec{b}\right)$

QN Consider the circle $x^2+y^2+2gx+2fy+25=0,$ where $g, f\in z$ centre lies on $2x-y=4$ and the area equilateral triangle inscribed within this circle is $27\sqrt{3}$ sq. units. The square of the length of chord whose equation is x = 1 is equal to

1) 45 2) 40 3) 80 4) 90

QN Let matrix $A=\begin{bmatrix}-1 & 1 & 1\\ 1 & 0 & 1\\ 0 & 0 & 1\end{bmatrix}$. If $A^2+\alpha\left(\text{adj}\left(\text{adj}(A)\right)\right)+\beta\text{adj}\left(\text{adj}\left(\text{adj}(A)\right)\right)=\begin{bmatrix}-4 & -4 & 0\\ -4 & 0 & 2\\ 0 & 0 & -2\end{bmatrix}$ then

$(\alpha+\beta)^2$ is equal to

QN If the image of a point A(6,2,a) with respect to line $L:\frac{x}{1}=\frac{y-1}{2}=\frac{z-a+1}{b}$ is $\left(\frac{a}{2},0,a+c\right)$. Then the distance of the foot of perpendicular of A on line L from the point (a,b,c) is equal to

1) $2\sqrt{7}$ 2) $\sqrt{346}$ 3) $\sqrt{421}$ 4) $\sqrt{247}$