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# Memory Based Questions and Answers

# JEE MAIN 2026

## SESSION 1

**Test Date: 21st January 2026 | Shift 2**

### Instructions

- The test is of **3 hours** duration.
- This test paper consists of 75 questions. Each subject (PCM) has 25 questions. The maximum marks are 300.
- This question paper contains Three Parts. Part-A is Physics, Part-B is Chemistry and Part-C is Mathematics. Each part has only two sections: Section-A and Section-B.
- Section - A: Attempt all questions.
- Section - B: Attempt all questions.
- Section - A (01–20) contains 20 multiple choice questions which have only one correct answer. Each question carries +4 marks for correct answer and –1 mark for wrong answer.
- Section - B (21–25) contains 5 Numerical value based questions. The answer to each question should be rounded off to the nearest integer. Each question carries +4 marks for correct answer and -1 mark for wrong answer.

# JEE Main – 21st January – 2026 (Shift-2)

[Memory Based Questions]

## MATHEMATICS

1. Let $f(x) = x^3 + x^2 f'(1) + 2x f''(2) + f'''(3), x \in R$. Then the value of $f'(5)$ is

(1) $\frac{117}{5}$ (2) $\frac{62}{5}$ (3) $\frac{657}{5}$ (4) $\frac{2}{5}$

Ans: (1)

2. Let one end of a focal chord of the parabola $y^2 = 16x$ be $(16,16)$. If $P(\alpha, \beta)$ divides this focal chord internally in the ratio 5 : 2 ; then the minimum value of $\alpha + \beta$ is equal to:

(1) 7 (2) 22 (3) 5 (4) 16

Ans: (1)

3. The largest $n \in N$, for which $7^n$ divides 101! Is

(1) 16 (2) 18 (3) 19 (4) 15

Ans: (1)

4. Let $y^2 = 12x$ be the parabola with its vertex at 0 . Let $P$ be a point on the Parabola and A be a point on the $x$-axis such that $\angle OPA = 90°$. Then the locus of the centroid of such triange $OPA$ is :

(1) $y^2 - 2x + 8 = 0$ (2) $y^2 - 6x + 4 = 0$

(3) $y^2 - 9x + 6 = 0$ (4) $y^2 - 4x + 8 = 0$

Ans: (1)

5. Let the line $L$ pass through the point $(-3,5,2)$ and make equal angle with the positive coordinate axes. If the distance of $L$ from the point $(-2, r, 1)$ is $\sqrt{\frac{14}{3}}$, then the sum of all possible values of $r$ is

(1) 16 (2) 10 (3) 12 (4) 6

Ans: (2)

6. Let $\mathbf{Z}$ be the complex nu+mber satisfing $|\mathbf{z} - 5| \leqslant 3$ and having maximum positive arguement, then $34\left|\frac{5z-12}{5iz+1}\right|^2$ is equal to

(1) 16 (2) 26 (3) 12 (4) 20

Ans: (4)

7. Let $a_1, \frac{a_2}{2}, \frac{a_3}{2^2}, \ldots \frac{a_{10}}{2^9}$ be a G.P of common ratio $\frac{1}{\sqrt{2}}$. If $a_1 + a_2 + \cdots + a_{10} = 62$, then $a_1$ is equal to

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

Ans: (3)

8. For Matrices $A = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} -29 & 49 \\ -13 & 18 \end{bmatrix}$, if $(A^{15} + B) \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$, then among the fallowing which one is the?

(1) $x = 11, y = 2$ (2) $x = 5, y = 7$ (3) $x = 18, y = 11$ (4) $x = 16, y = 3$

Ans: (1)

9. If the area of the region $\{(x, y): 1 - 2x \leq y \leq 4 - x^2, x \geq 0, y \geq 0\}$ is $\frac{\alpha}{\beta}$,

$\alpha, \beta, \in N, \gcd(\alpha, \beta) = 7$, then the value of $(\alpha + \beta)$ is

(1) 67 (2) 73 (3) 91 (4) 85

Ans: (2)

10. If the line $\alpha x + 4y = \sqrt{7}$, where $\alpha \in R$, touches the ellipse $3x^2 + 4y^2 = 1$ at the point **P** in the first quadrant then one of the focal distance of $P$ is

(1) $\frac{1}{\sqrt{3}} - \frac{1}{2\sqrt{7}}$ (2) $\frac{1}{\sqrt{3}} + \frac{1}{2\sqrt{5}}$ (3 $\frac{1}{\sqrt{3}} - \frac{1}{2\sqrt{5}}$ (4) $\frac{1}{\sqrt{3}} + \frac{1}{2\sqrt{7}}$

Ans: (1)

11. If P is a point on the circle $x^2 + y^2 = 4, Q$ is a point on the straight line $5x + y + 2 = 0$ and $x - y + 1 = 0$ is the perpendicular bisector of $PQ$, then 13 times the sum of abscissa of all such points P is?

Ans: (2)

12. Maximum of $[(\cos^{-1} x)^2 + (\sin^{-1} x)^2] = \frac{m}{n}\pi^2, x \in \left[-\frac{\sqrt{3}}{2}, \frac{1}{\sqrt{2}}\right]$. Then $m + n =$

Ans: (65)

13. Let $\alpha$ and $\beta$ be the roots of the equation $x^2 + 2ax + (3a + 10) = 0$ such that $\alpha < 1 < \beta$. Then the set of all possible values of $a$ is

(1) $\left(-\infty, -\frac{11}{5}\right) \cup (5, \infty)$ (2) $(-\infty, -3)$

(3) $(-\infty, -8) \cup (5, \infty)$ (4) $\left(-\infty, \frac{-11}{5}\right)$

Ans: (**4**)

14. $\frac{dy}{dx}\sec(x) - 2y = 2 + 3\sin x, y(0) = \frac{-7}{4} \Rightarrow y\left(\frac{\pi}{6}\right)$

Ans: $(-\frac{5}{2})$

15. $\int_0^1 4\cot^{-1}(1 - 2x + 4x^2)dx = a\tan^{-1}(2) - b\log_e 5$. Then $2a + b =$

Ans: (**20**)

## PHYSICS

1. A battery with emf e and internal resistance's r is connected across a resistance R. The power consumption will be maximum for

(1) R = r (2) R = 2r (3) $R = \sqrt{2}r$ (4) $R = r/2$

Ans: (**A**)

2. Keeping the significant figures in view the sum of the physical quantities

5.01m, 153.2m and 0.123m is

(1) 205.3m (2) 205m (3) 205.333m (4) 205.33m

Ans: (**158.3**)

3. The energy of an electron in an orbit of Bohr's hydrogen atom is - $0.04E$ eV, where E is the energy of ground state of hydrogen atom. If $L$ is the angular momentum of $e$ in this orbit and $h$ is plank's const then $\frac{2\pi L}{h}$ is...

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

Ans: (1)

4. The Kinetic energy of a simple hormonic oscillating with angular frequency of $176$ rad/s. The frequency of the simple harmonic oscillator is - $Hz\left(\pi = \frac{22}{7}\right)$

(1) 176 (2) 14 (3) 28 (4) 88

Ans: (4)

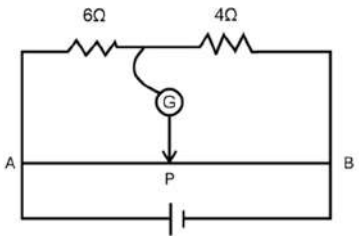
5. The rms speed of oxygen molecules at $47°C$ is equal to that of hydrogen molecules kept at____°C $\left(\frac{M(0)}{M(h)} = \frac{32}{2}\right)$

(1) -100 (2) -253 (3) -20 (4) -235

Ans: (-253)

6. The total length of potentiometer wire $AB$ is 50 cm in the arrangement as shown in the fig.

If $'P'$ is the point where the galvanometer shows zero reading, then the length AP is ___ cm.

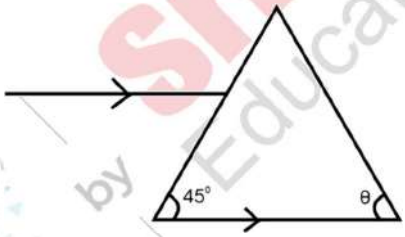



(1) 15 (2) 20 (3) 30 (4) 25

Ans: (3)

7. As shown in the diagram, when the incident ray is parallel to base of the prism the emergent ray grazes along the second surface.

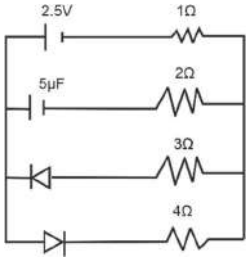
If refractive Index of material of prism is $\sqrt{2}$, the angle of Prism is




(1) $75^\circ$ (2) $45^\circ$ (3) $90^\circ$ (4) $60^\circ$

Ans: (1)

8. The charge stored by the capacitor C in the given circuit in the steady state is ___$\mu$C.




(1) 10 (2) 7.5 (3) 12.5 (4) 5

Ans: (1)

9. If mass of the particle $m = 2\,\text{kg}$ and displacement of Particle varies with the time as $x = \alpha t^3 + \beta t^2 + \gamma t$. then find the workdone in the time interval $t = 2\text{sec}$ to $t = 3\text{sec}$

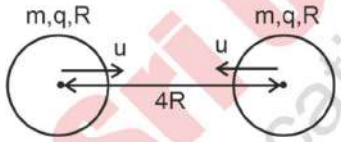
$(\alpha = 1,\ \beta = 1, \gamma = 1)$

Ans: (867 J)

10. The mass, charge and potential applied across a particle are $6.4 \times 10^{-27}$ kg, $3.2 \times 10^{-19}$C, and 1.21 V then find the de-brogile wavelength of charged particle is ___

Ans: ($9.4 \times 10^{-12}$m)

11. Two spheres having equal mass $m$, charge $q$ and radius $R$, are moving towards each other. Both have speed $u$ at an instant when distance between their centers is $4R$. Minimum value of $u$ so that they touch each other is



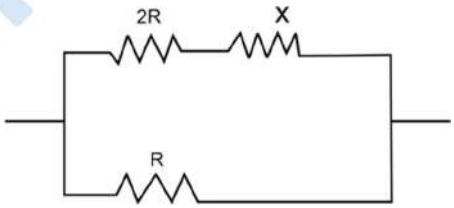

(1) $\sqrt{\frac{q^2}{16\pi\varepsilon_0 mR}}$ (2) $\sqrt{\frac{q^2}{8\pi\varepsilon_0 mR}}$ (3) $\sqrt{\frac{q^2}{4\pi\varepsilon_0 mR}}$ (4) $\sqrt{\frac{q^2}{\pi\varepsilon_0 mR}}$

Ans: (1)

12. A capacitor is initially connected to a battery of Emf "E" and capacitance "C" If capacitor is disconnected and reconnected across an inductor of inductance "L" then 25% of energy is transferred to inductor at the time t =

Ans: $(\frac{\pi}{6}\sqrt{LC})$

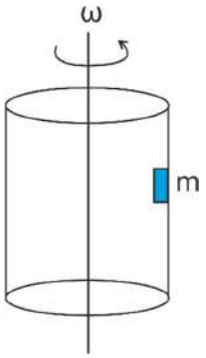
13. The equivalent resistance of given circuit is x. Find the value of x.




(1) $-R + \sqrt{3}R$ (2) $R - \sqrt{3}R$ (3) $2R - \sqrt{3}R$ (4) $-R + 2\sqrt{3}R$

Ans: (1)

14. A block of mass $m$ is at rest w.r.t. hollow cylinder which is rotating with angular speed $\omega$. Radius of cylinder is R. Find minimum coefficient of friction between block and cylinder.




(1) $\frac{3g}{2\omega^2 R}$ (2) $\frac{g}{4\omega^2 R}$ (3) $\frac{g}{\omega^2 R}$ (4) $\frac{2g}{\omega^2 R}$

Ans: (3)

15. **Statement I:** If the distance between the slits and the screen increases, fringe width increases.

**Statement II:** If the wavelength of the monochromatic light increases, the fringe width increases.

(1) Statement I and Statement II are correct

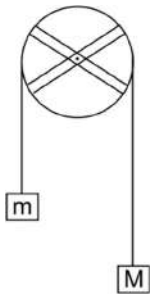
(2) Statement I is true Statement II is false

(3) Statement I is false Statement II is true

(4) Both are false

Ans: (1)

16. The mass of four rods and pulley is M. If radius of pulley is R, then find acceleration of block mass M.



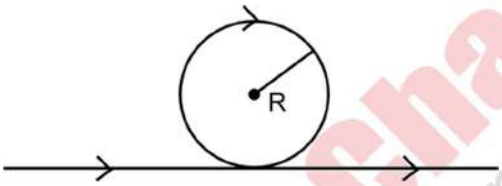
Ans: $(a = \frac{6(M-m)g}{(17M+6\ )})$

17. A spherical ball is moving with terminal velocity 20cm/sec, radius of ball is 6mm. Find the terminal velocity for a ball of radius 3mm, made of same material.

(1) 2 cm/s (2) 5 m/s (3) 4 m/s (4) 5 cm/s

Ans: (**4**)

18. Find the magnetic field at the center of circular loop, shown in the figure.




(1) $\frac{\mu_0 i}{2R}\left(\frac{\pi-1}{\pi}\right)$ (2) $\frac{\mu_0 i}{2R}\left(\frac{2\pi-1}{\pi}\right)$ (3) $\frac{\mu_0 i}{4R}\left(\frac{\pi-1}{\pi}\right)$ (4) $\frac{\mu_0 i}{R}\left(\frac{\pi-1}{\pi}\right)$

Ans: (**1**)

19. A diatomic gas $(Y = 1.4)$ does 100 J of works in Isobaric expansion. The heat given to the system

(1) 350 J (2) 100 J (3) 250 J (4) 150 J

Ans: (**1**)

## CHEMISTRY

1. 1 g of an organic compound produce 1.49 of $Mg_2P_2O_7$ Determine % of Phosphorous ?

   Ans: (**41.6**)

2. Match the following

| Reagent | | Reaction | |
|---|---|---|---|
| (A) | $H_2, Pd - BaSO_4$ | (i) | Etard Reaction |
| (B) | $SnCl_2, HCl$ | (ii) | Rosenmund Reduction |
| (C) | $CrO_2Cl_2, CS_2$ | (iii) | Gatterman Koch Reaction |
| (D) | $CO, HCl$ Anhyd. $AlCl_3$ | (iv) | Stephen Reaction |

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

3. Given below are two statements.

   **Statement I :** The correct order for radius is $Al > Mg > Mg^{2+} > Al^{3+}$.

   **Statement II :** Atomic size always, depends on electronegativity. In the light of the above statements, choose the correct option

   In the light of the above statements, which is the correct option.

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

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

   (3) Statement-I is correct and statement-II is incorrect

   (4) Statement-I is incorrect and statement-II is correct

   Ans: (2)

4. Correct Nucleophilicity order, $CH_3COO^-, Ph - O^{\ominus}, OH^{\ominus}, ClO_4^-$

   Ans: (3>2>1>4)

5. Following 4 molecules are given and among them, one is optically active. Find the percentage of carbon in that compound :-

(1) n-propyl Chloride (2) iso-propyl Chloride
(3) iso-butyl Chloride (4) secondary-butyl Chloride

Ans: (51.89)

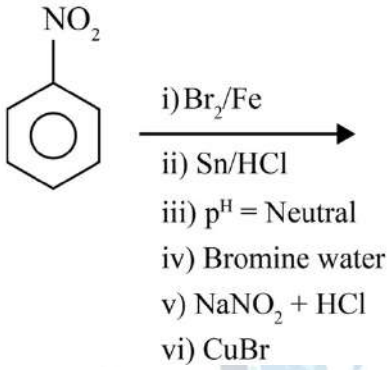
6. When $8.74 g MnO_2$ is treated with HCl , then what will be the weight of $Cl_2(g)$ obtained?
Molar mass of $MnO_2 = 87.4\ g/mol$
(1) 7.1 g (2) 17.1 g (3) 14.2 g (4) 3.55 g

Ans: (1)

7. What is the central atom and oxidation state of the compound formed when $K_2Cr_2O_7$ reacts with $H_2SO_4$ in the ___ presence of hydrogen peroxide? ___

Ans: (+6)

8. Number of Bromine atom in the given product,




Ans: (5)

9. Match the list-I with list-II

| List-I | | List-II | |
|---|---|---|---|
| (A) | Cis 2-butene, Trans 2- butene | (P) | Functional Isomer |
| (B) | Butanoic acid,Isopropyl methanoate | (Q) | Stereoisomer |
| (C) | 1-butene, 2-butene | (R) | Position Isomer |
| (D) | n-pentane, isopentane | (S) | Chain Isomer |

Ans: (A-Q, B-P, C-R, D-S)

10. Given below are two statements.

**Statement I :** The correct order of electron gain enthalpy's $Cl > F > Br > I$.

**Statement II:** $SnCl_6 > SnCl_4, PbCl_4 > PbCl_2, UF_6 > UF_4$, Correct order of lonic Character.

In the light of the above statements, which is the correct option.

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

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

(3) Statement-I is correct and statement-II is incorrect

(4) Statement-I is incorrect and statement-II is correct

Ans: (**3**)

11. 1.5 gm of $X$ is dissolved in 150 gm of solvent (mol. weight $\mathbf{300\ gm}$ ) to form dilute solution. Elevation in boiling point of solution is 0.5 K . Calculate relative lowering in vapour pressure.

Given $K_b = 5\ K\ kg/mol$. Assume no association or dissociation.

(1) 0.01 (2) 0.02 (3) 0.03 (4) 0.04

Ans: (**3**)

12. Calculate $E^0_{Cl^-}\Theta|AgCl|Ag$ (in millivolt).

Given:- $E^0_{Ag^+}/Ag = 0.79\ V; K_{sp}(AgCl) = 10^{-10}; \frac{2.303RT}{F} = 0.059$

Ans: (**0.2**)

13. What will be the ratio of wavelength $3^{rd}$ line at Paschen Series to $2^{nd}$ line of Balmer series of H -atom?

(1) $\frac{9}{4}$ (2) $\frac{3}{2}$ (3) $\frac{2}{3}$ (4) $\frac{16}{4}$

Ans: (**1**)

14. Osmotic pressure of a solution is 12 atm . What is the concentration of NaCl solution which is isotonic to the given solution at 300 K .

$$R = 0.082 Lit^- atm\ K^{-1}\ L^{-1}\ mol^{-1}$$

Assume 100% dissociation.

(1) 0.4878 M (2) 0.02439 M (3) 0.2439 M (4) 0.04878 M

Ans: (**3**)

15. Which of the following are correct regarding $Mn_2O_7$?

(A) It is an ionic oxide

(B) It has highest oxidation state of Mn.

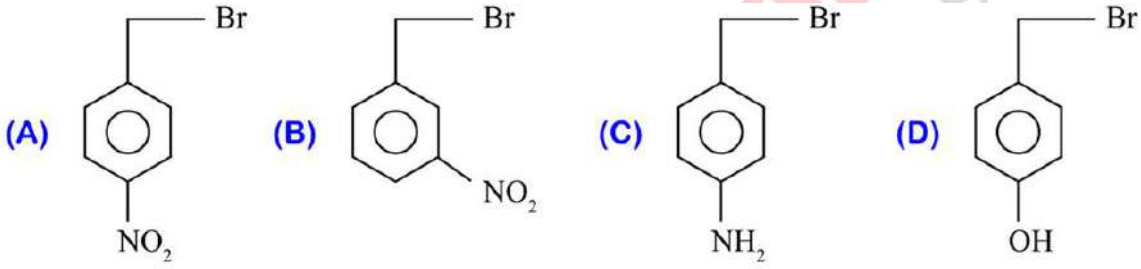
(C) Oxygen stabilizes by forming multiple bonds.

(D) It has one bridged oxygen atom.

(1) A, B & C are correct. (2) A, B, C & D are correct.

(3) B, C & D are correct. (4) A, C & D are correct.

Ans: (3)

16. 


Correct order of $SN_2$ reaction

(1) D > C > B > A (2) A > B > D > C (3) A > B > C > D (4) D > A > C > B

Ans: (2)

17. Select correct statements

(A) Amylose a long-branched chain polymer, formed by $C_2 - C_6$ glycosidic linkage.

(B) During denaturation destroyed but primary structures remained intact.

(C) Globular proteins structures results when the chains of polypeptides coil around to give a spherical shape.

(D) Carbohydrates which reduce Fehling's and Tollen's reagent are reducing sugars.

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

Ans: (3)

18. Give the correct bond length order of $C-H; C-O; C=O; CN$

(1) $C-H > C-O > C=O > CN$ (2) $C-O > C=O > CN > C-H$

(3) $C-H > C-O > CN > C=O$ (4) $CN > C-O > C-H > C=O$

Ans: (2)

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