



YOUR
FUTURE
DEPENDS ON
WHAT YOU DO
TODAY

AIR 1

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Memory Based Questions and Answers

JEE MAIN 2026

SESSION 1

Test Date: 23rd 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 2026 January (Shift-2)

[Memory Based Questions]

PHYSICS

1. When an unpolarized light falls at a particular angle on a glass plate (placed in air). It is observed that reflected beam is completely polarized the angle of refracted beam with respect to the normal is _____

$$\tan^{-1}(1.52) = 57.3^\circ; \text{refractive index of air and glass } 1.00 \text{ and } 1.52$$

Ans: (32.3°)

2. A parallel plate capacitor with plate separation 5 mm is charged by a battery. On introducing a mica sheet of 2 mm and maintaining the connections of the plates with the terminals of the battery, it is found that it draws 25 % more charge from the battery. The dielectric constant of mica is ____

- (1) 1.0 (2) 2.0 (3) 1.5 (4) 2.5

Ans: (2)

3. A metallic sphere of diameter 2 mm and density 10.5 g/cm^3 is dropped in glycerine having viscosity 10 poise and density 1.5 g/cm^3 . The terminal velocity attained by the sphere is ____ cm/s

$$\pi = \frac{22}{7}, g = 10 \text{ m/s}^2$$

- (1) 2.0 (2) 1.0 (3) 1.5 (4) 3.0

Ans: (1)

4. A prism of angle 75° and refractive index $\sqrt{3}$ is coated with thin film of refractive index 1.5 only at the back exit surface. To get total internal reflection (TIR) at the back exit surface, the incident angle must be _____ ($\sin 15^\circ = 0.25$, $\sin 25^\circ = 0.43$)

- (1) $< 15^\circ$ (2) 15° (3) $> 25^\circ$ (4) b/w 15° and 20°

Ans: (3)

5. Find the magnetic field at the centroid of an equilateral triangle of side length $4\sqrt{3} \text{ m}$ and a current of 2 A is flowing through it

Ans: ($3\sqrt{3} \times 10^{-7} \text{ T}$)



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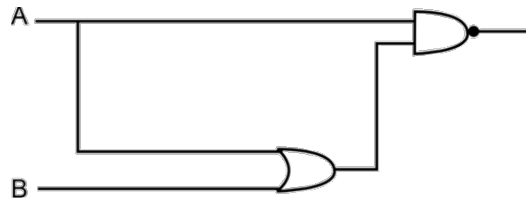
6. A sky trooper jumps from an airplane and opens his parachute after 2s and deaccelerates with 3 m/s^2 . When he reaches height of 10 m from ground his speed becomes 8 m/s, find the initial height of airplane.

Ans: (86 m)

7. A body of mass m kg initially at rest explodes and breaks into three fragments of masses in the ratio 2: 2: 3. The two pieces of equal masses fly perpendicular to each other with 1 m/s speed each. The velocity of heavier fragment is _____ m/s.

Ans: $\left(\frac{2\sqrt{2}}{3}\right)$

8. Provide the correct truth table _____



Ans: $\begin{pmatrix} A & B & C \\ 0 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 1 & 1 & 0 \end{pmatrix}$

9. One mole of an ideal diatomic gas expands from vol V to $2V$ isothermally at temp 27°C , and does W J of work. If the gas undergoes expansion adiabatically from 27°C doing the same amount of work, then find the final temp.

Ans: (-56°C)

10. A circular loop of radius 7 cm is placed in uniform Magnetic field of $0.2T$ directed perpendicular to plane of loop. The loop is converted into a square in 0.5s, the induced emf in the loop is _____ mV

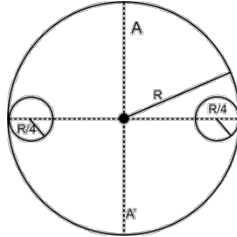
Ans: (1.32)

11. A point charge $7\mu\text{C}$ is placed of $(-9,0,0)$ Another point charge $-2\mu\text{C}$ is placed at $(9,0,0)$. Find potential energy of system.

Ans: (7 mJ)

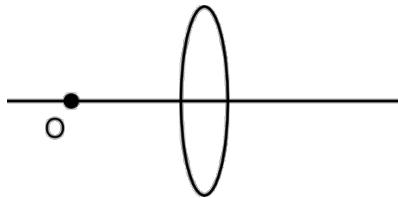


12. The shaded region is removed from the disc of radius $r = \frac{R}{4}$. Then MOI of remaining disc?



Ans: $(\frac{109}{256} MR^2)$

13. When an object is kept at a distance of 8 cm and 24 cm from a convex lens magnitude of magnification is same in both cases. Find Focal length.



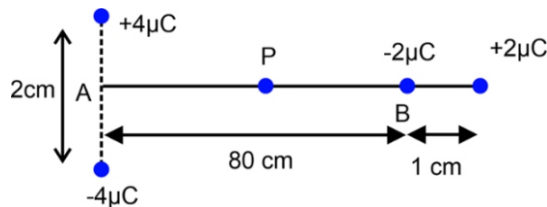
- (1) 24 cm (2) 32 cm (3) 8 cm (4) 16 cm

Ans: (4)

14. Work functions of 2 metals A, B are in the ratio of 1: 2. Kinetic energies of metals are in ratio 2.624:1. A Photon of energy of 6 eV is incident on the metals. Then the work function values of metal A and B are

Ans: $(\phi_A \approx 2.3 \text{ eV}, \phi_B \approx 4.6 \text{ eV})$

15. Four charges are kept as shown in the figure. Find magnitude of electric field at point P . P is midpoint of line AB .

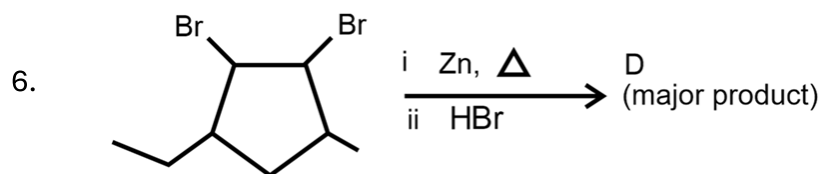


Ans: $(\frac{45\sqrt{5}}{8} \times 10^3 \text{ V/m})$

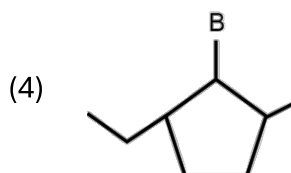
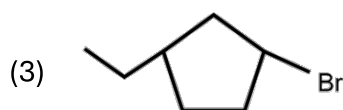
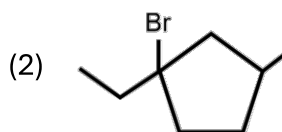
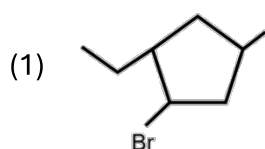


CHEMISTRY

1. Identify the correct set of details from the following
- A) $[\text{Co}(\text{NH}_3)_6]^{3+}$: Inner orbital complex :- d^2sp^3 hybridized
B) $[\text{MnCl}_6]^{3-}$: Outer orbital complex :- $sp^3 d^2$ hybridized.
C) $[\text{CoF}_6]^{3-}$: Outer orbital complex :- d^2sp^3 hybridized.
D) $[\text{FeF}_6]^{3-}$: Outer orbital complex :- $sp^3 d^2$ hybridized.
E) $[\text{Ni}(\text{CN})_4]^{2-}$: Inner orbital complex :- sp^3 hybridized.
- Choose the correct answer from the option given below
- (1) C, D only (2) A, B, & D only (3) A, B, C, D, E (4) A, C & E only
- Ans: (2)
2. The oxidation state of chromium in the final product in the reaction between KI and acidified $\text{K}_2\text{Cr}_2\text{O}_7$ solution is
- (1) +2 (2) +6 (3) +4 (4) +3
- Ans: (4)
3. Both human DNA and RNA are Chiral molecules. Chirality in DNA and RNA arise due to the presence of
- (1) Chiral Phosphate unit (2) D-sugar component
(3) sugar component (4) Base unit.
- Ans: (2)
4. In Carius method 0.2425 g of organic compound gave 0.52539 silver chloride. The percentage of chloride in the organic compound
- (1) 37.57% (2) 87.65% (3) 34.79% (4) 53.58%
- Ans: (4)
5. Iodoform test can differentiate
- (1) Anisole & Acetone (2) $\text{CH}_3 - \text{COOH}$ & $\text{CH}_3 - \text{CH}_2 - \text{COOH}$
(3) cyclopropene & cyclobutene (4) Phenol & Benzoic Acid
- Ans: (1)



Identify (D)



Ans: (2)

7. How many of the following complexes have unpaired electrons on their central atom ?
[Ni(CO)₄], [NiCl₄]²⁻, [PtCl₄]²⁻, [Pt(CN)₄]²⁻

Ans: (1)

8. Which of the following are isobars?



Ans: (3)

9. An element belongs to group-15. 'X', 'Y' and P (Phosphorus). The difference in electronegativity of X and P is higher than P and Y. Then X, Y are



Ans: (2)

10. Given below are two statements.

Statement I: $\overset{+}{C}(\text{CH}_3)_3$ is more stable than $\overset{+}{\text{C}}\text{H}_3$.

Statement II: $\overset{+}{C}(\text{CH}_3)_3$ has 9 hyper conjugation structures while $\overset{+}{\text{C}}\text{H}_3$ has 3 hyper conjugations structures.



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. Given below are two statements.

Statement 1 : Size of O^{2-} is smaller than F^- .

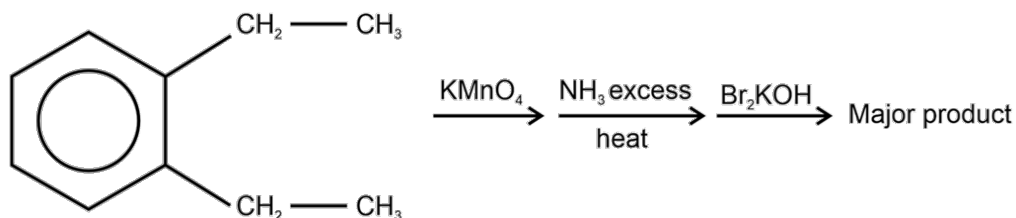
Statement II : Electronegativity of F is more than that of oxygen.

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: (4)

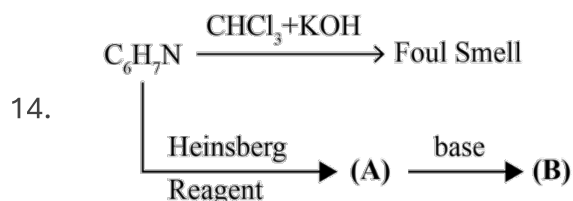
12. The major product in the following sequence of reactions,



Ans: o-Phenylenediamine or Benzene-1, 2 -diamine (Option dependent)

13. An ideal solution is formed by mixing 3 mole of A and 1 mole of B and the vapour pressure of solution is found to be 500 mm Hg . After further addition of 1 mole A, pressure of solution becomes 520 mm Hg . Find P_A° .

Ans: (600 mm Hg)





Number of hydrogen atoms in B.

Ans: (10)

15. For XeO_2F_2 , select the correct statement(s).

(A) It shows a see-saw shape.

(B) Number of lone pair(s) of electron on Xe is 1.

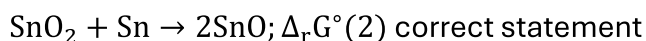
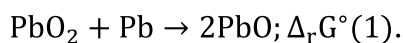
(C) $\angle \text{FXeF} = 180^\circ$ (approx.)

(D) It has a tetrahedral shape.

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

Ans: (3)

16. It is noted that Pb^{2+} is more stable than Pb^{4+} but Sn^{2+} is less stable than Sn^{4+} in the following reactions,



(1) $\Delta_r G^\circ(1) > 0, \Delta_r G^\circ(2) < 0$

(2) $\Delta_r G^\circ(1) > 0, \Delta_r G^\circ(2) > 0$

(3) $\Delta_r G^\circ(1) < 0, \Delta_r G^\circ(2) < 0$

(4) $\Delta_r G^\circ(1) < 0, \Delta_r G^\circ(2) > 0$

Ans: (4)

17. If $\text{K}_2\text{Cr}_2\text{O}_7(200 \text{ cm}^3, x \times 10^{-3}\text{M})$ react with $0.6\text{M}, 750 \text{ cm}^3$ Mohr's salt, then the value of x is:

Ans: (375)



MATHEMATICS

1. If $A = \begin{bmatrix} 0 & -2 & 3 \\ -2 & 0 & 1 \\ -1 & 1 & 0 \end{bmatrix}$ and $B(I - A) = I + A$ then $B = ?$

Ans: $B = \frac{1}{3} \begin{bmatrix} -3 & 2 & 2 \\ -6 & 5 & -10 \\ -6 & 6 & -9 \end{bmatrix}$.

2. The sum of all the real solutions of equation

$$\log_{(x+3)} (6x^2 + 28x + 30) = 5 - 2\log_{(6x+10)} (x^2 + 6x + 9) \text{ is :}$$

- (1) 2 (2) 4 (3) 1 (4) 0

Ans: (4)

3. The number of ways in which 16 identical oranges can be distributed to four children such that each child gets at least one orange, is

- (1) 455 (2) 429 (3) 384 (4) 403

Ans: (1)

4. If the points of intersection of the ellipses $x^2 + 2y^2 - 6x - 12y + 23 = 0$ and $4x^2 + 2y^2 - 20x - 12y + 35 = 0$ lie on a circle of radius r and centre (a, b) then the value of $ab + 18r^2$

- (1) 51 (2) 52 (3) 55 (4) 53

Ans: (3)

5. Let $\vec{a}, \vec{b}, \vec{c}$ be three vectors such that $\vec{a} \times \vec{b} = 2(\vec{a} \times \vec{c})$. If $|\vec{a}| = 1, |\vec{b}| = 4, |\vec{c}| = 2$, and the angle between \vec{b} and \vec{c} is 60° , then $|\vec{a} \cdot \vec{c}|$ is equal to

- (1) 1 (2) 2 (3) 4 (4) 0

Ans: (1)

6. The area of the region enclosed between the circle $x^2 + y^2 = 4$ and $x^2 + (y - 2)^2 = 4$ is

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

Ans: (4)



7. An equilateral triangle OAB is inscribed in the parabola $y^2 = 4x$ with the vertex 'O' at the vertex of the parabola. Then the minimum distance of the circle having AB as a diameter from the origin is.

- (1) $2(3 + \sqrt{3})$ (2) $4(6 + \sqrt{3})$ (3) $4(3 - \sqrt{3})$ (4) $2(8 - 3\sqrt{3})$

Ans: (3)

8. Let $A(1,2)$ and $C(-3,-6)$ be two diagonally opposite vertices of a rhombus, whose sides AD and BC are parallel to the line $x - y = 14$. If $B(\alpha, \beta)$ and $D(\gamma, \delta)$ are the other two vertices, then $|\alpha + \beta + \gamma + \delta|$ is equal to.

- A) 6 B) 1 C) 9 D) 3

Ans: (1)

9. If the mean and the variance of the data

Class	4 - 8	8 - 12	12 - 16	16 - 20
Frequency	3	λ	4	7

are μ and 19 respectively, then the value of $\lambda + \mu$ is

- A) 18 B) 21 C) 19 D) 20

Ans: (3)

10. The system of linear equations $x + y + z = 6, 2x + 5y + az = 36, x + 2y + 3z = b$ has

- A) infinitely many solutions for $a = 8, b = 16$
B) unique solutions for $a = 8, b = 16$
C) unique solutions for $a = 8, b = 14$
D) infinitely many solutions for $a = 8, b = 14$

Ans: (4)

11. If $Z = \frac{\sqrt{3}}{2} + \frac{i}{2}, i = \sqrt{-1}$ then $(Z^{201} - i)^8$ is equal to

Ans: (256)



12. If $I(x) = \int \frac{3dx}{(4x+6)(\sqrt{4x^2+8x+3})}$ where $I(0) = \frac{\sqrt{3}}{4} + 20$ and $I\left(\frac{1}{2}\right) = \frac{a\sqrt{2}}{b} + c$, for $a, b, c \in \mathbb{N}$, $\gcd(a, b) = 1$, $a + b + c$ is equal to

Ans: (31)

13. The minimum value of $\cos^2 \theta + 6\sin \theta \cos \theta + 3\sin^2 \theta + 3$ is
(1) -1 (2) 1 (3) $5 + \sqrt{10}$ (4) $5 - \sqrt{10}$

Ans: (4)

14. Let $\sum_{k=1}^n a_k = \alpha n^2 + \beta n$ and $a_{10} = 59$ and $a_6 = 7a_1$, then find $\alpha + \beta =$

Ans: (5)

15. If $f(x) = \begin{cases} \frac{a|x|+x^2-2(\sin|x|)(\cos|x|)}{x}, & x \neq 0 \\ b, & x = 0 \end{cases}$ is continuous at $x = 0$, then $a + b$ is equal to
(1) 0 (2) 1 (3) 4 (4) 2

Ans: (4)

16. $\vec{a} = 2\hat{i} - 2\hat{j} + 3\hat{k}$, $\vec{b} = 2\hat{i} + \hat{j} - \hat{k}$, $\vec{c} = \lambda\hat{i} + \hat{j} + \hat{k}$ and $\vec{v} = \vec{a} \times \vec{b}$. If $\vec{v} \cdot \vec{c} = 11$ and the length of the projection of \vec{b} on \vec{c} is P , then $9P^2$ is equal to
(1) 9 (2) 6 (3) 12 (4) 4

Ans: (3)

17. Consider two sets $A = \{x \in \mathbb{Z} : (|x - 3| - 3) \leq 1\}$

$$B = \left\{x \in \mathbb{R} - \{1, 2\} : \frac{(x-2)(x-4)}{x-1} \log_e (|x-2|) = 0\right\}$$

onto functions $f: A \rightarrow B$

- (1) 32 (2) 79 (3) 62 (4) 81

Ans: (3)
