

JEE (Main)
Sample Question Paper

Subjects	Physics, Chemistry and Mathematics
Total Number of Questions	75
Maximum Marks	300
Time Allowed	3 Hours

Marking Scheme (As per JEE Main Pattern)

Each question carries **4 (four) marks**.

1 (one) mark will be deducted for each incorrect answer.

No marks will be deducted for unattempted questions.

Only one option is correct for each question.

Important Instructions

1. This Question Paper consists of **75 Multiple Choice Questions**.
2. The paper contains **25 questions each from Physics, Chemistry and Mathematics**.
3. All questions are compulsory.
4. Rough work should be done only in the space provided in the Question Paper.
5. Calculators, mobile phones, smart watches, or any electronic devices are strictly prohibited.

Name of the Candidate (Capital Letters)	
Roll Number	
Examination Centre Name	
Candidate's Signature	Date

Invigilator's Signature

25. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R. Assertion A: In photoelectric effect, on increasing the intensity of incident light the stopping potential increases. Reason R: Increase in intensity of light increases the rate of photoelectrons emitted, provided the frequency of incident light is greater than threshold frequency.

A) Both **A** and **R** are true but **R** is NOT the correct explanation of **A** B) **A** is false but **R** is true

C) **A** is true but **R** is false

D) Both **A** and **R** are true and **R** is the correct explanation of **A**

JEE MAIN PHYSICS ANSWER KEY

1. (C)	2. (C)	3. (B)	4. (C)	5. (D)
6. (D)	7. (A)	8. (B)	9. (C)	10. (A)
11. (D)	12. (B)	13. (B)	14. (A)	15. (D)
16. (D)	17. (C)	18. (D)	19. (A)	20. (C)
21. (C)	22. (C)	23. (C)	24. (D)	25. (B)

CHEMISTRY

1. Decreasing order of the hydrogen bonding in following forms of water is correctly represented by

- A. Liquid water
- B. Ice
- C. Impure water

Choose the correct answer from the options given below:

- A) $C > B > A$
- B) $B > A > C$
- C) $A = B > C$
- D) $A > B > C$

2. The magnetic moment of a transition metal compound has been calculated to be 3.87 B.M. The metal ion is

- A) T_1^{2+}
- B) Mn^{2+}
- C) V^{2+}
- D) Cr^{2+}

3. Match List I with List II

List I (Complex) List II (Hybridization)

- | | | |
|------------------------|------|-----------|
| A. $Ni(CO)_4$ | I. | sp^3 |
| B. $[Cu(NH_3)_4]^{2+}$ | II. | dsp^2 |
| C. $[Fe(NH_3)_6]^{2+}$ | III. | sp^3d^2 |
| D. $[Fe(H_2O)_6]^{2+}$ | IV. | d^2sp^3 |

Choose the correct answer from the options given below:

- A) A-I, B-II, C-III, D-IV
- B) A-II, B-I, C-III, D-IV
- C) A-I, B-II, C-IV, D-III
- D) A-II, B-I, C-IV, D-III

4. The primary and secondary valencies of cobalt respectively in $[Co(NH_3)_5Cl]Cl_2$ are :

- A) 3 and 5
- B) 2 and 6
- C) 2 and 8
- D) 3 and 6

5. The wave function (Ψ) of $2s$ is given by $\Psi_{2s} = \frac{1}{2\sqrt{2\pi}} \left(\frac{1}{a_0}\right)^{1/2} \left(2 - \frac{r}{a_0}\right) e^{-\frac{r}{2a_0}}$ At $r = r_0$, radial node is formed

Thus, r_0 in terms of a_0

- A) $r_0 = \frac{a_0}{2}$
- B) $r_0 = 2a_0$
- C) $r_0 = 4a_0$
- D) $r_0 = a_0$

6. Freezing point of solution is less than that of pure solvent, which of the following statements are correct ?

- (A) Vapour pressure of solution is less than that of pure solvent
- (B) Vapour pressure of solution is greater than that of pure solvent
- (C) Only solvent molecules will freeze
- (D) Only solute molecules will freeze

- A) A & B only
- B) A & C only
- C) C & D only
- D) A, B & D only

7. Which one amongst the following are good oxidizing agents?
 (A) Sm^{2+}
 (B) Ce^{2+}
 (C) Ce^{4+}
 (D) Tb^{4+}
 Choose the most appropriate answer from the options given below:
 A) C only
 B) C and D only
 C) A and B only
 D) D only
8. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R
Assertion (A) : Benzene is more stable than hypothetical cyclohexatriene
Reason (R) : The delocalised π -electrons cloud is attracted more strongly by the nuclei of the carbon atoms than the electron cloud localised between two carbon atoms.
 In the light of the above statements, choose the correct answer from the options given below
 A) Both (A) and (R) are true but (R) is not the true explanation of (A)
 B) (A) is false but (R) is true
 C) (A) is true but (R) is false
 D) Both (A) and (R) are true and (R) is the true explanation of (A)
9. $O - O$ bond length in H_2O_2 is X than the $O - O$ bond length in F_2O_2 The $O - H$ bond length in H_2O_2 is Y than that of the $O - F$ bond in F_2O_2 Choose the correct option for X and Y from those given below :
 A) X-shorter, Y-shorter
 B) X - shorter, Y - longer
 C) X - longer, Y - shorter
 D) X-longer, Y-longer
10. Identify X, Y and Z in the following reaction (Equation not balanced) $ClO + NO_2 \rightarrow \underline{X} \xrightarrow{H_2O} \underline{Y} + \underline{Z}$
 A) $X = ClNO_3, Y = Cl_2, Z = NO_2$
 B) $X = ClONO_2, Y = HOCl, Z = HNO_3$
 C) $X = ClONO_2, Y = HOCl, Z = NO_2$
 D) $X = ClNO_2, Y = HCl, Z = HNO_3$
11. Boric acid is solid, whereas BF_3 is gas at room temperature because of
 A) Strong hydrogen bond in Boric acid
 B) Strong van der Waal's interaction in Boric acid
 C) Strong covalent bond in BF_3
 D) Strong ionic bond in Boric acid
12. Which of the following statements is correct about freons?
 A) All radicals are known as freons.
 B) Freons cause skin cancer.
 C) Freons are chlorofluoro carbon.
 D) Freons are used in sunscreen lotion.
13. Find correct order of covalent character (A) $KF < KI$ (B) $CuCl > NaCl$ (C) $LiF > KF$
 A) A & B only
 B) A & C only
 C) A, B & C
 D) B & C only
14. The correct order of basicity of oxides of vanadium is
 A) $V_2O_3 > V_2O_5 > V_2O_4$
 B) $V_2O_4 > V_2O_3 > V_2O_5$
 C) $V_2O_3 > V_2O_4 > V_2O_5$
 D) $V_2O_5 > V_2O_4 > V_2O_3$
15. Increasing order of stability of the resonance structures is: Choose the correct answer from the options given below:
 A) D, C, A, B
 B) C, D, A, B
 C) D, C, B, A
 D) D, A, B

JEE MAIN CHEMISTRY ANSWER KEY

1. (B)	2. (C)	3. (C)	4. (D)	5. (B)
6. (B)	7. (B)	8. (D)	9. (C)	10. (B)
11. (A)	12. (C)	13. (C)	14. (C)	15. (B)
16. (B)	17. (B)	18. (A)	19. (A)	20. (D)
21. (D)	22. (A)	23. (C)	24. (A)	25. (A)

18. If the system of equations
 $2x + y - z = 5$
 $2x - 5y + \lambda z = \mu$
 $x + 2y - 5z = 7$
has infinitely many solutions, then $(\lambda + \mu)^2 + (\lambda - \mu)^2$ is equal to
A) 904 B) 912
C) 916 D) 920
19. Let N be the foot of perpendicular from the point P (1, -2, 3) on the line passing through the points (4, 5, 8) and (1, -7, 5). Then the distance of N from the plane $2x - 2y + z + 5 = 0$ is
A) 6 B) 7
C) 8 D) 9
20. If the tangents at the points P and Q on the circle $x^2 + y^2 - 2x + y = 5$ meet at the point R $(\frac{9}{4}, 2)$ then the area of the triangle PQR is
A) $\frac{13}{8}$ B) $\frac{13}{4}$
C) $\frac{5}{8}$ D) $\frac{5}{4}$
21. Let $y = f(x)$ be the solution of the differential equation $y(x + 1)dx - x^2dy = 0$, $y(1) = e$. Then $\lim_{x \rightarrow 0^-} f(x)$ is equal to
A) $1/e$ B) 0
C) $1/e^2$ D) e^2
22. If $f : \mathbb{R} \rightarrow \mathbb{R}$ be a continuous function satisfying $\int_0^{\frac{\pi}{2}} f(\sin 2x) \sin x dx + \alpha \int_0^{\frac{\pi}{4}} f(\cos 2x) \cos x dx = 0$, then the value of α is
A) $-\sqrt{3}$ B) $\sqrt{3}$
C) $-\sqrt{2}$ D) $\sqrt{2}$
23. Let for a triangle ABC,
 $\vec{AB} = -2\hat{i} + \hat{j} + 3\hat{k}$
 $\vec{CB} = \alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$
 $\vec{CA} = 4\hat{i} + 3\hat{j} + \delta\hat{k}$
If $\delta > 0$ and the area of the triangle ABC is $5\sqrt{6}$, then $\vec{CB} \cdot \vec{CA}$ is equal to
A) 60 B) 54
C) 120 D) 108
24. Let $|\vec{a}| = 2$, $|\vec{b}| = 3$ and the angle between the vectors \vec{a} and \vec{b} be $\frac{\pi}{4}$. Then $|(\vec{a} + 2\vec{b}) \times (2\vec{a} - 3\vec{b})|^2$ is equal to
A) 441 B) 882
C) 482 D) 841
25. Let $S = w_1, w_2, \dots$ be the sample space associated to a random experiment. Let $P(w_n) = \frac{P(w_{n-1})}{2}$, $n \geq 2$. Let $A = \{2k + 3l : k, l \in \mathbb{N}\}$ and $B = \{w_n : n \in A\}$. Then $P(B)$ is equal to
A) $\frac{3}{64}$ B) $\frac{1}{16}$
C) $\frac{1}{32}$ D) $\frac{3}{32}$

JEE MAIN MATHEMATICS ANSWER KEY

1. (D)	2. (B)	3. (D)	4. (C)	5. (B)
6. (A)	7. (A)	8. (D)	9. (C)	10. (D)
11. (C)	12. (D)	13. (B)	14. (C)	15. (C)
16. (C)	17. (D)	18. (C)	19. (B)	20. (C)
21. (B)	22. (C)	23. (A)	24. (B)	25. (A)