

JEE Main 2025 Apr 7 Shift 2 Question Paper

Time Allowed :3 Hour

Maximum Marks :300

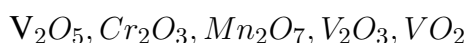
Total Questions :75

General Instructions

Read the following instructions very carefully and strictly follow them:

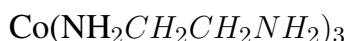
1. The test is of 3 hours duration.
2. The question paper consists of 75 questions. The maximum marks are 300.
3. There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 25 questions in each part of equal weightage.
4. Each part (subject) has two sections.
 - (i) Section-A: This section 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.
 - (ii) Section-B: This section contains 5 questions. The answer to each of the questions is a numerical value. Each question carries 4 marks for correct answer and –1 mark for wrong answer. For Section-B, the answer should be rounded off to the nearest integer.

1. Consider the following oxides:



Number of oxides which are acidic is x .

Consider the following complex compound:



The primary valency of the complex is y .

The value of $x + y$ is?

2. If $x|x - 3| + 3|x - 2| + 1 = 0$, then the number of real solutions is.

3. If $\operatorname{Re}\left(\frac{2z+i}{z+i}\right) + \operatorname{Re}\left(\frac{2z-i}{z-i}\right) = 2$ is a circle of radius r and centre (a, b) , then $\frac{15ab}{r^2}$ is equal to.

4. Given below are two statements. One is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): Refractive index of glass is more than air.

Reason (R): Optical density of a medium is directly related to its mass density.

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

- (1) (A) is false but (R) is true
 - (2) (A) is true but (R) is false
 - (3) Both (A) and (R) are true but (R) is NOT the correct explanation of (A)
 - (4) Both (A) and (R) are true and (R) is the correct explanation of (A)
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5. The correct order of basic strength of the following molecules is:

- (A) $\text{C}_6\text{H}_4\text{NH}_2\text{O}$
- (B) $\text{C}_6\text{H}_4\text{NH}_2\text{MeO}$
- (C) $\text{C}_6\text{H}_4\text{NH}_2\text{NO}_2$
- (D) $\text{C}_6\text{H}_4\text{NH}_2\text{CH}_3$

- (1) $A > B > C > D$
 - (2) $B > C > D > A$
 - (3) $D > B > A > C$
 - (4) $B > A > C > D$
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6. Which of the following is the correct hybridization of XeF_4 ?

- (1) sp^3d
- (2) sp^3
- (3) sp^3d^2

(4) sp^3d^3

7. Which of the following is the correct order of acidic character of oxides of vanadium?

(1) $V_2O_5 > VO_2 > V_2O_3$

(2) $V_2O_3 > VO_2 > V_2O_5$

(3) $V_2O_5 > V_2O_3 > VO_3$

(4) $VO_2 > V_2O_3 > V_2O_5$

8. If two vectors $\mathbf{a}$ and $\mathbf{b}$ satisfy the equation:

$$\frac{|\mathbf{a} + \mathbf{b}| + |\mathbf{a} - \mathbf{b}|}{|\mathbf{a} + \mathbf{b}| - |\mathbf{a} - \mathbf{b}|} = \sqrt{2} + 1,$$

then the value of $|\mathbf{a} + \mathbf{b}|/|\mathbf{a} - \mathbf{b}|$ is equal to.

(1) $1 + \sqrt{2}$

(2) $2 + 4\sqrt{2}$

(3) $1 + 2\sqrt{2}$

(4) $3 + 2\sqrt{2}$

9. Let $f(x) = \frac{x-5}{x^2-3x+2}$. If the range of $f(x)$ is $(-\infty, \alpha) \cup (\beta, \infty)$, then $\alpha^2 + \beta^2$ equals to.

(1) 1

(2) 2

(3) 3

(4) 4

10. The figure shows a circular portion of radius $\frac{R}{2}$ removed from a disc of mass m and radius R . The moment of inertia about an axis passing through the centre of mass of the disc and perpendicular to the plane is:

(1) $\frac{13}{32}mR^2$

- (2) $\frac{mR^2}{2}$
 - (3) $\frac{mR^2}{4}$
 - (4) $\frac{13}{64}mR^2$
-

11. Given below are two statements. One is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): A magnetic monopole does not exist.

Reason (R): Magnetic lines are continuous and form closed loops.

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

- (1) (A) is false but (R) is true
 - (2) (A) is true but (R) is false
 - (3) Both (A) and (R) are true but (R) is NOT the correct explanation of (A)
 - (4) Both (A) and (R) are true and (R) is the correct explanation of (A)
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12. Potential energy is not defined for which of the following forces?

- (1) Gravitational force
 - (2) Restoring force
 - (3) Friction
 - (4) Electrostatic force
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13. Which of the following quantity has the same dimensions as $\sqrt{\frac{\mu_0}{\epsilon_0}}$?

- (1) Voltage
 - (2) Resistance
 - (3) Inductance
 - (4) Capacitance
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14. If a box contains 19 unbiased coins and 1 biased coin with both faces heads, and a coin is randomly chosen from this box and tossed. If the head appears, then the probability that the unbiased coin was selected is:

(1) $\frac{19}{21}$

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

(3) $\frac{1}{5}$

(4) $\frac{1}{6}$

15. If $f(\theta) = \frac{\tan(\tan(\theta)) - \tan(\sin(\theta))}{\tan(\theta) - \sin(\theta)}$ is continuous at $\theta = 0$, then the value of $f(\theta)$ at $\theta = 0$ is equal to.

(1) 0

(2) 1

(3) 2

(4) 3
