

JEECUP 2025 Question Paper

Time Allowed : 2 Hours 30 Minutes

Maximum Marks : 400

Total Questions : 100

General Instructions for JEECUP 2025

Read the following instructions carefully and follow them strictly:

1. The paper consists of **100 multiple-choice questions (MCQs)**. For each correct answer, **+4 marks** will be awarded, and for each incorrect answer, **-1 mark** will be deducted.
2. If a candidate fills more than one circle for a question, the answer will be considered **invalid**.
3. The OMR answer sheet instructions will be given separately. Follow these instructions carefully, and ensure that all entries and circles are filled with a **ballpoint pen**.
4. Candidates must follow all instructions given by the **Centre Superintendent, Invigilator, or Board Authorities**. Failure to do so, or engaging in misconduct, such as tearing the question paper, exchanging written materials, or assisting others, will result in cancellation of the exam.
5. The use of **log tables, electronic calculators, pagers, mobile phones, and slide rules** is strictly prohibited during the examination.
6. The answer sheet should be filled carefully with a **ballpoint pen**. Make sure to mark the correct answer, as no changes will be allowed once the circle is filled.
7. After the examination, candidates may keep the question paper, but the answer sheet should be submitted as per the instructions.

1. A light wave of wavelength 600 nm passes through a double-slit apparatus with a slit separation of 0.2 mm. What is the angular separation (in degrees) of the first-order bright fringe?

- (A) 0.172°
 - (B) 0.344°
 - (C) 0.516°
 - (D) 0.688°
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2. A block of mass 5 kg is placed on a frictionless surface and pushed with a force of 20 N at an angle of 30° to the horizontal. What is the acceleration of the block?

- (A) 3.46 m/s^2
 - (B) 4.00 m/s^2
 - (C) 3.00 m/s^2
 - (D) 2.31 m/s^2
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3. A gas undergoes an isothermal process at 300 K, and its volume increases from 2 L to 4 L. If the initial pressure is 2 atm, what is the work done by the gas? ($R = 8.314 \text{ J/mol}\cdot\text{K}$, assume 1 mole)

- (A) 415.7 J
 - (B) 831.4 J
 - (C) 207.8 J
 - (D) 623.1 J
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4. Which of the following molecules has a trigonal planar molecular geometry?

- (A) NH
 - (B) BF
 - (C) HO
 - (D) CH
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5. What is the IUPAC name of the compound $\text{CH}_3\text{-CH}_2\text{-CO-CH}_3$?

- (A) Butan-2-one
 - (B) Propan-2-one
 - (C) Butanal
 - (D) Propanal
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6. For the reaction $\text{N(g)} + 3\text{H(g)} \rightleftharpoons 2\text{NH(g)}$, the equilibrium constant K_c is 0.5 at 400 K. If $[\text{N}] = 0.1 \text{ M}$, $[\text{H}] = 0.2 \text{ M}$, and $[\text{NH}] = 0.05 \text{ M}$, what is the reaction quotient Q_c ?

- (A) 0.3125
 - (B) 0.625
 - (C) 1.25
 - (D) 2.5
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7. The roots of the quadratic equation $x^2 - 5x + k = 0$ are real and distinct. What is the range of values for k ?

- (A) $k < \frac{25}{4}$
 - (B) $k > \frac{25}{4}$
 - (C) $k \leq \frac{25}{4}$
 - (D) $k \geq \frac{25}{4}$
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8. If $\sin \theta + \cos \theta = 2$, what is the value of $\sin \theta \cdot \cos \theta$?

- (A) $\frac{1}{4}$
 - (B) $\frac{1}{2}$
 - (C) $\frac{1}{2}$
 - (D) 1
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9. A point P divides the line segment joining A(2, 3) and B(8, 9) in the ratio 1:2. What are the coordinates of P?

- (A) (4, 5)
- (B) (6, 7)
- (C) (3, 4)

(D) (5, 6)

10. A bag contains 4 red and 6 blue balls. Two balls are drawn at random without replacement. What is the probability that both are red?

(A) $\frac{2}{15}$

(B) $\frac{1}{15}$

(C) $\frac{4}{45}$

(D) $\frac{2}{45}$

