

MHT CET 26 April Shift 2 PCM Question Paper

Time Allowed :1 Hour 30 Mins	Maximum Marks :120	Total Questions :120
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General Instructions

1. The question paper consists of three sections: Mathematics, Physics, and Chemistry. You must attempt all sections. No section can be skipped.
2. All questions are Multiple Choice Questions (MCQs). Each question has four answer options, of which only one is correct.
3. Marking Scheme:
Mathematics: 2 marks for each correct answer
Physics & Chemistry: 1 mark for each correct answer
No negative marking for wrong or unattempted answers.
4. The medium of the question paper is English. Questions will appear only in the language selected during application.
5. The total duration of the examination is 90 minutes. The timer will start once you click on "Start Test".
6. You may navigate between questions and sections at any time. Use the Next, Previous, and Question Palette options to move through the paper.
7. A question can be marked for review. Questions marked for review will be saved but not considered final unless a response is selected.
8. You must click Save & Next after selecting an answer. Answers not saved will not be recorded.
9. Rough sheets are provided for calculations. They must be returned to the invigilator before leaving.
10. Do not attempt to use any prohibited items. Calculators, mobile phones, smart-watches, written notes, or communication devices are strictly not allowed.
11. You must remain seated until the invigilator announces the end of the session. Leaving the hall before the scheduled time is not permitted.
12. In case of any technical issue, raise your hand immediately. Do not attempt to fix the system yourself.
13. The test will automatically submit when the time ends. You may also submit earlier by clicking the Submit button, after which no changes can be made.

1. Given the vectors:

$$\mathbf{a} = i + 3j - k, \quad \mathbf{b} = 3i - j + 2k, \quad \mathbf{c} = i + 2j - 2k$$

and the following information:

$$\frac{\mathbf{a} \cdot \mathbf{c}}{|\mathbf{c}|} = \frac{10}{3}$$

Find the value of $\alpha + \beta$ and the projection of $\mathbf{a}$ on $\mathbf{c}$.

- (A) $\alpha + \beta = 30^\circ$, Projection of $\mathbf{a}$ on $\mathbf{c} = 5$
 - (B) $\alpha + \beta = 45^\circ$, Projection of $\mathbf{a}$ on $\mathbf{c} = 4$
 - (C) $\alpha + \beta = 60^\circ$, Projection of $\mathbf{a}$ on $\mathbf{c} = 6$
 - (D) $\alpha + \beta = 90^\circ$, Projection of $\mathbf{a}$ on $\mathbf{c} = 7$
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2. A medicine compound having an amide linkage was asked. Which of the following compounds contains an amide linkage?

- (A) Acetanilide
 - (B) Aspirin
 - (C) Benzene
 - (D) Acetic acid
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3. Which is the weakest ligand?

- (A) F^-
 - (B) EDTA
 - (C) en
 - (D) CO
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4. What is the product obtained on the reaction of chlorobenzene with concentrated HNO_3 ?

- (A) Para nitro chloro benzene
 - (B) Ortho nitro chloro benzene
 - (C) Mixture of ortho and para nitro benzene
 - (D) Para nitro benzene
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5. Find the radius of a BCC molecule having an edge length of 2.0×10^{-11} m.

- (A) 1.0×10^{-11} m
 - (B) 1.5×10^{-11} m
 - (C) 2.0×10^{-11} m
 - (D) 3.0×10^{-11} m
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6. Which of the following elements shows a +4 oxidation state with the given configuration?

- (A) Ce
 - (B) Tb
 - (C) Eu
 - (D) Lu
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7. Given the formula for depression of freezing point:

$$\Delta T_f = K_f \cdot m$$

where ΔT_f is the depression of freezing point, K_f is the freezing point depression constant, and m is the molality, calculate the value of m .

- (A) $m = \frac{\Delta T_f}{K_f}$
 - (B) $m = \frac{K_f}{\Delta T_f}$
 - (C) $m = K_f \cdot \Delta T_f$
 - (D) $m = \frac{\Delta T_f}{K_f^2}$
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8. What is the number of unpaired electrons in Lutetium (Lu) in the +3 oxidation state?

- (A) 0
 - (B) 1
 - (C) 2
 - (D) 3
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9. Total pressure of the solution is 500, the partial pressure of component A is 400, and the partial pressure of component B is 575. What is the mole fraction of component B?

- (A) 0.5
 - (B) 0.6
 - (C) 0.8
 - (D) 0.9
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10. Which of the following elements has the most electronegativity: Li, Na, K, or Rb?

- (A) Li
 - (B) Na
 - (C) K
 - (D) Rb
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11. Which of the following has the lowest boiling point?

- (A) Butanol

- (B) Propanol
 - (C) Ethanol
 - (D) Methanol
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