MHT CET 2026 April 13 Shift 1

Question Paper

Conducted by CET Cell, Maharashtra

General Instructions

(i) **Duration:** The total duration of the examination is 3 hours (180 minutes).

(ii) **Total Marks:** The complete paper carries a maximum of 200 marks.

(iii) **Structure:** The paper has 3 Sections:

- **Section A:** 50 Multiple Choice Questions (Physics)
- **Section B:** 50 Multiple Choice Questions (Chemistry)
- **Section C:** 50 Multiple Choice Questions (Mathematics)

(iv) **Compulsory Questions:** All 150 questions are compulsory.

(v) Each question has four options. Only **one** option is correct.

(vi) **Right Answer:** +1 marks.

(vii) **Incorrect Answer:** (No Negative marking).

(viii) **Unanswered/Marked for Review:** 0 marks.

Mathematics

1. Find the value of k if the function $f(x) = \dfrac{k\sin x + 2\cos x}{\sin x + \cos x}$ is increasing for all x.

(A) $k < 2$

(B) $k = 2$

(C) $k \geq 2$

(D) $k \leq 2$

2. Calculate the area of the region bounded by the curve $y^2 = 4x$ and the line $x = 3$.

(A) $6\sqrt{3}$

(B) $8\sqrt{3}$

(C) $12\sqrt{3}$

(D) $4\sqrt{3}$

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3. Find the general solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = x^2$.

(A) $y = \frac{x^3}{4} + \frac{C}{x}$

(B) $y = \frac{x^3}{3} + \frac{C}{x}$

(C) $y = \frac{x^3}{2} + \frac{C}{x}$

(D) $y = x^3 + \frac{C}{x}$

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4. Determine the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$.

(A) $\frac{2}{\sqrt{3}}$

(B) $\frac{2}{\sqrt{5}}$

(C) $\frac{2}{\sqrt{2}}$

(D) $\frac{2}{\sqrt{29}}$

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5. If $\vec{a}$ and $\vec{b}$ are unit vectors and the angle between them is $60°$, find $|\vec{a} - \vec{b}|$.

(A) 1

(B) $\sqrt{2}$

(C) $\sqrt{3}$

(D) 2

Physics

6. A particle performs SHM with an amplitude of 5 cm. Find its acceleration when it is 3 cm from the mean position (assume $\omega = 2\,\text{rad/s}$).

(A) 3 cm/s^2

(B) 6 cm/s^2

(C) 12 cm/s^2

(D) 24 cm/s^2

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7. Calculate the de-Broglie wavelength of an electron accelerated through a potential difference of 100 V.

(A) 1.227 Å

(B) 0.1227 nm

(C) 12.27 nm

(D) 0.01227 nm

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8. Find the equivalent resistance between two opposite corners of a cube made of wires, each having resistance R.

(A) $\frac{R}{6}$

(B) $\frac{5R}{6}$

(C) $\frac{R}{3}$

(D) $\frac{2R}{3}$

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9. Determine the ratio of the speed of sound in Oxygen to that in Hydrogen at the same temperature.

(A) 1 : 4

(B) 1 : 2

(C) 2 : 1

(D) 4 : 1

Chemistry

10. What is the oxidation state of Phosphorus in H_3PO_4?

(A) +3

(B) +5

(C) +1

(D) +7

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11. Which of the following polymers is a copolymer: Buna-S, Polythene, or PVC?

(A) Polythene

(B) PVC

(C) Buna-S

(D) All of these

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12. Calculate the pH of a $0.001\,M\ NaOH$ solution at $25^\circ C$.

(A) 3

(B) 7

(C) 11

(D) 13

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13. Name the reagent used in the conversion of benzene to nitrobenzene.

(A) Concentrated HNO_3 only

(B) Concentrated H_2SO_4 only

(C) Mixture of concentrated HNO_3 and H_2SO_4

(D) Dilute HNO_3
