MHT CET 2026 April 11 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 B:** 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) **Correct Answer:** +1 marks.

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

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

Mathematics

1. If A, B, C are vertices of a triangle with position vectors $\vec{a}, \vec{b}, \vec{c}$ respectively, then find the position vector of the point D where the angle bisector from vertex A meets BC.

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2. If $y = f\left(\frac{3+2x}{3-2x}\right)$, where $f(x) = \tan(\log x)$, and $\frac{dy}{dx} = \frac{A}{B+Cx^2} \cdot \sec^2\left(\log \frac{3+2x}{3-2x}\right)$, then find A, B, C.

3. Evaluate: $\tan^{-1}(1)+\tan^{-1}(4)+\tan^{-1}(5)+\tan^{-1}\left(\frac{1}{4}\right)=\pi+\tan^{-1}\left(\frac{\alpha}{2}\right)$**. Find the value of** α**.**

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4. Evaluate the integral: $\int \frac{x}{x+2}\,dx$

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5. The equation $x^2-Ky^2-4x+6y-5=0$ **represents a pair of straight lines. Find the point of intersection.**

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6. Given $\int_1^a (2x+1)\,dx=5$**, find the sum of all values of** a**.**

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7. If $\tan^{-1}(-1)+\tan^{-1}(5)+\tan^{-1}(3)+\tan^{-1}\left(\frac{1}{4}\right)=\pi+\tan^{-1}\left(\frac{\alpha}{2}\right)$**, find** α**.**

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8. Find the approximate value of $\sqrt[3]{63}$**.**

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9. Evaluate: $\int_0^3 \sqrt{9-x^2}\,dx$

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10. A plane is formed by the axes whose centroid is $\left(2,-\frac{2}{3},\frac{1}{2}\right)$**. Find the distance of the plane from the origin.**

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11. For the curve $y=3x^3-3x^2+1$ **at** $x=1$**, find the equation of the tangent.**

Physics

12. Two progressive waves $Y_1 = \sin 2\pi\left(\frac{t}{0.4} - \frac{x}{4}\right)$ and $Y_2 = \sin 2\pi\left(\frac{t}{0.4} + \frac{x}{4}\right)$ superpose to form a standing wave (x and y in SI units). Find the amplitude of the particle at $x = 0.5$ m.

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13. When two sound waves having amplitudes 3 and 5 units are superimposed, find the ratio of maximum to minimum intensity of the resultant wave.

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14. An air column is of length 17 cm. Find the ratio of the frequency of the 5th overtone when the column is closed at one end to that when it is open at both ends. (Speed of sound in air = 340 m/s.)

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15. A particle starts oscillating simple harmonically from its mean position with time period T. At time $t = \frac{T}{6}$, find the ratio of potential energy to kinetic energy of the particle.

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16. Find the heat energy that must be supplied to 14 g of nitrogen at room temperature to raise its temperature by 48°C at constant pressure. (Molecular weight of nitrogen = 28; R = gas constant; $C_p = \frac{7}{2}R$ for a diatomic gas.)

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17. A gas having $\gamma = \frac{5}{2}$ and volume 360 cc is suddenly compressed to 90 cc. If the initial pressure of the gas is P, find the final pressure.
