

MHT CET 2025 Memory Based Question Paper PDF (April 20, 2025) (Shift 1)**Questions:**

1. Water is being poured at the rate of $36 \text{ m}^3/\text{min}$ into a cylindrical vessel whose circular base is of radius 3 meters. Then the water level in the cylinder increases at the rate of:
 - (1) $4\pi \text{ m/min}$
 - (2) $\frac{4}{\pi} \text{ m/min}$
 - (3) $\frac{1}{4\pi} \text{ m/min}$
 - (4) $\frac{\pi}{4} \text{ m/min}$
2. If $\mathbf{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, $\mathbf{b} = -\hat{i} + 2\hat{j} + \hat{k}$ and $\mathbf{c} = 3\hat{i} + \hat{j}$ are the vectors such that $\mathbf{a} + \lambda\mathbf{b}$ is perpendicular to $\mathbf{c}$, then the value of λ is:
 - (1) 6
 - (2) -6
 - (3) 8
 - (4) -8
3. If $\cos^{-1}\left(\frac{12}{13}\right) + \sin^{-1}\left(\frac{3}{5}\right) = \sin^{-1}P$, then the value of P is:
 - (1) $\frac{63}{65}$
 - (2) $\frac{56}{65}$
 - (3) $\frac{48}{65}$
 - (4) $\frac{36}{65}$
4. The area enclosed between the parabola $y^2 = 4x$ and the line $y = 2x - 4$ is:
 - (1) $\frac{17}{3}$ sq. units
 - (2) 15 sq. units
 - (3) $\frac{19}{3}$ sq. units
 - (4) 9 sq. units
5. If $y = \tan^{-1}\left(\frac{2+3x}{3-2x}\right) + \tan^{-1}\left(\frac{4x}{1+5x^2}\right)$, then $\frac{dy}{dx} =$
 - (1) $\frac{1}{1+25x^2}$

(2) $\frac{5}{1+25x^2}$

(3) $\frac{1}{1+5x^2}$

(4) $\frac{5}{1+5x^2}$

6. The particular solution of the differential equation, $xy \frac{dy}{dx} = x^2 + 2y^2$ when $y(1) = 0$ is:

(1) $\frac{x^2+y^2}{x^3} = 1$

(2) $x^2 + y^2 = x$

(3) $x^2 + y^2 = x^4$

(4) $x^2 + 2y^2 = x^4$

7. If the angle between the line $2(x+1) = y = z$ and the plane $2x - y + \sqrt{2}z + 4 = 0$ is $\frac{\pi}{6}$, then the value of λ is:

(1) $\frac{135}{7}$

(2) $\frac{45}{11}$

(3) $\frac{45}{7}$

(4) $\frac{135}{11}$

8. If the volume of the tetrahedron, whose vertices are $A(1, 2, 3)$, $B(-3, -1, 1)$, $C(2, 1, 3)$ and $D(-1, 2, x)$, is $\frac{11}{6}$ cubic units, then the value of x is:

(1) 3

(2) -2

(3) 4

(4) -1

9. A 5-ohm resistor is connected to a 10 V battery. Calculate the current flowing through the resistor.

(A) 1.0 A

(B) 2.0 A

(C) 0.5 A

(D) 0.2 A

10. A charge of $2 \mu C$ is placed in an electric field of intensity 4×10^3 N/C. What is the force experienced by the charge?

(A) 8×10^{-3} N

(B) $8 \times 10^{-6} \text{ N}$

(C) $4 \times 10^{-3} \text{ N}$

(D) $4 \times 10^{-6} \text{ N}$

