## MHT CET 2025 20 April Shift 1 Question Paper

Time Allowed :3 HourMaximum Marks :200Total Questions :150

1. Water is being poured at the rate of 36 m<sup>3</sup>/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)  $4\pi$  m/min
- (2)  $\frac{4}{\pi}$  m/min
- (3)  $\frac{1}{4\pi}$  m/min
- (4)  $\frac{\pi}{4}$  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 c, then the value of  $\lambda$  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

(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,

(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  $\lambda$  is:

 $xy\frac{dy}{dr} = x^2 + 2y^2$  when y(1) = 0 is:

 $\frac{dy}{dx} =$ 

- $(1) \frac{135}{7}$
- $(2) \frac{45}{11}$
- $(3) \frac{45}{7}$
- $(4) \frac{135}{11}$

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  $4 \times 10^3$  N/C. What is the force experienced by the charge? (A)  $8 \times 10^{-3}$  N (B)  $8 \times 10^{-6}$  N (C)  $4 \times 10^{-3}$  N

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