

MHT CET 2024 Mathematics Memory Based Question Paper PDF**Questions:**

1. One of the principal solutions of $\sqrt{3} \sec x = -2$ is equal to:

- (a) $\frac{\pi}{4}$
- (b) $\frac{2\pi}{3}$
- (c) $\frac{\pi}{6}$
- (d) $\frac{5\pi}{6}$

2. Integrate the following function w.r.t. x :

$$\int \frac{e^{3x}}{e^{3x} + 1} dx$$

- (a) $\frac{1}{3} \ln(e^{3x} + 1) + C$
- (b) $\frac{1}{3} \ln(e^{3x} - 1) + C$
- (c) $\frac{1}{3} \ln(e^{3x} + e^x) + C$
- (d) $\frac{1}{2} \ln(e^{3x} + 1) + C$

3. The general solution of $(x \frac{dy}{dx} - y) \sin \frac{y}{x} = x^3 e^x$ is:

- (a) $e^x(x - 1) + \cos \frac{y}{x} + c = 0$
- (b) $xe^x + \cos \frac{y}{x} + c = 0$
- (c) $e^x(x + 1) + \cos \frac{y}{x} + c = 0$
- (d) $e^x x - \cos \frac{y}{x} + c = 0$

4. Find the area of the region bounded by the parabola $y^2 = 4ax$ and its latus rectum.

- (a) $\frac{a^2}{2}$
- (b) a^2
- (c) $\frac{a^2}{4}$
- (d) $\frac{a^2}{8}$

5. If $p \wedge q$ is False and $p \rightarrow q$ is False, then the truth values of p and q are:

- (a) T, T
- (b) T, F
- (c) F, T
- (d) F, F

6. The inverse of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 3 & 3 & 3 \\ 5 & 2 & -1 \end{bmatrix}$ is:

$$(a) \frac{-1}{3} \begin{bmatrix} -3 & 0 & 0 \\ 3 & 0 & 0 \\ 9 & 2 & -3 \end{bmatrix}$$

$$(b) \frac{-1}{3} \begin{bmatrix} -3 & 0 & 0 \\ 3 & -1 & 0 \\ -9 & -2 & 3 \end{bmatrix}$$

$$(c) \frac{-1}{3} \begin{bmatrix} 3 & 0 & 0 \\ 3 & -1 & 0 \\ -9 & -2 & 3 \end{bmatrix}$$

$$(d) \frac{-1}{3} \begin{bmatrix} -3 & 0 & 0 \\ -3 & -1 & 0 \\ -9 & -2 & 3 \end{bmatrix}$$

7. What is the equivalent logic gate when the output of an AND gate is passed through a NOT gate?
- (a) OR gate
 - (b) NOR gate
 - (c) NAND gate
 - (d) XOR gate
8. In Young's double slit experiment, if the distance between the slits is doubled while keeping the wavelength and the distance to the screen constant, the fringe spacing will:
- (a) Double
 - (b) Halve
 - (c) Remain the same
 - (d) Quadruple
9. In a series LCR circuit connected to an AC source, at resonance, the current is maximum because:
- (a) The inductive reactance is maximum
 - (b) The capacitive reactance cancels the inductive reactance
 - (c) The resistance is zero
 - (d) The reactances add up
10. Butter is an example of which type of colloid?
- (a) Liquid in solid
 - (b) Solid in liquid
 - (c) Liquid in liquid
 - (d) Gas in liquid
11. Which of the following techniques is most suitable for determining the size and morphology of nanoparticles?

- (a) UV-Vis Spectroscopy
 - (b) Transmission Electron Microscopy (TEM)
 - (c) Fourier Transform Infrared Spectroscopy (FTIR)
 - (d) Atomic Absorption Spectroscopy (AAS)
12. What is the pH of a 0.01 M hydrochloric acid (HCl) solution?
- (a) 2
 - (b) 4
 - (c) 7
 - (d) 12

