

- Q1.** Solve the following differential equation: $\frac{dy}{dx} - \frac{y}{x} = 2x^2$ **3 Marks**
- Q2.** Find the particular solution of the differential equation $x \frac{dy}{dx} + x \cos^2 \left(\frac{y}{x} \right) = y$; given that when $x=1, y = \frac{\pi}{4}$. **3 Marks**
- Q3.** Find the particular solution of the differential equation $(y + 3x^2) \frac{dx}{dy} = x$, given that $y = 1$, when $x = 1$. **3 Marks**
- Q4.** Solve the following differential equation: $(1 + e^{\frac{y}{x}})dy + e^{\frac{y}{x}} \left(1 - \frac{y}{x} \right) dx = 0$ **3 Marks**
- Q5.** Solve the following differential equation: $(\tan^{-1} y - x)dy = (1 + y^2)dx$ **3 Marks**
- Q6.** Solve the following differential equation: $\sin x \frac{dy}{dx} + \cos xy = \cos x \sin^2 x$ **3 Marks**
- Q7.** Solve the following differential equation: $y(1 - x^2) \frac{dy}{dx} = x(1 + y^2)$. **3 Marks**
- Q8.** Find the particular solution of the differential equation given by $x^2 \frac{dy}{dx} - xy = x^2 \cos^2 \left(\frac{y}{2x} \right)$, given that when $x = 1, y = \frac{\pi}{2}$. **3 Marks**
- Q9.** Find the general solution of the differential equation. $x \frac{dy}{dx} - y + x \sin \frac{y}{x} = 0$. **3 Marks**
- Q10.** Find the general solution of the differential equation $\frac{dy}{dx} = \frac{x^2 + y^2}{2xy}$. **3 Marks**
- Q11.** Solve the differential equation: $\frac{dy}{dx} = \frac{x^2 + y^2}{xy}$. **3 Marks**
- Q12.** Find the general solution of the differential equation $x \frac{dy}{dx} = y(\log y - \log x + 1)$. **3 Marks**
- Q13.** Find the general solution of the differential equation: $\frac{dy}{dx} - \frac{2y}{x} = \sin \frac{1}{x}$. **3 Marks**
- Q14.** Find the particular solution of the differential equation: $\frac{dy}{dx} = \sin(x + y) + \sin(x - y)$, given that when $x = \frac{\pi}{4}, y = 0$. **3 Marks**
- Q15.** Find the general solution of the differential equation: $\frac{dx}{dy} = \frac{e^{\frac{x}{y}} \left(\frac{x}{y} - 1 \right)}{1 + e^{\frac{x}{y}}}$. **3 Marks**
- Q16.** Find the particular solution of the differential equation $\frac{dy}{dx} + \cot x \cdot y = \cos^2 x$, given that when $x = \frac{\pi}{2}, y = 0$. **3 Marks**
- Q17.** Find the general solution of the differential equation $ye^y dx = (y^3 + 2xe^y)dy$. **3 Marks**
- Q18.** Find the particular solution of the differential equation $x \frac{dy}{dx} = y - x \tan \left(\frac{y}{x} \right)$, given that $y = \frac{\pi}{4}$ at $x = 1$. **3 Marks**
- Q19.** Find the particular solution of the differential equation $x \frac{dy}{dx} - y = x^2 \cdot e^x$, given $y(1) = 0$. **3 Marks**

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- Q20.** Find the particular solution of the differential equation $\frac{dy}{dx} + \sec^2 x \times y = \tan x \times \sec^2 x$, given that $y(0) = 0$. **3 Marks**
- Q21.** Solve the differential equation given by $x \, dy - y \, dx - \sqrt{x^2 + y^2} \, dx = 0$. **3 Marks**
- Q22.** Form the differential equation of the family of curves $y = a \cos(x + b)$, where a and b are arbitrary constants. **3 Marks**
- Q23.** Form the differential equation of the family of curves $y = a \sin(x + b)$, where a and b are arbitrary constants. **3 Marks**
- Q24.** Form the differential equation of the family of curves $y = A \cos 2x + B \sin 2x$, where A and B are constants. **3 Marks**
- Q25.** Verify that $y = A \cos x - b \sin x$ is a solution of the differential equation. $\frac{d^2y}{dx^2} + y = 0$. **3 Marks**

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