

## Class XII

### Mathematics Assignment

### DIFFERENTIAL EQUATION

Q1. Show that ,  $y = \cos x$ , is the solution of differential equation ,  $\frac{dy}{dx} + \sin x = 0$

Q2 Show that  $xy = a e^x + b e^{-x} + x^2$  is a solution of differential equation

$$x\{d^2y/dx^2\} + 2\{dy/dx\} - xy + x^2 - 2$$

Q3. Solve the following differential equations :

i)  $\frac{dy}{dx} = \sin(x+y)$

ii)  $ydx - (x+2y^2)dy = 0$

iii)  $\cos x(1+\cos y) dx - \sin y(1+\sin x) dy = 0$

iv)  $\frac{dy}{dx} - 3y \cot x = \sin 2x, \{y=2 \text{ when } x = \frac{\pi}{2}\}$

v)  $\log \frac{dy}{dx} = ax+by.$

vi)  $\frac{dy}{dx} + 2y = x e^{4x}$

$$\text{vii) } \frac{dy}{dx} = \frac{1 - \cos x}{1 + \cos x}$$

$$\text{viii) } x \frac{dy}{dx} - y = x \tan \frac{y}{x}, \{ y = \frac{\pi}{2} \text{ when } x=1 \}$$

$$\text{ix) } (1+y^2)dx = (\tan^{-1} y - x) dy, \quad \text{given } y(0) = 0$$

$$\text{x) } \sin^{-1} \frac{dy}{dx} = x+y .$$

$$\text{xi) } \frac{dy}{dx} + \frac{y}{x} = \cos x + \frac{\sin x}{x}$$

$$\text{xii) } \frac{dy}{dx} + \frac{x^2 + 3y^2}{3x^2 + y^2} = 0$$

$$\text{xiii) } (1 + e^{x/y}) dx + e^{x/y} \{ 1 - \frac{x}{y} \} dy = 0$$

$$\text{xiv) } \frac{dy}{dx} - \frac{y}{x} + \operatorname{cosec} \frac{y}{x} = 0 ; y=0 \text{ when } x=1$$

$$\text{xv) } (1+x^2) \frac{dy}{dx} + y = \tan^{-1} x$$

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