ATOMIC ENERGY EDUCATION SOCIETY, MUMBAI

CLASS: XII (MATHEMATICS)

CHAPTER - 09

TOPIC: DIFFERENTIAL EQUATIONS

WORKSHEET: MODULE 3/3

1. **Find the general solution of the following differential equations:-**

(i) $\frac{dy}{dx} + \frac{y}{x} = x^2$

(ii) $(1 + x^2)\, dy + 2xy\, dx = \text{Cot } x\, dx$.

(iii) $\left(x^2 + 1\right)\frac{dy}{dx} + 2xy = \sqrt{x^2 + 4}$

2. **Find the particular solution of the following differential equations satisfying the given conditions:-**

(i) $\frac{dy}{dx} + 2y \tan x = Sinx$, y = 0 when x = $\frac{\pi}{3}$

(ii) $\frac{dy}{dx} + yCotx = xCo\sec x$, y = 0 when x = $\frac{\pi}{2}$

(iii) $\frac{dy}{dx} + yCotx = 2x + x^2 Cotx,\ (x \neq 0),\ y = 0\ when\ x = \frac{\pi}{2}$

3. Find the equation of a curve passing through the point (0, 2) given that the sum of the coordinates of any point on the curve exceeds the magnitude of the slope of the tangent to the curve at that point by 5.
4. Find the equation of a curve passing through the point (0, 1). If the slope of the tangent to the curve at any point (*x*, *y*) is equal to the sum of the x coordinate (abscissa) and the product of the x coordinate and y coordinate (ordinate) of that point.
