

Solve the following equations:

1. $\frac{d^2 y}{dx^2} - 4 \frac{dy}{dx} + 3y = 0$ (20%)

2. $x^2 \frac{d^2 y}{dx^2} + 2x \frac{dy}{dx} - 2y = 0$ (20%)

3. $ydy + x^2 dx = 0$ (20%)

4. $\frac{d^2 y}{dx^2} + 9y = e^x$ (20%)

5. $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$ (20%)

$$\begin{cases} I.C. & t=0, & u=H, & 0 \leq x \leq L \\ B.C.1 & x=0, & u=0, & t \geq 0 \\ B.C.2 & x=L, & u=0, & t \geq 0 \end{cases},$$

where c, L, H are constants.