## **UE22MA141A Unit IV: Partial Differential Equation**

## **Assignment**

## I. Solve the following PDEs by separation of variables:

1. 
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$$

2. 
$$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 3(x^2 + y^2)u$$

3. 
$$4\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 3u$$
;  $u(0, y) = e^{-5y}$ 

4. 
$$y^3 \frac{\partial u}{\partial x} + x^2 \frac{\partial u}{\partial y} = 0$$

## **Answers:**

$$1. \quad u = c \left(\frac{x}{y}\right)^k$$

2. 
$$u = ce^{x^2 + y^3 + k(x - y)}$$
  
3.  $u = e^{2x - 5y}$ 

3. 
$$u = e^{2x-5y}$$

4. 
$$u = c e^{k\left(\frac{x^3}{3} - \frac{y^4}{4}\right)}$$