

Home Assignment (Set – 01)
Differential Equations
Paper Code : GE – 2.1
B.A. / B.Sc. 2nd Semester (Generic Elective)

1. Form partial differential equations by eliminating arbitrary constants 'a' and 'b' from the following relations :
 - (i) $\log (az - 1) = x + ay + b$
 - (ii) $z = (x + a)(y + b)$
 - (iii) $z = ax + by + a^2 + b^2$
 - (iv) $z = ax^3 + by^3$

2. What are the classes of 1st order partial differential equations ? Define them with one example each.

3. Form partial differential equations by eliminating arbitrary function from the following relations :
 - (i) $z = f(x^2 - y^2)$
 - (ii) $z = x + y + f(xy)$
 - (iii) $z = f(x - y)$
 - (iv) $f(x + y + z) = xyz$

4. Solve the following partial differential equations :
 - (i) $p + q = 1$
 - (ii) $zp = x$
 - (iii) $zp = -x$

$$(iv) 2p + 3q = 1$$

5. Classify the following equations into parabolic, hyperbolic and elliptic :

$$(i) \frac{\partial^2 z}{\partial x^2} = \frac{\partial^2 z}{\partial y^2}$$

$$(ii) \frac{\partial^2 z}{\partial x^2} = \frac{\partial z}{\partial y}$$

$$(iii) \frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$$

$$(iv) u_{xx} + u_{yy} = u_{zz}$$

$$(v) u_{xx} - u_{yy} = u_{zz}$$

$$(vi) u_{xx} + u_{yy} + u_{zz} = 0$$

***** end *****