[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2240 **H**

Unique Paper Code : 62357604

Name of the Paper : Differential Equations

Name of the Course : **B.A. (Prog.) – DSE**

Semester : VI

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **two** parts from each question.
3. **All** questions are compulsory.

1. (i) Solve the differentials equation

$$(x^2 + y^2 + 1)\,dx - 2xy\,dy = 0$$

(ii) Solve

$$y + px = p^2x^4$$

P.T.O.

(iii) Find the solution

$$y = 2px + y^2p^3$$

2. (i) Find the general solution of

$$(D^2 + 4)y = \text{Sin } 3x + e^x$$

(ii) Solve

$$x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} - y = x^3$$

(iii) Solve the following equation

$$\frac{dy}{dx} - 7x + y = 0, \quad \frac{dy}{dt} - 2x - 5y = 0$$

3. (i) Using the variation of parameters, solve

$$y'' + 4y = \sin x$$

(ii) Solve $(y + z)dx + (z + x)dy + (x + y)dz = 0.$

(iii) Show that the e^{2x} and e^{3x} are linearly independent solution of $y'' - 5y + 6y = 0$. Find the solution $y(x)$ with the property that $y(0) = 0$ and $y'(0) = 1$.

4. (i) Form the partial differential equation of the equation $z = a(x + y) + b$.

(ii) Find the general solution of the equation $(y^2z/x)p + xzq = y^2$.

(iii) Find the complete integral of $x^2 p^2 + y^2 q^2 = z^2$.

5. (i) Form the partial differential equation of the equation $z = f(x^2 - y^2)$.

(ii) Find the general solution of the equation $p + 3q = z + \cot(y - 3x)$.

(iii) Find the complete integral of $z^2 = pqxy$.

6. (i) Find the differential equation of all spheres of radius, having center in the xy–plane.

(ii) Find the general solution of the equation $x(y^2 + z)p - y(x^2 + z)q = z(x^2 - y^2)$.

(iii) Find the complete integral of $p + q = pq$.