

(3 Hours)

[Total Marks: 80]

N.B.: (1) Question No. 1 is **compulsory**.

(2) Solve any **three** questions out of remaining **five** questions.

(3) Assume suitable data if required.

- 1 a) Write short program in scilab-while,do and for loop. **10**
 b) Solve by Gauss Siedal method $6x+15y+2z=72$
 $x+y+54z=110$ **10**
 $27x+6y-z=85$
- 2 a) Find $y(0.2)$ using eulers method from equation $\frac{dy}{dx}=1+xy$ with $y(0)=2$ **10**
 $h=0.1$
 b) Find the root of $f(x)=x^3-4x-9=0$ by using regular falsi method. Correct upto 4 decimal places. **10**
- 3 a) write short note on Adam bashforth predictor and corrector method.. **05**
 b) Use the Bander Scimdt method to solve the partial differential equation **15**
 $\frac{\partial^2 u}{\partial x^2} - \frac{\partial u}{\partial t} = 0$ subject to condition $u(0,t)=0, u(5,t)=0, u(x,0)=x^2(25-x^2)$ Take $h=1$
- 4 a) Solve by using secant method: $x^3-5x+1=0$ correct up to 3 decimal places. **10**
 b) Use Newton's Method to find the only real root of the equation $x^3-3x+1=0$ correct to 4 decimal places. **10**
5. a) Explain in detail convergence in Secant and Regula falsi method. **10**
 b) Differentiate between ordinary and partial differential equation. **5**
 c) Why convergence of newton raphson method is sensitive to starting value? Explain with example. **5**
6. a) Use Runge-Kutta Method of Order 4 to solve the following, using a step size **10**
 $h=0.2,$
 $\frac{dy}{dx} = \frac{(y^2-x^2)}{(y^2+x^2)}$
 $y(0)=1, \text{ find } y(0.4)$
 b) find the solution of difference Equation **10**
 $u_{n+1} - (\frac{11}{6})u_n + u_{n-1} - (\frac{1}{6})u_{n-2} = 0, u_0=0, u_1=1, u_2=2$

59915