HG(3)-Math(8) Num. Anal. (Sc & Arts)

2021

Time : 3 Hours

Maximum Marks : 70

Candidates are required to give their answers in

their own words as far as practicable.

Answer any five questions.

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1. (a) Explain Bisection method for obtaining real root of an equation.

   (b) Solve the equation $x^3 - x - 1 = 0$ by using false position method.

2. (a) Explain Newton's Raphson's method for solving an algebraic and transcendental equation.

   (b) Evaluate $\sqrt{12}$ by applying Newton's Raphson formula.

3. (a) Establish Newton – Gregory forward interpolation formula.

   (b) Evaluate $\Delta\left(\dfrac{x^2}{Cos2x}\right)$

4. (a) Prove that divided differences are symmetric function of their arguments

   (b) Find the form of the function given by:

x	3	2	1	-1
f(x)	3	12	15	-21

5. (a) Using Euler's method, find approximate value of y when x = 0.6 of $\dfrac{dy}{dx} = 1 - 2xy$ given that y=0 when x = 0 (take h=0.2)

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(b) Using Runge – Kutta method of forth order,

Solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with y(0)=1 at x = 0.2

6. (a) Establish general Quadrature formula for equidistant ordinates.

(b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Trapezoidal rule.

7. (a) Solve the following equation by Gauss elimination method.

$x + 2y + z = 3$

$2x + 3y + 3z = 10$

$3x - y + 2z = 13$

(b) Solve the following equation by Gauss Jordan elimination method.

$x + y + z = 1$

$4x + 3y - z = 6$

$3x + 5y + 3z = 4$

8. Solve the following equation by Relaxation method :

$10x - 2y + z = 12$

$x + 9y - z = 10$

$2x - y + 11z = 20$

9. Find the eigen – value and eigen vector of the matrix

$A = \begin{vmatrix} 1 & 2 & 3 \\ 0 & -4 & 2 \\ 0 & 0 & 7 \end{vmatrix}$

10. Write short notes on any two of the following :

(a) Weddel's rule of integration

(b) Regula Falsi method

(c) Gauss Jordan method

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