B.Sc. DEGREE EXAMINATION, APRIL 2018.

III YEAR V SEMESTER

Core Elective - Paper I - NUMERICAL METHODS

Time : 3 Hours Max. Marks : 75

SECTION A – (10 × 2 = 20 marks)

Answer any *TEN* questions

1. State Iterative formula for Regula-falsi method.

2. What is the condition for the convergence of the iterative method for solving

3. State the condition for convergence of Gauss-Seidel method.

4. Compare Gauss-Elimination and Gauss-Seidel method

5. Find the missing term for the following data

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| y | 2 | 4 | 8 | ? | 32 | 64 | 128 |

6. Find the divided differences of for the arguments 1, 3, 6, 11

7. State Simpson’s 3/8 the rule formula.

8. State Newton-Cote’s quadrature formula.

9. State Milne’s predictor and corrector formula.

10. State Adam-Bashforth Predictor-corrector formula.

11. Prove that

12. Explain the terms (i) Round off error (ii) Truncation error.

SECTION B – (5 × 5 = 25 marks)

Answer any *FIVE* questions

13. Evaluate by Newton’s Raphson method.

14. Solve the system of equations by Gauss-Elimination method

[P.T.O.]

15. Find the value of y when x = 10 from the following data

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | 5 | 6 | 9 | 11 |
| Y | 12 | 13 | 14 | 16 |

16. Evaluate by using trapezoidal rule and Simpson’s 1/3th rule.

17. Using Taylor’s method compute y(0.2) given and y(0)=0, h = 0.2.

18. Find the value of x when y = 13.6 from the following data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 30 | 35 | 40 | 45 | 50 |
| y | 15.9 | 14.9 | 14.1 | 13.3 | 12.5 |

19. Given , ,

Using Euler’s formula.

SECTION C – (3 × 10 = 30 marks)

Answer any *THREE* questions

20. Find the positive root of by bisection method.

21. Solve the system of equations by Gauss-Elimination method

22. Using Newton’s divided difference formula, find the values of from the fol   
 lowing data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | 4 | 5 | 7 | 10 | 11 | 13 |
| f(x) | 48 | 100 | 294 | 900 | 1210 | 2028 |

23. Find the first two derivatives at x = 50 and x=56 from the following data

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| X | 50 | 51 | 52 | 53 | 54 | 55 | 56 |
| Y | 3.6840 | 3.7084 | 3.7325 | 3.7563 | 3.7798 | 3.8030 | 3.8259 |

24. Apply the fourth order Runge-Kutta method to find y(0.2) given that