B.Sc. DEGREE EXAMINATION, APRIL 2018.

II YEAR IV SEMESTER

Allied - Paper IV - NUMERICAL METHODS

Time : 3 Hours Max. Marks : 60

SECTION A – (10 × 1 = 10 marks)

(Q. No. 1-12)Answer any *TEN* questions

1. What is Interpolation?

2. When to use Newton’s Backward Formula?

3. What is the Lagrange’s formula to find y, if 3 sets of values of (x0, y0), (x1, y1), (x2, y2)

are given?

4. What is the assumption we make when Lagrange’s formula is used?

5. Write down the Stirling’s Central Difference formula.

6. Give the Gauss forward difference formula.

7. What is Inverse interpolation?

8. Mention the iterative formula for Newton – Raphson method.

9. State Simpson’s 1/3rd and 3/8th rule.

10. State the basic principle for deriving Simpson’s 1/3 rule.

11. What is the criterion for the convergence in Newton-Raphson method?

12. Give two direct methods to solve a system of linear equations.

SECTION B – (5 × 4 = 20 marks)

(Q. No. 13-19)Answer any *FIVE* questions

13. Find the value of f(x) at x=9 from the given table using Newton’s forward difference.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x: | 2 | 5 | 8 | 11 |
| f(x) | 94.8 | 87.9 | 81.3 | 75.1 |

14. Using Lagrange’s formula , find the polynomial to the given data:

|  |  |  |  |
| --- | --- | --- | --- |
| X: | 0 | 1 | 3 |
| Y: | 5 | 6 | 50 |

15. From the following table, find f(34) using Everett’s formula.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x: | 20 | 25 | 30 | 35 | 40 |
| y= f(x) | 11.4699 | 12.7834 | 13.7648 | 14.4982 | 15.0463 |

16. Find x corresponding to y = 85, using Gauss forward formula.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x: | 2 | 5 | 8 | 14 |
| y: | 94.8 | 87.9 | 81.3 | 68.7 |

[P.T.O.]

17. Evaluate using Trapezoidal rule with h=0.2.

18. Compute divided difference table for the data given below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x: | 0 | 2 | 3 | 4 | 5 | 6 |
| y= f(x) | 4 | 26 | 58 | 112 | 466 | 922 |

19. Devise Bessel’s formula.

SECTION C – (3 × 10 = 30 marks)

(Q. No. 20-24)Answer any *THREE* questions

20. State and prove the properties of E and delta.

21. Using Newton’s divided difference formula, find the values of f(2) and f(8) , given

the following table:

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

22. From the following table, Using Stirling’s formula, estimate the value of tan 16

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x : | 0 | 5 | 10 | 15 | 20 | 25 | 30 |
| y= tan x: | 0.0 | 0.0875 | 0.1763 | 0.2679 | 0.3640 | 0.4663 | 0.5774 |

23. Find the real root of X3- 2X-5 =0 using Newton Raphson method.

24. Derive trapezoidal rule for numerical integration.