

(For candidates admitted from 2008 - 2015 Batch)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

PHYSICS

NUMERICAL METHODS AND PROGRAMMING

Time: Three hours

Maximum: 75 marks

PART A — (10 × 2 = 20)

Answer ALL questions.

1. What do you mean by error?
2. Define average.
3. Write down the final result of Gauss elimination method.
4. Write the formula for Newton-Rapson method?
5. Define interpolation.
6. Write down Newton forward interpolation formula.
7. Define Simpson rule.
8. Write down Newton forward and backward difference formula to compute derivatives.
9. Define Euler methods.
10. Give 1st order ordinary differential equation.

PART B — (5 × 5 = 25)

Answer ALL questions, choosing either 'a' or 'b'

11. a) Briefly explain least square fitting.
(OR)
b) Derive general formula for error.
12. a) Explain the iteration method.
(OR)
b) Define Gauss-Seidal method of iteration.
13. a) Define Lagrange interpolation.
(OR)
b) Define central difference interpolation formula.

14. a) Derive trapezoidal rule.
(OR)
b) Give the comparison of trapezoidal and Simpson rule.
15. a) Derive N^{th} order ordinary differential equation.
(OR)
b) Derive power series approximation.

PART C — (3 × 10 = 30)
Answer any THREE Questions

16. Write down the algorithm for solution of linear equation.
17. Write down the C programme for solving first order differential equation.
18. Write a note on convergence and rate of convergence.
19. Derive Runge Kutta method for second order differential equation.
20. Write down the C programme for evaluates integrals using Simpson's rule.
