



25020375

QP CODE: 25020375

Reg No : .....

Name : .....

**B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE / MERCY CHANCE  
EXAMINATIONS, FEBRUARY 2025**

**Sixth Semester**

**CHOICE BASED CORE COURSE - PH6CBT03 - COMPUTATIONAL PHYSICS**

Common for B.Sc Physics Model I, B.Sc Physics Model II Applied Electronics, B.Sc Physics Model  
II Computer Applications & B.Sc Physics Model III Electronic Equipment Maintenance

2017 Admission Onwards

58AB8FD3

Time: 3 Hours

Max. Marks : 80

**Part A**

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Write down the procedure for Regula Falsi Method.
2. What is coefficient matrix?
3. What is upper triangular matrix?
4. Which are the two iterative methods for the solution of a system of linear algebraic equations?
5. In which situation Newton's forward formula is suitable?
6. Define averaging operator.
7. If  $y_1=4$ ,  $y_3=12$ ,  $y_4=19$  and  $y_x=7$ . Find  $x$  using Lagrange interpolation formula.
8. State second order Newton's divided difference interpolation polynomial.
9. Write down Newton-Cote general quadrature formula.
10. Write the formula of Simpson's 3/8 rule.
11. Write Taylor's series formula.
12. What is the difference between Euler's and modified Euler's method?

(10×2=20)

**Part B**

*Answer any **six** questions.*

*Each question carries **5** marks.*





13. Find a real root of the equation  $x^3 - 3x + 1 = 0$  lying between 1 and 2 correct to three places of decimal by using bisection method.
14. Locate root of the equation  $x^2 + x - 2 = 0$  using the fixed point method.
15. Solve  $2x + y = 3$ ;  $2x + 3y = 5$  by Gauss-Seidel iteration method.
16. Using least square regression fit a parabola to the following data
- |   |    |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|----|
| X | 0  | 2  | 4  | 6  | 8  | 12 | 16 | 20 |
| Y | 10 | 12 | 18 | 22 | 20 | 30 | 26 | 30 |
17. Fit the exponential model  $y = a e^{bx}$  to the following data
- |   |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|
| X | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | 2.4 |
| Y | 75  | 100 | 140 | 200 | 270 | 375 |
18. Find the first two derivatives of  $x^{1/3}$  at  $x=50$  and  $x=56$  given the table below:
- |               |        |        |        |        |        |        |        |
|---------------|--------|--------|--------|--------|--------|--------|--------|
| x             | 50     | 51     | 52     | 53     | 54     | 55     | 56     |
| $y = x^{1/3}$ | 3.6840 | 3.7084 | 3.7325 | 3.7563 | 3.7798 | 3.8030 | 3.8259 |
19. Solve  $y' + y = e^x$ ,  $y(0) = 0$  by Picard's method.
20. Using Heun's method, find  $y(0.2)$ ,  $y(0.1)$  given  $\frac{dy}{dx} = x^2 + y^2$ ,  $y(0) = 1$ .
21. Given  $y' = x^2 - y$ ,  $y(0) = 1$ , find  $y(0.1)$ ,  $y(0.2)$  using R.K method of second order.

(6×5=30)

### Part C

Answer any **two** questions.

Each question carries **15** marks.

22. Find a positive root of each of the following equation using Newton-Raphson method  $x^4 - x - 13 = 0$ .
23. Solve the system  $2x_1 + 4x_2 - 6x_3 = -8$ ;  $x_1 + 3x_2 + x_3 = 10$ ;  $2x_1 - 4x_2 - 2x_3 = -12$  using Gauss Jordan method.
24. Find a cubic polynomial which takes the following values
- |      |   |   |   |    |
|------|---|---|---|----|
| x    | 0 | 1 | 2 | 3  |
| f(x) | 1 | 2 | 1 | 10 |
25. Explain Trapezoidal rule.

(2×15=30)

