

DECEMBER 2015

**P/ID 37475/PMANE**

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Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What are manipulators?
2. Give the general form of switch statement.
3. What does this pointer points to?
4. What is multilevel inheritance?
5. What is a virtual function?
6. State fixed point theorem.
7. State Taylor polynomial approximation theorem.
8. State Ricardson's Extrapolation theorem.
9. Define the degree of precision of a quadrature formula.
10. State the theorem on first derivative test.

SECTION B — (5 × 7 = 35 marks)

Answer any FIVE questions.

11. What is a friend function? What are the merits and demerits of using friend function?
12. What are objects? How are they created?
13. Explain the manipulation of strings using operators.
14. Explain multiple inheritance.
15. Using Gaussian elimination method, construct the triangular factorization of the matrix

$$A = \begin{pmatrix} 4 & 3 & -1 \\ -2 & -4 & 5 \\ 1 & 2 & 6 \end{pmatrix}.$$

16. Consider  $f(x) = \cos x$  over  $[0, 1.2]$ . Using the three nodes  $x_0 = 0.0$ ,  $x_1 = 0.6$  and  $x_2 = 1.2$ , construct a quadratic approximation polynomial  $P_2(x)$ .
17. Using composite trapezoidal rule with 11 sample points, compute an approximation to the integral of  $f(x) = 2 + \sin(2\sqrt{x})$  taken over  $[1, 6]$ .
18. Find the minimum of  $f(x, y) = x^2 - 4x + y^2 - y - xy$ .

SECTION C — (3 × 15 = 45 marks)

Answer any THREE questions.

19. Write the general form of do – while, switch and for statements. Explain with examples.
20. Write a program to illustrate how to construct a matrix of size  $m \times n$ .
21. Solve by using Gauss-Seidel iteration method.  
$$5x - y + z = 10$$
$$2x + 8y - z = 11$$
$$-x + y + 4z = 3.$$
22. Using Runge-Kutta method of order 4, solve the initial value problem  $y' = \frac{t-y}{2}$  on  $[0, 3]$  with  $y(0) = 1$ . Compare solutions for  $h = 1, \frac{1}{2}, \frac{1}{4}$  and  $\frac{1}{8}$ .
23. Write the Hamming method algorithm.

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