FD-2763

B.Sc./B.Sc. B.Ed. (Part-III)
Examination, 2022

MATHEMATICS

Optional

Paper - III (C)

Programming in C and Numerical Analysis

Time : Three Hours] [*Maximum Marks* : 30

Note : Answer any **two** parts from each question. All questions carry equal marks.

Unit-I

1. (*a*) What do you understand by logical and conditional operator ? Explain it with an example.

(*b*) Explain file formatting and write a program for file formatting.

(*c*) What is meant by the pointer to pointer ? What are the advantages of that ?

Unit-II

2. (*a*) Perform three iteration of Newton's method to complete the positive root of equation

$$x^3 - 5x + 3 = 0$$

(*b*) Find the root of equation

$$x^3 - x - 4 = 0$$

using the bisection method.

(*c*) What is Chebychev's formulas ? Explain with example.

Unit-III

3. (*a*) Solve the system of linear equations :

$$x + 2y + 3z = 5$$
$$2x + 8y + 22z = 6$$
$$3x + 22y + 82z = -10$$

using the Cholesky method.

(*b*) Solve the system of linear equation by LU decomposition method :

$$x_1 + x_2 - x_3 = 2$$
$$2x_1 + 3x_2 + 5x_3 = -3$$
$$3x_1 + 2x_2 + 3x_3 = 6$$

(*c*) Explain QR method.

Unit-IV

4. (*a*) Using Euler's method, complete the solution of :

$$\frac{dy}{dx} = y^2 - x^2$$

when $y(0) = 1$ where $x = 0\ (0.1)\ 0.5$

(*b*) Determine the values of y in the interval $(0, 1)$ if y satisfies the boundary value problem :

$$\frac{d^4y}{dx^4} + 81y = 81x^2$$

Given : $y(0) = y(1) = y''(1) = 0$ (take $n = 3$)

(*c*) Find the least square approximating polynomial of degree 2 for the function $f(x) = \sin\pi x$ on the interval $[0, 1]$.

Unit-V

5. (*a*) Explain with example the acceptance rejection method.

(*b*) Explain Monte-Carlo integration for improper integrals. How you do error analysis for Monte-Carlo integration ?

(*c*) Explain the random number through Monte-Carlo method.

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