Roll No. .....

(05/25)

5221

B.A./B.A. (Hons.)/B.Sc. EXAMINATION

(Fourth Semester)

MATHEMATICS

BM-243

Programming in C and Numerical Methods

Time : Three Hours *Maximum Marks :* B.Sc. : 30, B.A. : 20

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

(Compulsory Question)

1. (a) Draw a flow chart to find the area of a circle. 1½(1)

(b) What is an escape sequence ? 1½(1)

(c) What is meant by Looping ? Write the two different form of looping. 1½(1)

(d) Show that the equation :

$$x^3 - 4x^2 + 7x - 5 = 0$$

has at least one positive root. Find the interval in which it lies. 1½(1)

Unit I

2. What is a flowchart ? List its use and write its types, advantages and limitations. 6(4)

3. (a) What are constants ? Name and describe the four basic types of constants in C language. 3(2)

(b) Explain with examples the syntax of scanf() and printf() functions. 3(2)

Unit II

4. (a) Give the syntax of while and do-while loops and explain with the help of flow chart. 3(2)

   (b) Explain the switch statement and goto statement with the help of an example. 3(2)

5. Describe and explain one and two dimensional arrays. How can these arrays be initialized in C ? 6(4)

Unit III

6. (a) What is a structure in C language ? How structure is defined and declared ? Explain with the help of an example. 3(2)

(b) Explain the difference between call by value and call by reference. 3(2)

7. (a) Find a real root of the equation :

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

by bisection method, correct to three places of decimal. 3(2)

(b) Find the real root of $x^4 - x - 10 = 0$ by Newton-Raphson method which is near to 2, correct to three places of decimal. 3(2)

Unit IV

8. Solve the following equations by using LU decomposition method :

$$2x - 6y + 8z = 24,$$

$$5x + 4y - 3z = 2,$$

$$3x + y + 2z = 16.$$ 6(4)

9. (a) Find the inverse of the matrix

$$A = \begin{bmatrix} 2 & -1 & 2 \\ -1 & 1 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$ by Cholesky method.

3(2)

(b) Solve the following equations by Jacobi's method :

$$20x + y - 2z = 17,$$

$$3x + 20y - z = -18,$$

$$2x - 3y + 20z = 25.$$ 3(2)

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