Class — B.A./B.Sc. 4th Semester

Subject — Mathematics

Paper — BM-243

(Programming in C and Numerical Methods)

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B.Sc. -II Programming in C Paper-III

Chapter-1 (Computers: General Introduction)

Ques-1 What do you understand by programmer's model of a Computer? How does it help in problem Solving and programming? Illustrate

Ques-2 What is a bit? What is a byte? What is the difference between a byte and a word of memory?

Ques-3 What is meant by Compilation? How does it differ from interpretation?

Ques-4 Define Algorithm write properties of algorithm.

Ques-5 What is flowchart? list its use and write its types, advantages and limitations.

Ques-6 Draw a flowchart to check whether a number is prime or not?

Ques-7 Draw a flowchart to find area of a circle of given radius.

Ques-8 How flowchart is differ from an algorithm

Ques-9 to Draw flowchart to find roots of a quadratic Equation.

Chapter - 2 (Introduction to c)

Ques-1   Write Short note on Escape sequences with its purpose

Ques-2   Write Rules for naming a variable?

Ques-3   what are general characteristics of C?

Ques-4   what are Constants? Name and describe the four basic types of Constants in C.

Ques-5   Summarize the rules that apply to all numeric type constants.

Ques-6   Define Variable in C and also discuss some Valid or invalid variable.

Ques-7   what is a string Constant? How does a string Constant differ from Character Constant.

Chapter-3   (Data Types)

Ques-1   What do you mean by data types. What are Various data types Used in C Language? Illustrate their declaration and usage?

Ques-2   What is purpose of scanf() and printf() functions How it is used within a C program?

Ques-3   Describe the process of Computation and Complitation of a Source program in C.

Ques-4   How Comments be included within a C program; where Can Comments be placed?

Ques-5   Explain with Examples the syntax of scanf() and printf() functions? How it is used with in C

Ques-6   write a short note on typedef statement?

Ques-7   write use of Comments

Ques-8   write Short note on Qualifiers.

Chapter-4 (Operators and Expressions)

Ques-1 What are operators? Chart various types of operators offered by C language and Illustrate precedence of these operators.

Ques-2 What is the difference between postfix and prefix increment and decrement operators? Explain

Ques-3 How are library functions accessed? How is information passed to library function from its access point?

Ques-4 What is an expression? What are its Components

Ques-5 What do you mean by type Conversion? why it is necessary? Explain diff type of Conversions in C language

Ques-6 Write a program to Calculate Volume and Surface area of a Sphere when its radius is given.

Ques-7 Write a program to reverse a four digit number

Ques-8 Write a program to Calculate Compound Interest.

Ques-9 Difference b/w Relational operator and Assignment operator ie. ("=" and "==")

Ques-10 What is Cost operator

Chapter-5 (Decision Control Structure)

Ques-1 What is nested if statement?

Ques-2 Diff. b/w Switch and Else-if ladder.

Ques-3 Explain the syntax of Switch Statement by an Example.

Ques-4 Diff b/w Nested if... Else Statement and Else-if ladder.

Ques-5 Define goto Statement with help of program.

or

Give syntax of 'goto' statement. when is this used in the program? Give flow chart of goto Statement with forward jump and goto Statement with backward jump.

Ques-6 Define Iteration

Chapter-6 (Loops)

Ques-1 What is meant by looping? Describe two different forms of looping.

Ques-2 How many times is a for loop executed? Compare this with while and do-while loop.

Ques-3 Differentiate b/w

- ✓ for and do-while loop
- break and Continue
- while and do-while loop
- ✓ Continue and goto
- break and Switch
- while and for
- ✓ switch and elseif ladder.

Ques-4 Write a program to print all even no. upto 50.

Ques-5 W.A.P to find Sum of first 10 natural nos.

Chapter-1 (Functions)

Ques-1 What is a function in C? Why do we use functions? What are different categories of functions in C? Give examples.

Ques-2 Distinguish b/w a user defined function and one belonging to C library.

Ques-3 What are the rules for naming a fu.

Ques-4 Diff b/w local and global variables.

Ques-5 Diff b/w formal and actual arguments? Explain Concept of fu prototype.

Ques-6 What is recursion? How recursion is implemented in C language? Illustrate with help of Ex.

Ques-7 Write a program to find factorial of a no. using recursion.

Ques-8 Differentiate b/w

User-defined and built-in functions

Chapter-8 (The C Preprocessor)

Ques-1   What is a macro and what is its use?

Ques-2   Diff b/w macros and functions

Ques-3   What is Conditional Compilation?

Ques-4   What is meant by nested macro?

Ques-5   Summarize the Special preprocessor operators # and ## what is the purpose of each?

Chapter - 9 (Arrays)

Ques-1 What is an array? Explain why arrays are used in programming. Discuss how elements are read and accessed through arrays.

Ques-2 In what ways does an array differ from an ordinary variable?

Ques-3 Summarize the rules for writing a one-dimensiona array definition

Ques-4 Describe and Explain one and two dimensional arrays. How Can these arrays be initialized in C?

Ques-5 Write a program to Calculate Sum of two 3×3 matrix

Ques-6 W.A.P to find trace of a matrix of n×n order

Ques-7 How are multi-dimensional array defined? Compare its def" with that of one-dimensional arrays.

Ques-8 W.A.P to find transpose of given matrix.

Chapter-10 (Strings)

Ques-1   How is a String Stored in an array in C?

Ques-2   what is meant by concatenation? what function is used to achieve this operation? write a program to concatenate the two strings.

Ques-3   W.A.P in C to Count and return the no. of Characters in a String.

Ques-4   How Can we Compare two Strings

Ques-5   what is String Constant? How does a string Constant differ from Character Constant?

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Chapter-11 (Structure and Union)

Ques-1 what is chief reason of using structures?

Ques-2 How is an array different from structure?

Ques-3 How can a structure variable be declared and initialized?

Ques-4 what is meant by nesting of structures?

Ques-5 Distinguish b/w

Structure & union
Structure & array

Ques-6 How can size of structure be determined? In what units is size returned?

Ques-7 what is a structure tag and what is its purpose?

Chapter-12 (Pointers)

Ques-1 What is meant by address of a memory cell? How are addresses usually numbered?

Ques-2 What are pointers? Why are they needed? Explain with an example.

Ques-3 Explain the concept of Void pointer in C.

Ques-4 How is a pointer variable declared and initialized?

Ques-5 Explain the concept of pointer dereferencing

Ques-6 Explain diff b/w Call by value and Call by reference with help of Example.

Ques-7 What is pointer arithmetic? How is it performed? Explain with an Example.

Ques-8 Diff. b/w Array and pointer.

Numerical Method

Chapter-1 (Sol. of Algebraic & transcendenta Eq)

Ques-1 Find real positive root by bisection method Correct to three place of decimal.

i) $x^3 - 26 = 0$

ii) $x^2 - 37 = 0$

iii) $x^3 - 9x + 1 = 0$

Ques-2 Explain Regula falsi method for finding real root of

Ques-3 Find order of Convergence of Regula falsi methoo

Ques-4 Find real root of Eq

$x \log_{10} x - 1.2 = 0$ by Regula falsi upto 4 dec

ii) $x^3 - 4x + 9 = 0$

iii) $x^3 - 5x - 7 = 0$ — upto 3 decimal

Ques-5 Find real root of Eqi by secant method

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

iy) $x^4 - x - 10 = 0$

Ques-6 Obtain Newton-Raphson formula

Ques-7 Find order of Convergence of Newton-Raphson formula

Ques-8 Find real root of Equations by Newton-Raphson Corree to three places of dec

i) $x^3 - 2x - 5 = 0$

ii) $x^4 - x - 10 = 0$

Ques-9 Using Newton Raphson formula find value of $\sqrt[4]{32}$

Ques-10 Prove recurrence formula $x_{i+1} = \frac{1}{3}\left(2x_i + \frac{N}{x_i^2}\right)$ for finding Cube root of N. Hence find Cube root of

Ques-11 Show iterative formula for finding the reciprocal
         N is $x_{i+1} = x_i (2 - N x_i)$ and hence find value of $\frac{1}{31}$.

Ques-12 What are algebraic and transcendental equations?
         Give examples. Use an iterative formula twice to
         Evaluate $\sqrt{12}$.

Ques-13 Define Descarte's rule of sign.

Chapter-2 (Simultaneous Linear Algebraic Eq)

Ques-1   Solve given Eq by Gauss Elimination method

i)
$$4x + 3y + 2z = 8$$
$$x + y + 2z = 7$$
$$3x + 2y + 4z = 13$$

ii)
$$4x + y + 3z = 11$$
$$3x + 4y + 2z = 11$$
$$2x + 3y + z = 7$$

Ques-2   Solve Eq. by Gauss - Jordan method

i)
$$x + 2y + z = 8$$
$$2x + 3y + 4z = 20$$
$$4x + 3y + 2z = 16$$

ii)
$$2x + y + 4z = 12$$
$$4x + 11y - z = 33$$
$$8x - 3y + 2z = 20$$

Ques-3   Solve Eq. by triangularization method

i)
$$2x + y + z = 2$$
$$x + 3y + 2z = 2$$
$$3x + y + 2z = 2$$

ii)
$$2x + y + 3z = 13$$
$$x + 5y + z = 14$$
$$3x + y + 4z = 17$$

iii)
$$2x + 3y + z = 9$$
$$x + 2y + 3z = 6$$
$$3x + y + 2z = 8$$

iv)
$$x + y + 2z = 1$$
$$2x + y + 3z = 1$$
$$3x - 2y + 4z = -1$$

v)
$$2x + 4y + 3z = 9$$
$$3x + y - 2z = -1$$

Ques-4 Solve by Crout's method:

i)
$$x + y + 2z = 4$$
$$2x + 3y + 4z = 9$$
$$3x + 4y + 5z = 14$$

ii)
$$5x + 2y + z = -12$$
$$-x + 4y + 2z = 20$$
$$2x - 3y + 10z = 3$$

Ques-5 Solve by Cholesky's method
$$4x + 6y + 8z = 0$$
$$6x + 34y + 52z = -160$$
$$8x + 52y + 129z = -452$$

ii)
$$x + y + z = 5$$
$$x + 2y + 2z = 6$$
$$x + 2y + 3z = 8$$

Ques-6 Solve by Jacobi's iteration method

i)
$$20x + y - 2z = 17$$
$$3x + 20y - z = -18$$
$$2x - 3y + 20z = 25$$

ii)
$$10x + y + 2z = 44$$
$$2x + 10y + z = 51$$
$$x + 2y + 10z = 61$$

iii)
$$5x + 2y + z = 12$$
$$x + 4y + 2z = 15$$
$$x + 2y + 5z = 20$$

Ques-7 Solve by Gauss-Seidel method

i)
$$10x + 2y + z = 9$$
$$2x + 20y - 2z = -44$$
$$-2x + 3y + 10z = 22$$

ii)
$$10x + y + z = 12$$
$$2x + 10y + z = 13$$
$$2x + 2y + 10z = 14$$

iii) $2x + y + 6z = 9$

$8x + 3y + 2z = 13$

$x + 5y + z = 7$

iv) $10x + y + z = 6$

$x + 10y + z = 6$

$x + y + 10z = 6$

v) $5x + y + 2z = 19$

$x + 4y - 2z = -2$

$2x + 3y + 8z = 39$

Ques-8 Solve by relaxation method

i) $9x - y + 2z = 9$

$x + 10y - 2z = 15$

$2x - 2y - 13z = -17$

ii) $10x - 2y - 3z = 205$

$-2x + 10y - 2z = 154$

$-2x - y + 10z = 120$

iii) $10x - 2y - 2z = 6$

$-x + 10y - 2z = 7$

$-x - y + 10z = 8$

Ques-9 Diff b/w Jacobi's method and Gauss Seidal's method

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Ques-3 W.A.P in c to count and return the number of Characters in a string.

Ques-4 How Can we Compare two strings.