

B.Sc. Semester - 5 (CBCS) Examination**Oct/Nov. - 2023(Old Course)****PROGRAMMING IN C AND NUMERICAL ANALYSIS-1 (CORE)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que-1(A) Answer any one out of two. (07)
1. Explain if else statement.
 2. Explain Integer and Real constants in C.
- Que-1(B) Answer any one out of two. (04)
1. Explain scanf() in C.
 2. Explain Hierarchy of operations in C.
- Que-1(C) Answer any one out of two. (03)
1. Write logical operators with meaning.
 2. Explain difference between If and If-else statement.
- Que-2(A) Answer any one out of two. (07)
1. Explain Integer data types in C.
 2. Explain for loop.
- Que-2(B) Answer any one out of two. (04)
1. Explain while loop.
 2. Write a program to find sum of digits of given number.
- Que-2(C) Answer any one out of two. (03)
1. Differentiate continue and break statement.
 2. Differentiate while and do-while loop.
- Que-3(A) Answer any one out of two. (07)
1. Explain array in C.
 2. Write a program to find an addition of two 3x3 matrices.
- Que-3(B) Answer any one out of two. (04)
1. Explain Macros without argument.
 2. Write a program to find a geometric progression for given value of a and r.
- Que-3(C) Answer any one out of two. (03)
1. Explain two-dimensional array initialization.
 2. Explain C preprocessor.
- Que-4(A) Answer any one out of two. (07)
1. Fit normal equation for $y=ax+b$, using principle of least squares method.
 2. State and Prove L.U. decomposition method.

Que-4(B) Answer any one out of two. (04)

1. Solve the following system of linear equation by Gauss Elimination method.

$$X+4y+9z=34; 2x+y+z=12; 3x+2y+3z=24$$

2. Fit a straight-line $y=ax+b$ for the following data.

X: 1 2 3 4 5

Y: 14 27 40 55 68

Que-4(C) Answer any one out of two. (03)

1. Derive Gauss Jacobi iteration method.
2. Explain a linear law for graphical method.

Que-5(A) Answer any one out of two. (07)

1. Derive Gregory Newton Forward interpolation formula.
2. Explain: Error propagation in difference table.

Que-5(B) Answer any one out of two. (04)

1. Express $f(x) = 3x^4 - 4x^3 + 6x^2 + 2x + 1$ in factorial notation.
2. Evaluate $\Delta^3 f(x)$ for $f(x) = (1-x)(1-2x)(1-3x)$ if $h=1$

Que-5(C) Answer any one out of two. (03)

1. Form a table of forward differences of the function $f(x) = x^4 - 5x^3 + 6x^2 + x - 2$ for $x = -3, -2, -1, 0, 1, 2, 3$.
2. Prove that $(\Delta + \nabla)^2 (x^2 + x) = 8$ where $h=1$.
