647510 **BSCc&nCC5020** **Seat No :_____**

B.Sc. Semester - 5 (Remedial) (*CBCS*) Examination
Feb/Mar. -2021 (OLD COURSE)
PROGRAMMING IN C AND NUMERICAL ANALYSIS-1(CORE)

Time: 1:30 Hours **Marks: 42**

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q.1(A) Answer the following (any one). (07)

1. Explain if and if-else statement in C language with flow chart and give an example.
2. (i) If the ages of Ram, Shyam and Ajay are input through the keyboard, write a program to determine the youngest of the three.
   (ii) Find the absolute value of a number entered through the keyboard.

Q.1(B) Attempt any One. (04)

1. Give a point (x, y), write a program to find out if it lies on the x-axis, y-axis or at the origin, viz. (0, 0).
2. Explain *printf* and *scanf* functions.

Q.1(C) Attempt any One. (03)

1. Write the rules to make variable names (identifiers) in C. Give proper example.
2. Write a program to determine whether the given integer is divisible by 5 or not.

Q.2(A) Answers the following (Any One) (07)

1. Explain the syntax and usage of do-while loop in C Give the difference between while loop and do-while loop.
2. Write a program to find the range of a set of numbers. Range is the difference between the smallest and biggest number in the list.

Q.2(B) Attempt any One. (04)

1. Write a program to calculates sum of digits of the given integer.
2. Explain what are types of user defined function in detail.

Q.2(C) Attempt any One. (03)

1. Explain the for loop in C language with example.
2. If n is enter through the key board, then write a C-program to print the sequence 2, 4, 8, 32,…up to n^{th} term.

Q.3(A) Answer the following (Any One). (07)

1. Explain file inclusion directives in C language.
2. Write a program to find determinant of any 3×3 matrix and to check whether entered matrix is symmetric or not.

Q.3(B) Attempt any One. (04)

1. Write a program to find transpose of 4×4 matrix.
2. Explain one dimensional array with example.

Q.3(C) Attempt any One. (03)

1. Explain Macro substation Expansion in C language with syntax and example.
2. Explain syntax to declare and initialize two-dimensional array in C.

Q.4(A) Answer the following (Any One). (07)

1. Derive the normal equations for $y = x^2 + ax + b$ and $y = e^x$.
2. State the condition for convergence of system of linear equations to find solution by iterative method. Discuss Gauss-Jacobi method to solve system of linear equation.

Q.4(B) Attempt any One. (04)

1. Solve the following equations by Gauss-Jordan method.
   $X + 2y + z - w = -2,\ 2x + 3y - z + 2w = 7,\ x + y + 3z - 2w = -6,\ x + y + w = 2$.
2. Solve the equations $2x + 3y + z = 9,\ x + 2y + 3z = 6,\ 3x + y + 2z = 8$ by the factorization method.

Q.4(C) Attempt any One (03)

1. By the method of least squares, find the straight line that best fits the following data:

X	1	2	3	4	5
Y	14	27	40	55	68

2. Solve the system of equation $3x + y - z = 3,\ 2x - 8y + z = -5,\ x - 2y + 9z = 8$ using Gauss elimination method.

Q.5(A) Answer the following (Any One) (07)

1. Derive Gregory – Newton backward interpolation formula.
2. Express a n^{th} degree polynomial $P_n(x)$ as a factorial polynomial and hence prove that $\Delta^n P_n(x) = n!h^n$.

Q.5(B) Attempt any One. (04)

1. Find the cubic polynomial which taken the following values y(0) = 1, y(1) = 0, y(2) = 1 and y(3) = 10. Hence obtain y (4).
2. Evaluate $\Delta^n \sin(px + q)$.

Q.5(C) Attempt any One. (03)

1. In usual notation prove that $D = \frac{1}{h}\left[\Delta - \frac{\Delta^2}{2} + \frac{\Delta^3}{3} - \frac{\Delta^4}{4} + \cdots\right]$.
2. Find th missing value in the given table.

X	16	18	20	22	24	26
y	43	89	-	155	268	388

****