



Seat No. _____

HAK-003-1015002
Third Year B. Sc. (Sem.-V) (CBCS)
(W.E.F. 2016) Examination
May - 2023
Mathematics - 06(A) (Theory)
(Programming in C and
Numerical Analysis-I)

Faculty Code : 003
Subject Code : 1015002

Time : $2\frac{1}{2}$ Hours / Total Marks : 70

Instructions :

- (1) All the questions are compulsory.
- (2) Numbers written to the right indicate full marks of the questions.

- 1 (a) Attempt the following : **1+1+1+1=4**
- (1) Who invented the BCPL language ?
 - (2) What is the range of single character constant in C language ? (w.r.t 32 bit compiler)
 - (3) The exponent must have at least one digit, which must be a positive or negative integer. True or False.
 - (4) Write a scanf() statement to input two integers, and two floats values through keyboard.
- (b) Attempt any **one** in brief : **2**
- (1) Explain the usage of the conditional operator statement in C language with example.
 - (2) Explain integer division in C with example.
- (c) Attempt any **one** : **3**
- (1) Explain type declaration instruction (variable declaration) in C language.
 - (2) Explain the “if-else statement” in C language with example.

- (d) Attempt any **one** : 5
- (1) Explain the syntax of the scanf() statement in C language with multiple examples.
 - (2) Write a program to verify a number whether it is palindrome or not.

- 2 (a) Attempt the following : 1+1+1+1=4

- (1) Give the list of loop control structures in C.
- (2) What will be the output of the following code in C language.

```
int i, j; i=5;
i++;
printf("\n\ti=%d",i);
```

- (3) Write a for loop which will print integers 50, 45, 40....10,5
- (4) Specify memory requirement and format specification for unsigned long integer data type.

- (b) Attempt any **one** in brief : 2

- (1) Explain the meaning of goto statement in C, also give proper examples for the same.
- (2) Explain what is the return value with respect to user defined functions with an example program.

- (c) Attempt any **one** in detail : 3

- (1) Write a C programme using a user defined function without any arguments and without any return values.
- (2) Explain the difference between while and do-while loop in C.

- (d) Attempt any **one** : 5

- (1) Explain the syntax of the for statement in C language with example.
- (2) Write a C program to find factorial of any non-negative integer entered through key board.

- 3 (a) Attempt the following : 1+1+1+1=4
- (1) Explain file inclusion directives in C language.
 - (2) Find errors in the following statement if there are any
#define epsilon = 0.00001
 - (3) Find errors in the following statement if there are any
and write it correctly
Float a(2)(3) = {70, 22: 13,45: 21,47};
 - (4) Write an input statement to read a 3×5 matrix using a
two dimensional array.
- (b) Attempt any **one** in brief : 2
- (1) Explain with examples and diagrams how values of one
dimensional integer arrays are allocated space in the
memory of computer.
 - (2) Explain macro without argument in the C language with
syntax and examples.
- (c) Attempt any **one** in detail : 3
- (1) Explain the meaning of array in C language with proper
example.
 - (2) Explain Macro with arguments in C language with syntax
and examples.
- (d) Attempt any **one** : 5
- (1) Explain the syntax of the one (single) dimensional array
in C language with multiple examples.
 - (2) Write a C program to input a 3×3 matrix using two
dimensional array and print the transpose of the matrix
entered.
- 4 (a) Attempt the following : 1+1+1+1=4
- (1) Write normal equations for fitting a straight line.
 - (2) Define empirical equation.
 - (3) What is L in factorization method ?
 - (4) Which method is more rapid than Jacobi method ?
- (b) Attempt any **one** in brief : 2
- (1) Explain Laws reducible to linear laws.
 - (2) Write name of any four direct methods.
- (c) Attempt any one in detail : 3
- (1) Explain principle of fitting a parabola.
 - (2) Explain Gauss Seidel method.

- (d) Attempt any **one** : 5
 (1) Explain Method of Factorization (L.U. Decomposition)
 (2) Explain Gauss Jordan Method.

- 5 (a) Attempt the following : 1+1+1+1=4
 (1) Define: Backward difference formula.
 (2) Write Gregory backward difference formula.
 (3) Define reciprocal factorial polynomial.
 (4) Write relation between central difference operator and shift operator.

- (b) Attempt any **one** in brief : 2
 (1) In usual notation prove that $E = e^{hD}$
 (2) Express $p(x)=x^4-12x^3+24x^2 - 30x + 9$ as a factorial polynomial.

- (c) Attempt any **one** in detail : 3
 (1) Explain Error propagation in difference table.
 (2) Find the missing value in the following table.

x	16	18	20	22	24	26
y	43	89	–	155	268	388

- (d) Attempt any **one** : 5
 (1) Derive Gregory forward difference formula.
 (2) Consider the following data table and find value of I when $V = 9$, using Newton's forward interpolation formula.

V	8	10	12	14	16
I	1000	1900	3250	5400	8950