* M A K - 0 0 3 - 0 0 1 5 1 4 *

MAK-003-001514

Seat No. _____

B. Sc. (CBCS) (Sem. V) Examination

October / November – 2016

Mathematics : BSMT - 502 (A)

(Programming in C and Numerical Analysis - I)

[New Course]

Faculty Code : 003

Subject Code : 001514

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (i) All the questions are compulsory.

(ii) Figures written to the right indicate full marks of the question.

1 Answer all the following **20** short answer questions : **20**

(1) Who invented C language ? In which year it was invented ?

(2) Which file is required to be included into the C-programme while using printf( ) and scanf( ) ?

(3) Write the output of printf("\n\tJai\n\t\tJawan\n\t\t\tJai\n\t\t\t\tKishan");

(4) What is the range of integer constant (in a 16 bit computer) ?

(5) What is the meaning of i++ ?

(6) How much memory space is required for double datatype ?

(7) Give one example of symbolic constant in C language.

(8) What is the format code for unsigned long integer ?

(9) What is the numerical value of 3/4 in C-language ?

(10) Give an example to explain multiline comment in brief.

(11) Define : Approximating curve

(12) Write normal equations to best fit the straight line.

(13) What is the linear form of the equation $y = ae^{bx}$?

(14) In which method the coefficient matrix is reduced into upper triangular matrix ?

(15) Write name of any two indirect methods.

(16) Write relation between E and D.

(17) If h = 2 then what is the value of $\Delta^3 x^4$?

(18) If h = 1 then what is the value of $\Delta^6 (1-2x)\left(2-3x^2\right)\left(3-4x^3\right)$?

(19) Define : Interpolation.

(20) Write Gregory-Newton forward interpolation formula.

2 (a) Attempt any **three** : **6**

(1) Write names of any four direct methods.

(2) Define :

(i) Translation operator

(ii) Averaging operator.

(3) Express $p(x) = x^4 + 6x^2 - 7x + 6$ as a factorial polynomial.

(4) In usual notation prove that

$$\Delta^2\left[\frac{1}{x(x+4)(x+8)}\right] = \frac{192}{x(x+4)(x+8)(x+12)(x+16)}.$$

(5) Exlain how to fit the curve of the type $y = ax^b$.

(6) In usual notations prove that $\Delta\left(\frac{2^x}{x!}\right) = \frac{2^x \cdot (1-x)}{(1+x)!}$.

(b) Attempt any **three** : **9**

(1) Explain Jacobi's method.

(2) In usual notations prove that $D = \frac{1}{h}\left[\Delta - \frac{\Delta^2}{2} + \frac{\Delta^3}{3} - \frac{\Delta^4}{4} + \ldots.\right]$.

(3) In the following table one value is incorrect and y is a cubic polynomial in x :

x	0	1	2	3	4	5	6	7
y	25	21	18	18	27	45	76	123

Construct a difference table for y and use it to locate and correct the wrong value.

(4) In usual notations prove that n^{th} differences of a polynomial of degree n are constant.

(5) Express ∇, δ and μ in terms of E.

(6) Evaluate :

(i) $(2-3x)^{[2]}$; $x = 4$

(ii) $(-1-5x)^{[4]}$; $x = 0$.

(c) Attempt any **two** : **10**

(1) Explain Gauss-Jordan method.

(2) Derive Gregory-Newton backward interpolation formula.

(3) Explain Least Squares principle and obtain normal equations for a second degree curve.

(4) Find the missing values in the following table :

x	0	1	2	3	4	5	6
y	–4	–2	–	–	220	546	1148

(5) Explain Crout's method.

3 (a) Attempt any **three** : **6**

(1) Explain General form of Arithmetic Statement with examples.

(2) Explain the meaning and provide list of LOGICAL OPERATORS being used in C.

(3) Explain the meaning break statement in C, also give proper examples for the same.

(4) Give an example of a user defined function without any argument and without a return value.

(5) Write at least FOUR rules for constructing identifiers (variable names) in C language.

(6) Write a C-program to find the area of a triangle when base and height of the triangle are input by user.

(b) Attempt any **three** : **9**

(1) Explain the "if – else statement" in C language with example.

(2) Explain Type Declaration Instruction (Variable Declaration) in C language.

(3) Explain what is the meaning of the Actual Arguments (with respect to user defined functions in C) with example program.

(4) Explain Macro substitution Expansion in C language with syntax and examples.

(5) Write a C-program to input a 3×3 matrix and output its transpose matrix.

(6) Write a C-program to find the sequence 2, 2, 4, 8, 32, ...

(c) Attempt any **three** : **10**

(1) State the syntax of the printf( ) statement including at least four different examples of usage of printf( ) to explain the syntax.

(2) Explain the syntax and usage of for loop in C. Give proper examples with output.

(3) Explain the methods to declare and initialize the ONE dimensional array.

(4) Write a detailed note on primary data types in C.

(5) Write a C program to determine whether given year is a LEAP-YEAR or not.