JW-003-001514 Seat No. _____

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

October – 2019

Mathematics : 502(A)

(Programming in C & Numerical Analysis - 1)

Faculty Code : 003
Subject Code : 001514

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

1 Answer the following in one sentence / word : **20**

(1) Write a symbol of ampersand.

(2) In which laboratory language C was developed ?

(3) Write the general form of usage of conditional operators.

(4) Write a flow chart of "if" statement.

(5) Look at the following codes of C language. Is the loop never ending or will it stops ?

```
int a;
while(a)
a++;
```

(6) Which are unary operators ?

(7) What is the range of unsigned char type constant ?

(8) *%Ld* is the specifier of which type of data ?

(9) What is C processor ?

(10) Write the syntax of the macro which defines constant value and can be any of the basic data types.

(11) Which header file is included for mathematical operations ?

(12) Write the syntax of one dimensional array.

(13) Which is the linear form of the equation $y = ax^2 + bx$?

(1) $Y = ax + b$ (2) $y = ax + b$

(3) $y = aX + b$ (4) $Y = aX + b$

(5) $Y = Ax + B$ (6) $y = Ax + B$.

(14) In Gauss Jordan method coefficient matrix A is reduced into which matrix ?

(15) Fill in the blank by appropriate alternative :

$y = ax^2 + b\log_{10} x$ reduced to linear law takes the form _____.

(1) $Y = ax + b$ (2) $y = ax + b$

(3) $y = aX + b$ (4) $Y = aX + b$

(5) $Y = Ax + B$ (6) $y = Ax + B$.

(16) If $y = a + bx$, $\sum x = 50$, $\sum y = 80$, $\sum x^2 = 750$, $\sum xy = 1030$ and $n = 10$, then $a =$ _____ and $b =$ _____.

Fill the blanks.

(17) Write symbols of forward difference, backward difference and central difference operators.

(18) Write $(2n-1)^{th}$ forward difference of y_n.

(19) Write $f(x-2h)$ using inverse operator.

(20) What is result of $E^{1/2} \nabla + E^{1/2} \Delta$?

2 (a) Answer any three the following in brief : **6**

(1) Write a hierarchy of operators in the table.

(2) How many bytes are required to store the character "4" in char type data ?

(3) Explain use of break statement.

(4) Draw a flow chart of for loop.

(5) What is the meaning of compile time initialization ?

(6) Describe the meaning of following declaration :

float table [5] [3];

(b) Answer any three of the following in detail : **9**

(1) How many byte the variable *x* will take ? What will be stored at the variable *X* when we declare as following :

```
main( )
{
int  x=32769;
}
```

(2) Explain *printf* function with an example.

(3) Give an example of user defined function.

(4) What are differences between while and for loops ?

(5) Explain memory map of following one dimensional arrays :

```
int n[4]={5, 7, 2, 6};
float a[5]={4.1, 7.5, 0.3, 8.02, 68.5};
char c[3]={'p', 'm', 'c'};
```

(6) Write use of the following commands :

(1) *Alt+x* (2) *Alt+F9*

(3) *F9* (4) *F3*

(5) *F2* (6) *Alt+F3*

(c) Write notes on any two of the following : **10**

(1) Write a program to find grade if the score is input through keyboard. Write it using conditional statements for the following grade system :

Score	***Grade***
0 to 150	D
151 to 200	C
201 to 300	B
301 to 400	A

(2) Write a program to find grade if the score is input through keyboard. Write it using nested if statements only for the following grading system :

Score	*Grade*
Less than 150	D
151 to 200	C
201 to 300	B
301 to 400	A

(3) Write a program to find factorial of a number input through keyboard.

(4) Write a program to calculate the sum of first 10 numbers using do-while loop.

(5) Write a program to input and output 10×2 matrix.

3 (a) Answer any three the following in brief : **6**

(1) Explain Graphical method.

(2) Using the "principle of least square" which curve can be fit ?

(3) Prove that : $\mu^2 = 1 + \frac{\delta^2}{4}$.

(4) Prove : $\Delta\nabla = \Delta - \nabla$.

(5) Give difference between interpolation and extrapolation.

(6) Write equivalent value of (i) $x^{[0]}$ and (ii) $\Delta x^{[n]}$.

(b) Answer any three of the following in detail : **9**

(1) Solve the system : $x+y+5z=7,\ 2x+10y+z=13,\ 10x+y+z=12$ by the modified form of Gauss elimination method.

(2) Solve : $2x+y+z=4,\ x+2y+z=4,\ x+y+2z=4$.

(3) Find $\Delta^2\left[\frac{1}{x(x+3)(x+6)}\right]$.

(4) Represent the function $f(x)=x^3-2x^2+x-1$ and successive differences in factorial notation in the interval of differencing is 1.

(5) Prove that :

$$\Delta^2(1-ax)(1-bx^2)(1-cx^3)(1-dx^4) = abcd\,(10)!$$

(6) Obtain the estimate of the missing figure in the following table :

x	1	2	3	4	5
y	2	5	7	----	32

(c) Write notes on any two of the following : **10**

(1) Explain the Triangular method.

(2) Fit a curve of the form $y = ax^b$ to the data given below in least square sense :

x	1	2	3	4	5
y	7.1	27.8	62.1	110	161

(3) Estimate the values of $f(22)$ and $f(42)$ from the following data :

x	20	25	30	35	40	45
$f(x)$	354	332	291	260	231	204

(4) Find a cubic polynomial which takes the following set of values (0, 1), (1, 2), (2, 1) and (3, 10).

(5) Explain Gregory-Newton Forward interpolation formula.