CENTRAL UNIVERSITY OF HARYANA

Term End Examinations January 2023

Programme: Integ. BSc-MSc Mathematics **Session: 2022-23**

Semester: III **Max. Time: 3 Hour**

Course Title: Computer Fundamentals and Programming In C **Max. Marks: 70**

Course Code: SBSMAT 03 03 02 SEC 3024

Instructions:

1. *Question No. 1 has seven parts and students are required to answer any five. Each part carries two marks.*
2. *Question No. 2 to 6 have three parts each and students are required to answer any two parts of each question. Each part carries six marks.*

Q 1(a). Which of the following are invalid constants and why?

25,000 3.5e-5 1.5e+2.5 $255

Q 1(b). Write down two differences between structure and union.

Q 1(c). Which of the following arithmetic expressions are valid? If valid, give the value of the expression; otherwise give reason.

15.25 + – 5.0 (5/3)*3 + 5 % 3

Q 1(d). State whether the following statements are true or false.

(i) The purpose of the header file *<stdio.h>* is to store the programs created by the users.
(ii) The C standard function that receives a single character from the keyboard is **getchar**.
(iii) The **getchar** cannot be used to read a line of text from the keyboard.
(iv) The input list in a **scanf** statement can contain one or more variables.

Q 1(e). State whether the following are true or false:

(i) When ***if*** statements are nested, the last ***else*** gets associated with the nearest ***if*** without an ***else***.
(ii) One ***if*** can have more than one ***else*** clause.
(iii) A ***switch*** statement can always be replaced by a series of ***if..else*** statements.
(iv) A program stops its execution when a ***break*** statement is encountered.

Q 1(f). Which of the following is the correct syntax of **for** loop?

(i) for (a=0: a<b: a++)
(ii) for (a=0, a<b, a++)
(iii) for (a=0; a<b; a++)
(iv) for (a=0; a++; a<b)

Q 1(g). Fill in the blanks in the following statements.

(i) The parameters used in a function call are called_____.

(ii) In prototype declaration, specifying ____ is optional.

(iii) In passing by pointers, the variables of the formal parameters must be prefixed with ____ in their declaration.

(iv) A function that calls itself is known as a _____function.

Q 2(a). Identify syntax errors in the following program. After corrections, what output would you expect when you execute it?

```
#define PI 3.14159
main()
{
int R,C; / * R-Radius of circle
float perimeter; / * Circumference of circle */
float area; /* Area of circle */
C = PI
R = 5;
Perimeter = 2.0 * C *R;
Area = C*R*R;
printf("%f", "%d", &perimeter, &area) }
```

Q 2(b). Discuss the main features of the following looping structures:

for **while** **do..while**

Q 2(c). The numbers in the sequence

1 1 2 3 5 8 13 21.....

are called Fibonacci numbers. Write a program using a looping structure to calculate and print the first m Fibonacci numbers.

Q 3(a). Write a program using one-dimensional array to evaluate the following expression:

$Total = \sum_{i=1}^{10} x_i^2$. The values of x_1, x_2,....are read from the terminal.

Q 3(b). Write a program to find transpose of a 3x3 matrix.

Q 3(c). Fill in the blanks in the following statements.

(i) The variable used as a subscript in an array is popularly known as _____variable.

(ii) An array can be initialized either at compile time or at _____.

(iii) An array created using **malloc** function at run time is referred to as _____array.

(iv) An array that uses more than two subscript is referred to as _____array.

(v) _____is the process of arranging the elements of an array in order.

(vi) In C, by default, the first subscript is _____.

Q 4(a). Explain the following in terms of their scope, visibility and lifetime:

Automatic variables Global variables Static variables

Q4 (b). Write a C program that reads a string and prints if it is a palindrome or not.

Q 4 (c). Describe the main string functions provided in the C language.

Q 5(a). Explain how complex numbers can be represented using structures. Write two C functions: one to return the sum of complex numbers passed as parameters, and the other to return the product of two complex numbers.

Q 5(b). What is recursion. Using this concept, write a function to evaluate factorial of an integer n.

Q5 (c). Write a program to calculate the standard deviation of an array of values. The array elements are read from the terminal. Use functions to calculate standard deviation and mean.

Q 6(a). Describe the process of opening and closing of a file in C, along with the relevant I/O functions and modes. .

Q 6(b). Describe the role of *include* facility in C programming. Illustrate with some suitable examples.

Q 6 (c). Write a program using pointers to compute the sum of all elements stored in an array.