H Roll No. .....

TCS–101

B. TECH. (FIRST SEMESTER)
END SEMESTER
EXAMINATION, Jan., 2023

FUNDAMENTALS OF COMPUTERS AND
INTRODUCTION TO PROGRAMMING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) Discuss Computer system memory hierarchy with a neat diagram. Why cache

memory is significant to a computer programmer or user ? Why can it be made as large as the device for which it is caching ?

(b) List advantages of Computer Network. Briefly elaborate on the importance of LAN, MAN and WAN types of networks.

(c) Explain the meaning of symbols used in a flowchart. Write a flowchart to find whether a number accepted from the user is prime or not.

2. (a) Describe primary datatypes in C with their format specifiers. List the Formatted and Unformatted input-output functions with appropriate examples.

(b) Explain signed and unsigned integer types with an example for each. Assume a one byte integer (short) and justify how the size of data type is significant to its range (Positive and Negative).

(c) Write short notes on the following : $2\frac{1}{2}\times4=10$

(i) Features of C languages

(ii) Postfix and Prefix increment/ decrement operators

(iii) Type Conversion

(iv) Ternary Operator

3. (a) Design an algorithm and develop a C program to compute and print the sum of following series :

$$1^2 - 2^2 + 3^2 - 4^2 + 5^2 - 6^2 \ldots\ldots\ldots\ldots N^2$$

(b) Differentiate between Entry controlled and Exit controlled loops with appropriate examples. Also, demonstrate the use of break and continue with a snippet of C code.

(c) Predict the output of the following code : $2\frac{1}{2}\times 4=10$

Note : If your answer is Error then mention the reason for the same.

(i)
```
#include <stdio.h>
int main( )
{     char ch = '5';
      ch=ch-'0';
      printf("%d",ch);
   return 0;
}
```

(ii)
```
#include <stdio.h>
int main( )
{     int n1 = 55, n2 = 3;
      if (n1 < n2);
            printf("%d", n1%n2);
return 0;
}
```

(iii)
```
#include <stdio.h>
int main( )
{     int True = 0;
      while (True)
      {
        printf ("Welcome to the C
                                World.");
      }
     prinft("C is wonderful.");
 return 0;
 }
```

(iv)
```
# include <studio.h>
int main( )
{     int x = 10;
      for (;x;)
      }       x = x–2;
              printf("%d\n", x);
      }
return 0;
}
```

4. (a) Illustrate with examples the compile time and run time initialization of 1-D and 2-D arrays.

   (b) Draw a flowchart and write a C program accept N elements of an array from the user and then sort the elements using any sorting technique. Display the sorted array to the output screen.

   (c) Design a C program to find the sum of principal and secondary diagonal elements of a square matrix accepted from the user. Finally compare the two sums and print the greatest of the sum to the output screen.

5. (a) Explain the elements of a user defined function (UDF), Write a program to demonstrate an UDF that returns 1 if the number is an Armstrong number else returns 0 to the main program. Display appropriate message in the calling program.

   (b) List and discuss four types of storage classes used in C program with an appropriate example for each.

   (c) Draw a memory layout of a C program block diagram and elaborate on different sections of the segments. Also, indicate in which segment of the C memory block the static variables are stored.