B. Sc. Mathematics (Hons.) Examination, 2023

(1st Year, 2nd Semester)

Computer Science - I

Paper – GE-2

Time : 1 hour 15 minutes Full Marks : 24

The figures in the margin indicate full marks.

Symbols / Notations have their usual meanings.

Answer ***any four*** questions from the following: 4×6=24

1. Determine the output of the following programs:

a)
```
#include<stdio.h>
int main()
{
    int i=4, j=i+1
    for (; ;)
    {
        if (i > 15)
            break;
        else
            j += i;
        printf("%d\n", j);
        i += j;
    }
    return 0;
}
```

b)
```
#include<stdio.h>
int main()
{
    int value, num = 30;
    value = (num > 5 ? (num <= 40 ? 100: (num <=
    10 ? 100 : 300)) ; 500);
    printf ("\n %d", value++);
    return 0;
}
```

c)
```
#include <stdio.h>
int main()
{
    int a = 4, b = -1, c = 0, d=12, i, j, k, l;
    i = a  || b || c && d;
    j = a && b && c || d;
    k = a || b && c && d;
    l = a && b || c || d;
    printf("i=%d j=%d k=%d l=%d\n", i, j, k, l);
    return 0;
}
```
(2+2+2)

2. a) Differentiate between 'while' and 'do while' statements with suitable examples.

   b) Using conditional operators, write a C program to find the smallest of the three numbers entered through the keyboard. (4+2)

3. a) What is recursion in C? What are its uses? Explain with an example.

   b) Develop an algorithm and a flow chart to obtain the sum of the first and last digit of a given four-digit number. (3+3)

4. a) State the utilities of ***strlen()*** function and ***strcmp()*** function.

   b) Write a C program to compute the sum of all elements in an array by using pointer. (2+4)

5. a) What is file pointer? Write a C program to copy the contents of one file into another.

   b) Define structure pointer variable? (4+2)

6. a) Write a C-program to find addition of two complex numbers by passing ***structure*** to a function.

   b) What are the dynamic memory allocation functions available in C? Write a C program to dynamically allocate memory using ***malloc()*** function. (3+3)