B.Sc. Semester-III Examination, 2022-23

ELECTRONICS [Honours]

Course ID : 31713 Course Code : SH/ELC/303/C-7(T)

Course Title : C Programming and Data Structures

Time : 1 Hour 15 Minutes. Full Marks : 25

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **three** of the following questions: 1×3=3

   a) What is an unary operator? Give example.

   b) What is the difference between '=' and '==' operator?

   c) What are automatic variable?

   d) Why header files are included in 'C' programming?

   e) Mention the use of "break' and "continue'.

   f) What are function prototypes?

2. Answer any **three** of the following questions: 2×3=6

   a) What is the purpose of comma operator? Explain with example.

   b) What do the following complex declarations mean?

      i) int (*p)[2];

      ii) int(*p)();

      iii) int *(*p)[5];

      iv) int (*p)(int,int).

   c) What will be the output of the following program?

```
#include<stdio.h>
void main()
{
    int a= 10,b=20,c;
    a=a++ + – –b;
    printf("%d%d%d",a,b,c);
}
```

   d) What will be the output of the following program?

```
#include <stdio.h>
#include <math.h>
int main ()
{
    printf("a = %f\n", floor(–12.65));
    printf("b = %f\n", ceil(–2.3));
    return 10;
}
```

e) What will be the output of the following program?

```
#include<stdio.h>
void main()
{
    int x=128, y=32;
    x=x<<l;
    y=y>>2;
    printf("%d%d", x,y);
}
```

f) What will be the output of the following program?

```
#include<stdio.h>
void main()
{
    printf("%d\n", 19 & 16);
    printf("%d\n", 16 | 7);
    printf("%d\n", ~8);
}
```

3. Answer any **two** of the following questions: 5×2=10

a) Given the coordinates (x, y) of center of a circle and its radius, write a program that will determine whether a point lies inside the circle, on the circle or outside the circle. 5

b) What is recursion? Write a program that evaluate 'a' to the power b(a^b)where $b \geq 1$ using recursion. 1+4=5

c) What do you mean by dynamic memory allocation? Explain the malloc() and realloc() function in detail. 1+2+2=5

d) Write a program to print the following pattern:

```
12345
1234
123
12
```

4. Answer any **one** of the following questions: 6×1=6

a) Consider the following program:

```
#include<stdio.h>
void main()
{
    int a[2] [2] [3 ]={1,2,3,4,5,6,7,8,9,10,11,12};
    printf("%u",a[0]);
    printf("%u",a+l);
    printf("%u",a[0]+l);
    printf("%u",a[0][0]+l);
    printf("%u",a[0][0][0]+l);
    printf("%u",&a+l);
}
```

Assuming base address of the array to be 1024 and size of integer to be 4 bytes, what will be the values printed by printf() statements? 6

b) Write a program in C to create a database of fifty students to store personal details such as roll no, name and marks. Print all the details of a student whose name is entered by user. 6

c) What do you mean by sorting? Write a program in C to sort the given 'n' positive integers using *insertion sort* algorithm. 1+5=6

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