Roll No. | | | | | | | |

END SEMESTER EXAMINATION DEC – 2024

Name of the Course: B.Tech — Semester: I
Name of the Paper: Fundamental of Computer and Introduction to Programming
Paper Code: **TCS101**
Time: 3 Hours — Maximum Marks: 100

Note:-

(i) All questions are compulsory.
(ii) Answer any two sub questions among a, b & c in each main question.
(iii) Q3. is having only two parts. Attempt both the parts.
(iv) Each question carry 20 marks.

<table>
<tr><td>Q.1</td><td>(20 Marks)</td><td rowspan="4">CO1</td></tr>
<tr><td>a)</td><td>Draw a neat sketch of a Von Neumann Architecture. Explain each component involved in the architecture. [10]</td></tr>
<tr><td>b)</td><td>Define a computer network and explain its key components which help facilitate communication and data transfer. Additionally, explain the characteristics and applications of networks based on local, metropolitan and wide-area coverage, providing each example [10]</td></tr>
<tr><td>c)</td><td>Describe various memories available in computer system and also compare them. Differentiate RAM and ROM along with its type. [10]</td></tr>
<tr><td>Q.2</td><td>(20 Marks)</td><td rowspan="4">CO3
CO4</td></tr>
<tr><td>a)</td><td>Describe various decision-making statements available in ‘C’ with suitable syntax and example. Compare else-if ladder and switch-case by highlighting their advantages on each other. [10]</td></tr>
<tr><td>b)</td><td>Accept a positive number from the keyboard then if the first bit i.e. least significant bit (LSB) is one then find the value by raising it to the power of 2 else find the value by EX-ORing with 15. Implement a C program and write an algorithm for the same. [10]
<table>
<tr><th>Sample Input</th><th>Sample Output</th></tr>
<tr><td>Inputted Number: 5
8-bit Binary equivalent is 00000101 then LSB is 1.
Hence, 2^5 is 32</td><td>32</td></tr>
<tr><td>Inputted Number: 12
8-bit Binary equivalent is 00001100 then LSB is 0.
Hence, 12 EX-OR 15 = 00000011 equals 7.</td><td>12</td></tr>
</table></td></tr>
<tr><td>c)</td><td>Draw a flowchart to generate the following pattern for n rows. [10]
1
1 0 1
1 0 1 0 1
1 0 1 0 1 0 1
1 0 1 0 1 0 1 0 1</td></tr>
</table>

Q.3 **(20 Marks)**

a) Write a C program to generate the final water bill as charged by municipal authority according to following criteria:

1. Base price of water: 35 paisa/liter
2. Surcharge on consumption of water as per below rules:
   i) Water consumption up to 400 liters: No surcharge
   ii) Water consumption greater than 400 liters up to 800 liters: surcharge is 10 paisa/liters
   iii) Water consumption greater than 800 liters: surcharge is 18 paisa/liters
3. A additional amount of 5% GST is added to final bill.

CO2
CO4

Sample Input	Sample Output
Water Consumption: 1000 liters Cost per liter: 35 Base charge: 1000*35 = 35000 paisa (Rs. 350) Surcharge: Till first 400 liters: 0 paisa 401 to 800 liters: (800-400) * 10 = 4000 paisa (Rs. 40) 801 to 1000 liters: (1000-800) * 18 = 3600 paisa (Rs. 36) Total surcharge: 4000+3600 = 7600 paisa (Rs. 76) Total bill (excluding GST): Base charge + surcharge: 35000+7600 = 42600 paisa (Rs. 426) GST: 5% of 42600 = 2130 paisa (Rs. 21.30) Final Bill: Total bill + GST = 42600 + 2130 = 44730 paisa (Rs. 447.30)	Rs. 447.30

[10]

b) Predict the output of the following C programs. Assume that all the programs are free of syntax errors. Justify your answers.

[5*2=10]

(1)

```
#include<stdio.h>
void main()
{
    char ch=69;
    while(1!=0)
    {
        if(ch < 'H' )
            ch++;
        else
            ch--;
            break;
    }
  printf("%c", ch);
}
```

(2)

```
#include<stdio.h>
void func()
{
static int x;
printf(" %d", x);
x++;
}
int main()
{
func();
func();
func();
return 0;
}
```

(3)

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

(4)

```
#include <stdio.h>
void main()
{
  int i, j=4, sum=0;
  int num[]={1, 0, 0, 1, 0};
  for (i=0; j>0; i++, j--)
  {
     if(num[i]>num[j])
     {
          sum+=num[i];
     }
  }
  printf("%d ", sum);
}
```

(5)

```
#include<stdio.h>
void main()
{
    unsigned int a = 8;
    int result = a << 2;
    printf(" %d", result);
    result = a>>1;
    printf(" %d", result);
}
```

Q.4 **(20 Marks)**

a) Define array. Explain need of array by describing its advantages. Also describe any two demerits of array with proper explanation. Describe different ways to initialize an array during compile time with example. **[10]**

b) A store keeper has a list having the detail of the expiry month of N products. As new year is coming, he wants to arrange the products in the shelf according to their expiry month in such a manner as the product having expiry month soon will be placing first followed by the product having expiry month later. Write a 'C' program to help him to arrange the products according to their expiry months. **[10]**

c) Write a 'C' program to input N integer elements in an array. Replace each element of array placed at even index with their square and elements placed at odd index with their cube. **[10]** **CO5**

Sample Input	Sample Output
Number of elements in array(N): 6 Elements in array: 2 4 6 1 5 3	Final elements in array after changes: 4 64 36 1 25 27

Q.5	(20 Marks)	
a)	Demonstrate the call by value method with an example. Also explain actual parameters and formal parameters. Also explain the automatic and static storage classes supported in a C program with an appropriate example for each. [10]	CO6
b)	On a certain polling booth station, a program tracks the number of voters casting the votes during an electoral process. Voter ID is valid only if it is an 8-digit integer number. Design a C function which accept an 8-digit Voter ID (integer only) and returns 1 if person is eligible to cast vote and 0 if person is not eligible to cast vote. Assume the casting vote starts from 8 am onwards & closes at 5 pm which is indicated by the control authority at the booth by entering a '#' character. Write a 'C' program to display the final count at the end of the day (EOD). [10]	
c)	What is recursion? How it is different from iteration? Design a recursive function to evaluate the sum of following series. [10] 1+3+5+7+9+.....N (where N is an odd number)	