Roll No. 2 4 6 1 3 9 2

END SEMESTER EXAMINATION JUNE – 2025

Name of the Course: B.Tech — Semester: II
Name of the Paper: Programming for Problem Solving
Paper Code: **TCS201**
Time: 3 Hours — Maximum Marks: 100

Note:

(i) Q1. is having only two parts. Attempt both the parts.
(ii) Answer any two sub questions among a, b & c in each main question.
(iii) Each question carries 20 marks.

Q.1 **(20 Marks)**

a) *Assuming that the given segments of C and python programs does not prompt any compile time and/or run time errors, predict the output for them, when the following segments of code are executed on a 32-bit machine.* **[10]**

1.
```
#include<stdio.h>
void main()
{
    int i = 15;
    void *ptr = &i;
    printf("%d", *ptr);
}
```

2.
```
#include<stdio.h>
void main()
{
    int *p, a = 10;
    p = &a;
    *p += 1;
    printf("%d %d", *p, a);
}
```

3.
```
#include<stdio.h>
int main()
{
  struct forest
  {
    int trees;
    int animals;
  }F1,*F2;
  F1.trees=1000;
  F1.animals=20;
  F2=&F1;
  printf("%d ", F2.animals);
  return 0;
}
```

4.
```
#include <stdio.h>
void fun(int*);
int main()
{
  int i = 10, *p = &i;
  fun(p++);
}
void fun(int *p)
{
  printf("%d\n", *p);
}
```

5.
```
#include<stdio.h>
char *func(char *pt)
{
    pt+=8;
    return(pt);
}
void main()
{
    char *x, *y;
```

6.
```
#include<stdio.h>
int main()
{
  int a[20] = {10, 30, 80, 120}, i;
  int *p = a;
  for (i=0; i<4; i++)
  {
    *p = *p + 8;
    p = p + 1;
```

CO1
CO2
CO3
CO4
CO5
CO6

```
    x = "LIFE IS BEAUTIFUL";
    y = func(x);
    printf("%s", y);
}
```

```
    *p = 100;
    printf("%d", a[i]);
  }
  return 0;
}
```

7.

```
#include <stdio.h>
struct employee
{
 char *empname;
 int salary;
};
int main()
{
 struct employee e1, e2;
 e1.empname = "Raj Gopal";
 e2 = e1;
 printf("%s %s", e1.empname, e2.empname);
 return 0;
}
```

8. What is the output of this program in the text file?

```
#include <stdio.h>
int main()
{
  FILE *infile;
  char c;
  infile = fopen("sample.txt", "w+");
  for (c = 'E'; c <= 'P'; c++)
  {
    putc(c, infile);
  }
  fclose(infile);
  return 0;
}
```

9.

```
def display(n):
 if n % 15 == 0:
  print("fifteen")
 elif n % 3 != 0 and n % 5 != 0:
  print("neither")
 elif n % 3 == 0:
  print("three")
 elif n % 5 == 0:
  print("five")
display(40)
display(47)
display(23)
display(66)
```

10. What will be the last value of x in following python code?

```
i = 1
while True:
  if i%64 == 0:
    break
  print(i)
  i = i+i
```

b) Draw a flowchart to read a string *str*. Pass this string into a function called *count()* which counts number of digits in the string. **[10]**

Q.2 **(20 Marks)**

a) Write a program to input elements in a square matrix and swap principal and secondary diagonal element with each other. **[10]**

Sample Input:	Sample Output:
Size of matrix: 3 Elements of matrix: 10 12 14 18 23 45 67 89 32 54 78 90 80 43 87 55	Final Matrix: 18 12 14 10 23 67 45 89 32 78 54 90 55 43 87 80

b) Give the prototype of following methods with suitable syntax and their functionality. Also explain where the following methods are used. **[10]**

CO1
CO3
CO5

	i) malloc() ii) calloc() iii) realloc() iv) free()		
c)	Develop a 'C' code to write some text into a file named "IN_DATA". Read the file and write the content in another file named "REV_DATA" in reverse order by skipping the spaces. Display the content of both the file on the screen. [10] **Sample Input:** — Content of the file IN_DATA: I love my city **Sample Output:** — Content of the file REV_DATA: yticymevoll		
Q.3		**(20 Marks)**	
a)	Define structure? How it is different from array? Which operator we use to access elements of structure? Explain following terms: [10] i) structure and pointer ii) structure and union,		
b)	Create a structure *Student* with the data members *Stud_name(char type)*, *Stud_id(int type)*, *Stud_DateofBirth(int type)*, *Stud_DateofAdmission(int type)*. (consider the format: *year month day* for Date of birth and Date of Admission). Develop a 'C' code to read the details of *n* students taken admission in a university in a particular academic session. Display the details of each student along with their age at the time of admission. Note: 1 month = 30 days, 1 year = 12 months [10]		CO4 CO5
c)	An organization has to maintain the records of specific species present in the different National parks. The record contains the fields like *Name_of_NationalPark(char type)*, *Area_of_Park(int type)*, *No_of_Tigers(int type)*, *No_of_Elephants(int type)*, *No_of_Lions(int type)*, *No_of_Rhino(int type)* and *No_of_Others(int type)*. They surveyed the detail of *n* different parks. Write a 'C' code to maintain all the records in a file named "RECORD". Further extract data from the file to: 1. Display detail of all the National Park along with the total number of species. 2. Display the detail of the National Park having the maximum number of species. [10]		
Q.5		**(20 Marks)**	
a)	Describe the characteristic of Python. Also describe the fields where Python is considered one of the most desirable programming languages. "List is mutable and Tuple is immutable" Justify your answer by stating two similarities and two dissimilarities between them. [10]		
b)	Develop a Python code to find sum of following given series. Use a user define function *fact()* to calculate factorial in the given series. The function *fact()* accept an integer number and returns its factorial. [10] 1! + 3! /1 + 5! /2 + 7! /3 + 9! /4 ..... Upto n terms		CO6
c)	Develop a Python code which find all the prime numbers between the limit *m* and *n*, whose sum of digit is odd. [10]		

Q.4		(20 Marks)	
a)	Explain the need of File in 'C'. What do you mean by sequential access and random access. Explain any five function of file handling with their suitable syntax and explanation. [10]		CO5
b)	Develop a 'C' code to write *n* integer elements into a file named "INFILE". Write factors of each integer number into another file named "OUTFILE". Finally print content of both the file. [10]		
c)	Develop a 'C' code to write some text into a file named "IN_DATA". Read the file and write the content in another file named "REV_DATA" in reverse order by skipping the spaces. Display the content of both the file on the screen. [10]		

Sample Input:	**Sample Output:**
Content of the file IN_DATA: I love my city	Content of the file REV_DATA: yticymevolI