Roll No. .....

TCS–201

B. TECH. (SECOND SEMESTER)

END SEMESTER EXAMINATION, July/Aug., 2022

PROGRAMMING FOR PROBLEM SOLVING

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) Kholi likes the number 239. Therefore, he considers a number *lucky* if its last digit is 2, 3, or 9.

Kholi wants to watch the numbers between L and R (both inclusive), so he asked you to determine how many *lucky* numbers are in this range ? Can you help him ? (CO1, CO3)

P. T. O.

(b) (i)

```
#include<stdio.h>
#include<string.h>
int main( )
{   struct box
    {   char shape[10];
    }box1,box2;
    strcpy(box1.shape,"TRIANGLE");
    printf("%s",box1.shape);
    box2 = box1;
    strcyp(box2.shape,"SQUARE");
    printf("%s",box1.shape);
    return 0;}
```

(ii)

```
#include<stdio.h>
#include<string.h>
int main( )
{   struct box
    {   char shape[10];
    }box1,box2:
    strcpy(box1.shape,"TRIANGLE");
    printf("%s",box1.shape);
    box2 = box1;
    strcyp(box2.shape,"SQUARE");
    printf("%s",box1.shape);
    return 0;}
```

(iii)
```
#include<stdio.h>
int main( )
{   char str[ ] = "OUR UNIVERSITY";
    char *s = str;
    printf("%s\n",s++ +5);
    return 0;
}
```

(iv)
```
list 1=["blue","green",3,7, "red"]
list1.append("85")
list1.extend([3,"black","white"])
print(list1)
list1.pop(2)
list1.pop( )
print(list1)
```

(v)
```
#include<stdio.h>
void chane(int*,int);
int main( )
{
   int i, a[ ] = {2, 4, 6, 8, 10};
    change(a, 5);
    for(i=0; i<=4;i++)
      printf("%d,",a[i]);
    return 0;
}
```

```
void change(int*b,int n)
{
  int i;
  for(i=0; i<n; i++)
    *(b+1)=*(b+i)+5;
}
```

(CO1, CO3)

(c) (i)

```
#include<stdio.h>
int main( )
{  int arr[3] = {2, 3, 4};
   char *p;
   p = arr;
   p = (char*)((int*)(p));
   printf("%d,",*p);
   p = (int*)(P+1);
   printf ("%d",*p);
   return 0;}
```

(ii)

```
#include<stdio.h>
#include<string.h>
int main( )
{  char  *str;
   str = "%S";
   printf(str, "K\n");
   return 0;}
```

(iii)
```
#include<stdio.h>
int main( )   { int a, b, c;
        char *p = 0;
        int *q = 0;
        double *r = 0;
        a = (int)(p + 1);
        b = (int)(q + 1);
        c = (int)(r + 1);
        printf("%d %d %d",a,b,c);
        return 0;}
```

(iv)
```
a = input("enter a number")  #assume user input 5
b = input("enter another number")  #assume user input 10
c = a+b
print(c)
print(a+b)
```

(v)
```
#include<stdio.h>
void change (int*, int);
int main( )
{   int i, a[ ] = {2, 4, 6, 8, 10};
    change(a,5)
    for(i=0; i<=4; i++)
       printf("%d, ",a[i]);
    return 0;}
void change (int *b, int n)
{    int  i;
    for(i=0; i<n; i++)
      *(b+i) = *(b+i+2)+3;}
```

(CO1, CO3)

2. (a) Explain pointers using a example. Also, write code to how dynamic memory allocation functions helps in saving memory. (CO1, CO3)

   (b) Draw a flowchart to input an array and sort it using pointer. (CO1, CO3)

   (c) Write a C code to input a string and count how many characters have single and multi-occurrence in the input string. (CO1, CO3)

3. (a) .Explain any *four* from the following : (CO2, CO4)

   (i) Nesting of structures

   (ii) Self-referential structure

   (iii) typedef in structure

   (iv) Comparisons and copy operation between two structure variables

   (v) Union and bitfield

   (b) Draw a flowchart to calculate gross salary and net salary of n employees working in a retail medical shop. If their basic DA, TA and other allowances, deductions are given display the employee name, employee ID, month/year of salary whose net salary is greater than ₹ 50,000.

   Gross Salary = Basic pay + All other allowances

   Net Salary = Gross Salary – Deduction (CO2, CO4)

   (c) Write a C code to create a structure student with data members roll_no, name and marks in 3 subjects. Input details of 10 students and print the detail of student having maximum total marks. (CO2, CO4)

4. (a) What is the need of file in C ? Differentiate between text and binary file. Explain with syntax any *three* sequential access and *two* random access functions in file handling. (CO2, CO5)

(b) Write an algorithm to read n integer in a file and copy sum of digit of each number in another file. (CO2, CO5)

(c) Write a C code to input a string in a file and print it in reverse order. (without using fgets( )) (CO2, CO5)

Example :

File content : Hi how are you ?

Output : ?uoy era who iH

5. (a) Explain any *five* features of Python which are different from C language. What are the different application areas of Python ? (CO2, CO6)

(b) Write a Python code to input five numbers and print the largest among them. (CO2, CO6)

(c) Write a Python code to print the sum of even numbers between given range P and Q : (CO2, CO6)

Input : P = 5 and Q = 15

Output : 6 + 8 + 10 + 12 + 14 = 50