Course Name: Computer Programming and Problem Solving | Course Code: CS100
Date: 10.04.2021 | Time: 2:00-5:00PM
Duration: **3 Hours** | Max. Marks: **100**

ANSWER ALL QUESTIONS

1. Write a program in C to display the sum of the series 5 + 55 + 555 + 5555 + ….

   Enter the number of terms: 6
   Expected Output*:*
   5 55 555 5555 55555 555555
   Sum=617280

   [10]

2. A perfect number is a positive integer that is equal to the sum of its positive divisors, excluding the number itself. For instance, 6 has divisors 1, 2 and 3 (excluding itself), and 1+2+3=6, so 6 is a perfect number. Write a C program to check whether a given number is a perfect number or not.

   Input the number : 56
   Expected Output *:*
   The positive divisor : 1 2 4 7 8 14 28
   The sum of the divisor is : 64
   So, the number is not perfect.

   [10]

3. (a) Find the error(s) (if any) in each of the following program fragments. If the error can be corrected, explain how.

   i) int * a, b;
   a = b;

   ii) float a = 8.93;
   float p = &a;
   printf("%f\n", p);

   iii) char *s;
   printf("%s\n", s);

   (b) Write programs in C to swap elements using call by value and call by reference. Explain the difference.

   [6+4=10]

4. Write a program in C to merge two arrays of the same size. The merged array should be sorted in ascending order.

   Input the number of elements to be stored in the first array : 3
   Input 3 elements in the array : 4 7 2
   Input the number of elements to be stored in the second array : 3
   Input 3 elements in the array : 1 6 3
   Expected Output *:*
   The merged array in ascending order is :
   1 2 3 4 6 7 [10]

5. Write a program in C to find the largest element. Use Dynamic Memory Allocation.

   Input total number of elements: 5
   Input the elements: 2 3 6 4 5
   The largest element is 6

[10]

6. (a) Write a C program to print a string in reverse order using a pointer.
   (b) How do you access a pointer to a structure?

[5+5=10]

7. Consider the program fragment given below. List out the error (if any), and the corresponding rectification. p will reference array A.

```
int *p;
int *a=NULL;
void *s=NULL;
int i,j;
int A[5]={30,40,50,60,70};
s=A;
```

(a) ++p;
(b) i=p; (Use pointer to get the first value of array; assume p is initialized)
(c) i=*p[2]; (Assign the second array element to i; assume p is initialized)
(d) Display the array A; (assume p is initialized)

```
for ( k = 0; k <= 5; ++k) {
printf( "%d ", p[k] );
}
```

(e) i= *s; // assign the value pointed to by s to i
(f) ++A;

[10]

8. Write the algorithm and a program in C to print Fibonacci Series using recursion.

   Input the number of terms: 10
   Expected Output:

   1 1 2 3 5 8 13 21 34 55 [10]

9. (a) Write a C program with a structure and a union and explain where each will be used.

   (b) What will be the output of the following code? Assume that you have entered 1. Give a brief justification.

```
#include<stdio.h>
int main()
{
       char *ch;
       printf("enter a value between 1 to 3:");
       scanf("%s", ch);
```

```
        switch(ch)
         {
                  case "1":
                            printf("1");
                            break;
                  case "2":
                           printf("2");
                           break;
          }
              return 0;
   }
```

[5+5=10]

10. What will be the output of the following programs? Give a brief explanation of each.

a)
```
#include‹ stdio.h ›
int main()
{
 struct book
 {
     char name[] = "C Programming";
     int no_of_pages = 500;
 };
 struct book *ptr;
 printf("%d", ptr->no_of_pages);
 printf("%s", ptr->name);
 return 0;
}
```

b)
```
#include<stdio.h>
struct book
{
    int x;
    struct book next;
};
int main()
{
    struct book temp;
    temp.x = 1;
    temp.next = temp;
    printf("%d", temp.next.x);
    return 0;
}
```

[5+5=10]