B. M. S. College of Engineering, Bengaluru - 560019

Autonomous Institute Affiliated to VTU

September / October 2023 Semester End Main Examinations

Programme: B.E.   **Semester: I / II**
Branch: Common to all Branches   **Duration: 3 hrs.**
Course Code: 21CC1ESPSP / 21CC2ESPSP   **Max Marks: 100**
Course: Problem-Solving Through Programming

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1. a) Compare application software and system software. **05**

   b) Write an algorithm and flow chart to compute the volume of a sphere. **10**
   Hint : V=(4/3)*pi*r3

   c) Determine output of the following code snippet. Justify your answer **05**
   ```c
   #include <stdio.h>
   #include <stdio.h>
   int main()
   {
      int a,b=2,c,i=0,j=1,k=2,m;
       a=2*(b++);
      c=2*(++b);
      printf("%d %d\n",a,c);
      m=i++ || j++|| k++;
      printf("%d %d %d %d ",m i, j, k);
      return 0;
   }
   ```

UNIT - II

2. a) Write a C program to check whether entered character is an alphabet, digit or a special character. **06**

   b) Write a C program to find the largest of three numbers using if else ladder. **08**

   c) Determine the output of the following code snippet. Justify your answer **06**
   ```c
   #include<stdio.h>
   int main( )
   {
   int n;
   for(n=9;n != 0;n--)
   {
      printf("n=%d",n--);
   }
   return 0;
   }
   ```

<div align="center">**OR**</div>

3. a) Write a program that reads a character from keyboard and then prints it in reverse order. **06**

b) Write a program in C to plot Pascal Triangle. **08**

c) Illustrate the difference between while loop and do while loop with an example **06**

<div align="center">**UNIT - III**</div>

4. a) Write any two different ways of initializing 1D array in C Program. **06**

b) Write a program in C to search an element using binary search. **08**

c) Determine what the piece of code is trying to do, also write the output of the following code. **06**

```c
#include <stdio.h>
int main() {
   char s[] = "Programming is fun";
   int i;

   for (i = 0; s[i] != '\0'; ++i);

   printf("Reached %d ", i);
   return 0;
}
```

<div align="center">**OR**</div>

5. a) Explain the following string handling functions with an example for each **06**
   i.strcat()   ii. strcmp()   iii. strcpy()

b) Write a program in C to read a 3 X 3 matrix and print the sum of the matrix. **08**

c) Analyse, what the below program is trying to do. Write the output of the program. **06**

```c
#include <stdio.h>
int main()
{
 int a[5]={8,10,6,1,20};
 int  c, d, x;

 for (c = 0 ; c <= 4; c++)
 {
   for (d = 0 ; d <= 4 - c - 1; d++)
   {
    if (a[d] < a[d+1])
    {
     x = a[d];
     a[d] = a[d+1];
     a[d+1] = x;
    }
   }
 }
 for (c = 0; c < 5; c++)
   printf("%d ", a[c]);
 return 0;
}
```

UNIT - IV

6. a) Explain the following categories of functions with examples **06**
     i. function with arguments and no return value
     ii. function with arguments and one return value

   b) Write a C program to find the GCD of two numbers **08**

   c) Analyse output of the following program **06**

```c
#include<stdio.h>
void print(int n)
{
   if (n > 4000)
   {
      return;
   }
   printf("%d ", n);
   print(2*n);
   printf("%d ", n);
}

int main()
{
   print(1000);
   getch ();
   return 0;
}
```

UNIT - V

7. a) Create a structure called STUDENT that contains student name, age and percentage using this structure write a program to read the information for one student from the keyboard and print the same on the screen **06**

   b) Write a program to add two complex numbers using structures. Use a function to return the sum of two complex numbers **08**

   c) Determine the output of the following code snippet. Justify your answer **06**

```c
#include <stdio.h>

int main()
{
   int a[5]={6,9,5,3,8};
   int *ptr= a, i;
   for(i=0;i<4;i++)
   {
      ptr++;
   }
   for(i=0;i<=4;i++)
   {
      printf("%d ",*ptr);
      ptr--;
   }

   return 0;
}
```

*****