Code : 100204

B.Tech 2nd Semester Exam., 2021

(New Course)

PROGRAMMING FOR PROBLEM SOLVING

Time : 3 hours *Full Marks* : 70

Instructions :

(i) *The marks are indicated in the right-hand margin.*

(ii) *There are* **NINE** *questions in this paper.*

(iii) *Attempt* **FIVE** *questions in all.*

(iv) *Question No.* **1** *is compulsory.*

1. Choose the correct option (any *seven*) : 2×7=14

   (a) What will be the output of this C code?

   ```
   #include<stdio.h>
   int main( )
   {
   char ch= 'A';
   printf("%d", sizeof 'A');
   return 0;
   }
   ```

   (i) 1   (ii) 2

   (iii) 3   (iv) 4

   (b) What will be the output of this C code?

   ```
   #include<stdio.h>
   int main( )
   {
   extern int i;
   i = 20;
   printf("%d", i);
   return 0;
   }
   ```

   (i) 20

   (ii) 4

   (iii) Undefined reference to I

   (iv) Linking error

   (c) What will be the output of this C code?

   ```
   #include<stdio.h>
   int main( )
   {
     int i = 100;
         {
           int i = 0;
           printf("%d", i==0);
         }
     return 0;
   }
   ```

   (i) 10

   (ii) 0

   (iii) Garbage value

   (iv) 1

(d) What will be the output of this C code?

```
#include<stdio.h>
int main(){
int x=3, y=4, z;
z = ++x * y++;
printf("%d", z);
}
```

(i) 12

(ii) 16

(iii) 18

(iv) 20

(e) In C, if you pass an array as an argument to a function, what actually gets passed?

(i) Value of elements in array

(ii) First element of the array

(iii) Base address of the array

(iv) Address of the last element of array

(f) The keyword used to transfer control from a function back to the calling function is

(i) switch

(ii) goto

(iii) go back

(iv) return

(g) What will be the output of this C code?

```
#include<stdio.h>
int main()
{
   int y=200;
   const int x=y;
   x=10;
   printf("%d\n", x);
   return 0;
}
```

(i) 200

(ii) Garbage value

(iii) Error

(iv) 10

(h) Which of the following are unary operators in C?

1. !

2. sizeof

3. ~

4. &&

(i) 1, 2

(ii) 1, 3

(iii) 2, 4

(iv) 1, 2 and 3

(i) How will you free the allocated memory?

    (i) remove(var-name);

    (ii) free(var-name);

    (iii) delete(var-name);

    (iv) alloc(var-name);

(j) Which statement will you add in the following program to work it correctly?

```
#include<stdio.h>
int main()
{
    printf("%f", log(128.0));
    return 0;
}
```

    (i) #include<conio.h>

    (ii) #include<math.h>

    (iii) #include<stdlib.h>

    (iv) #include<maths.h>

2. Answer the following questions :   7+7=14

(a) Write a program to print all prime numbers from 1 to 100.

(b) It is syntactically valid to use float variable as loop control variable but it is not recommended. Justify your answer regarding this statement.

3. Answer the following questions :   7+7=14

(a) Write a program to generate all combinations of 1, 2 and 3 using for loop.

(b) Define data types in C. Discuss primitive data types in terms of memory occupied, format specifier and range.

4. Define calling and called functions with suitable examples. What do you mean by call-by-value and call-by-reference? Write C programs for swapping of two numbers using call-by-value and call-by-reference techniques.   14

5. Answer the following questions :   7+7=14

(a) Explain various types of arithmetic and logical operators in C language with the help of example. When precedence of two operators in an arithmetic expression is same, how associativity helps in identifying which operator will be evaluated first? Illustrate it with example.

(b) Suppose that hundred numbers are entered from the keyboard into an array. The number to be searched is entered through the keyboard by the user. Write a program to find if the number to be searched is present in the array and if it is present, display the number of times it appears in the array.
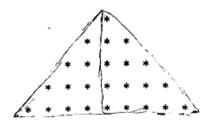
6. Answer the following questions : 7+7=14

(a) What is case control structure in C? What is the reason for using break statement at the end of each case in case control block?

(b) Explain pointer arithmetic with the help of suitable examples.

7. Answer the following questions : 7+7=14

(a) Any year is entered through the keyboard. Write a C program to determine whether the year is a leap year or not.

(b) Explain string palindrome. Write a program in C to check whether a given string is palindrome or not.

8. Answer the following questions : 7+7=14

(a) Write a C program using the nesting of loops to print the following pattern :

(b) Define storage classes with its type in detail.

9. Answer the following questions : 7+7=14

(a) What is recursive function? Further, for given integer n, write a program in C to find the sum of the following series using recursion :

$$S = 1 + 2 + 3 + \cdots + n$$

(b) Define structure and union in C with suitable examples.

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