LM/2020

21CS11
(2021 Batch only)

Reg. No. _____
(To be filled by the candidate)

COIMBATORE INSTITUTE OF TECHNOLOGY
(Government Aided Autonomous Institution)
COIMBATORE 641 014

B.Tech. DEGREE EXAMINATIONS, MAY 2022
(First Semester)

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE BRANCH

21CS11 C PROGRAMMING

Time : 3 Hours

Max: 75 marks

INSTRUCTIONS

1. Answer all questions in PART A and as per choice in PART B.
2. Part A and Part B questions should be answered separately in the same answer sheet.

PART – A

(10 X 2 = 20)

1. An algorithm specifies a process for solving a problem in finite number of steps. Construct an algorithm for the below problem statement:
Ravi has to attend at least 70% of Practical Classes for C programming to be eligible to appear in the examination. There are total 50 Practical Classes for C programming. He has attended 20 out of 30 classes held so far. Find, at least how many more classes to be attended by Ravi to be eligible for appearing in Practical Examination.

2. **Differentiate** between variables and constants in C programming. Provide examples.

3. List the basic data types in C programming.

4. Define the purpose of a) scanf ( ) b) printf ( ) and c) main ( ) function in C programming with suitable examples.

5. Compute the values of the following C expressions assuming that b,s,e,m and k are integer variables , z and t are float variables as declared below.
int b=1, s=3, e=5, m=4, k=10; float z=2.0, t=5.5;

   a) $e \,\%\, s \times m > z \| k \,\%\, s \times b < t$ _____
   b) $++b \;\&\&\; s--$ _____

6. State the purpose of switch statement. What are labels i.e. case prefixes? What type of expression must be used to represent a case label?

7. Differentiate between single dimension array, two – dimension arrays and string in C programming.

8. Is it possible to add pointers to each other? If the answer is yes or no, Justify with valid reasons.

9. State any Two difference between structure and union in C.

10. List any two file opening modes used with the fopen ( ) function.

PART –B

(5x11=55)

11. a) Flowchart is a diagrammatic representation of an algorithm. It clearly illustrates the sequence of operations to be performed for getting the solution of a problem. **Explain** the steps involved in drawing of a flow chart. List any two (2) advantages of flow chart. (8)

    b) In programming paradigm, **Compare and contrast** between the features of structure-oriented programming with object –oriented programming. (3)

(OR)

Contd...

12. a) In C programming, an operator is a symbol that tells the computer to perform certain mathematical or logical manipulations. **Explain** the below C operators with examples.
    a) Relational operator
    b) Logical operator
    c) Increment and decrement operator
    d) Bitwise operator (8)

    b) **Infer** the reason, why does the statement a+b = c+d is not legal in C programming? (3)

13. a) Raj is working for a cell phone company that is coming up with a new text message pricing policy. Company would like to come up with a program to execute their new policy. In particular, the first 300 text messages sent during the month cost 5 paise, the next 300 text messages during the month cost 4 paise and all subsequence messages in the month cost 1 paise. **Write** a C program using the concept of control structures to print out the texting cost for a month given the total number of text messages for the month. (8)

    b) Explain the purpose of if-else statement and nested if with suitable examples in C program. (3)

(OR)

14. a) Consider the given while loop below:

```
i = 1
while (i<=10)
{
printf ("hello\n");
i=i+2;
}
```

    a) **Rewrite** the code above using a for loop
    b) **Rewrite** the code above using a do-while loop (8)

    b) Distinguish between break and continue statement in control structures of C program. (3)

15. a) Write a C program which performs the following tasks:
        a) Initialize the array of 10 elements in main ( )
        b) Pass the entire array to a function modify ( )
        c) In modify ( ) multiply each element of array by 3
        d) Return the control to main ( ) and print the new array elements is main ( ) (8)

    b) **Explain** the below string manipulation functions in C programming.
    a) Strcpy ( )
    b) Strcmp ( )
    c) Strlen ( ) (3)

(OR)

16. a) **Analyze** the below C program code and answer the below questions (8)

```
#include <stdio.h>
int main ( )  {
   int vals [ ] = { 4, 6,  7,  2,  1,  5,  3,  0};
   int array [8] ;
   int i ;
   for  ( i = 0 ;  i < 8; i++)
        array [vals [ i ] ]  = i ;
   printf (" %d  %d\n",  array [0],  array [1] ) ;
   printf (" %d  %d\n",  array [2],  array [3] ) ;
   printf (" %d  %d\n",  array [4],  array [5] ) ;
   printf (" %d  %d\n",  array [6],  array [7] ) ;
   return 0 ;
}
```

    a) What is the first line in the output?
    b) What is the second line in the output?
    c) What is the third line in the output?
    d) What is the fourth line in the output?

    b) **Write** a C program to find a string within the sentence and replace it with other string. (3)

Contd ...

17. a) **Write** a C function that takes in a string (character array) and a character, and returns the number of times that character appears in the string. Complete the function skeleton below:

```
int numTimes (char word [ ] , char c)
 {
 ------------
 }
```

(3)

b) **Differentiate** between array pf pointer and pointer to an array in C programming. (3)

c) **Discuss** in detail the concept of pointer arithmetic with an example. (5)

(OR)

18. a) The function H(n) is defined for positive integers n as follows:

$$H(n) = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \cdots + \frac{1}{n}$$

Write a function that computes and returns H(n). if n is 0 or negative, your function should return 0 to indicate an invalid input parameter. (3)

b) List the different storage class specifier and **explain** it with salient features such as place of storage, scope, lifetime and default value. (3)

c) **Explain** in detail the use of dynamic memory allocation and deallocation with examples in C programming. (5)

19. a) **Discuss** in detail the concept of passing structures as function arguments and returning a structure from a function with an example. (3)

b) **Predict** the output for following code segment which use the concept of self-referential structure. (3)

```
#include <stdio.h>
   struct employee
   {
      char  *c ;
      struct employee *point;
   };
   void main ( )
   {
       struct  employee s ;
       struct employee m;
       m.point = s;
       (m.point) ->c = "hi";
        printf("%s", s.c);
    }
```

c) A hospital keeps a file of blood donors in which each record has the format: (3)
Name : 20 columns; Address: 40 columns; Age 2 columns; Blood type :1 column (Type 1,2,3 or 4).
Write a C program to read the file and print a list of all blood donors whose age is below 25 and whose blood type is 2.

d) **State** the necessity of using bit – fields in C programming. (2)

(OR)

20. a) Declare a structure called student containing his name, age and address. Create and initialize three structure variables. Define a function to which these variables are passed. The function should convert the names in to uppercase. **Write** a C program to print the resultant structure variables, (3)

b) Based on your understanding, **describe** how binary file is different from text file in C? (3)

c) **Is** there any error in the below code? If the answer is Yes/No, **Justify with** the reasons.

```
File * fp
int c;
If (fp = fopen(oldname, "rb")) = NULL)
return -1
while (c=fgetc (fp) ! = EOF)
fprintf (stdout, "%c", c);
fclose (fp);
```

(3)

d) **Distinguish** between enum and typedef in C programming. (2)

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