

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER INTEGRATED MCA DEGREE EXAMINATION (R), MAY 2023**(2020 SCHEME)****Course Code: 20IMCAT108****Course Name: Problem Solving and Structured Programming****Max. Marks: 60****Duration: 3 Hours****PART A****(Answer all questions. Each question carries 3 marks)**

1. Write a short note on C character set.
2. Brief on associativity and precedence of operators available in C programming language.
3. How does *break* and *continue* statements work in a C program? Give an example.
4. Explain what happens when the following statement is executed.
`if (abs(x) < xmin) x = (x>0) ? xmin : -xmin;`
5. Write a computer program to linearly search for an ITEM in a one-dimensional integer array named DATA.
6. Explain the library functions `strcat()`, `strcmp()`, `strcpy()` with suitable examples.
7. What are recursive functions? Write a computer program employing recursion for calculating the GCD of two positive integers.
8. What are storage classes? Brief the working of static storage class.
9. How will you store a string using an array and a pointer? Give examples.
10. Tabulate the different file opening modes in C programming language. What happens when these modes are used with `fopen()`?

PART B**(Answer one full question from each module, each question carries 6 marks)****MODULE I**

11. With a suitable flowchart explain how a source program is converted into a target program in C programming language. (6)

OR

12. Explain basic input/ output instructions of the C programming language with correct syntax and example. (6)

MODULE II

13. a) What is selection? Explain the *switch* statement with its syntax and flowchart. (3)

- b) Write a computer program using *switch* statement to simulate a simple calculator involving addition, subtraction, multiplication and division. While implementing division operation, care must be taken to avoid division by zero. (3)

OR

14. a) Give a comparison of entry-controlled looping structures and exit-controlled looping structures by supplementing each category with suitable C programs. (3)
- b) With a nested looping structure using *for* statement, prepare the following pattern using a computer program.

```
1
12
123
1234
12345
```

(3)

MODULE III

15. a) How does an array differ from an ordinary variable? How are arrays usually processed in C? Explain with the help of a program involving an integer array. (3)
- b) Write a computer program to read-in a line of text using an array and print it backwards. (3)

OR

16. a) How are multidimensional arrays defined and processed in C? (3)
- b) Write a computer program to perform addition of two matrices only if they are conformable for addition. (3)

MODULE IV

17. a) What are the two principal components of a user-defined function definition? Explain. (2)
- b) Write a computer program to compute the factorial of a number using a user-defined function. (4)

OR

18. a) What is a structure? How can a structure member be accessed and processed? Explain with the help of a suitable example. (3)
- b) Define union. Explain with the help of a suitable C program. (3)

MODULE V

19. A C program contains the following statements. (6)
- ```
float a = 0.001, b = 0.003;
float c, *pa, *pb;
pa = &a;
*pa=2*a;
```

pb = &b;

c = 3 \* (\*pb - \*pa);

Suppose each floating-point number occupies 4 bytes of memory. If the value assigned to variable a begins at (hexadecimal) address 1130, the value assigned to variable b begins at address 1134, and the value assigned to variable c begins at 1138, then

- a) Find the value assigned to &a.
- b) Find the value assigned to &b.
- c) What is the value assigned to pa?
- d) What value is represented by \*pa?
- e) What value is represented by &>(\*pa)?
- f) What value is assigned to c?

Give justifications to your answers.

**OR**

20. a) Describe the different ways in which data files can be categorized in C. (3)
- b) Write a computer program that read-in a line of characters. Each character entered from the keyboard is tested to determine its case, and is then written to the data file in the opposite case. (3)

\*\*\*\*\*