

**END TERM EXAMINATION****FIRST SEMESTER [B.TECH] JANUARY 2024****Paper Code: ES-101****Subject: Programming in 'C'****Time: 3 Hours****Maximum Marks: 60**

**Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit. Assume missing data if any.**

**Q1 Attempt all questions:- (2x6=12)**

- (a) What is recursion? Differentiate direct and indirect recursion?  
 (b) What is the return value of f(p,p), if the value of p is initialized to 5 before the call? Note that the first parameter is passed by reference, whereas the second parameter is passed by value.

```
int f (int &x, int c)
{
    c = c - 1;
    if (c==0) return 1;
    x = x + 1;
    return f(x,c) * x;
}
```

- (c) Discuss the structure of the C program with examples.  
 (d) What is printed by the print statements in the program P1 assuming call by reference parameter passing?

```
Program P1()
{
    x = 10; y = 3;
    func1(y,x,x);
    print x; print y;
}
func1(x,y,z)
{
    y = y+4;
    z = x+y+z;
}
```

- (e) Write a C program to print the Fibonacci series.  
 (f) Explain file handling. Differentiate sequential and random-access files.

**UNIT-I**

- Q2** (a) What is an operator? Explain different types of operators. Discuss arithmetic, relational, logical, bitwise, assignment and comma operators in detail. (6)  
 (b) Explain storage classes. Elaborate auto, extern, static and register storage classes with the help of examples. (6)
- Q3** (a) What is a token? Explain different types of tokens. Discuss keywords, identifiers, constants, and special characters in detail with examples. (3)  
 (b) What is a variable? Discuss the scope, visibility and lifetime of a variable. (3)  
 (c) What is the difference between call by value and reference? Write a C program to elaborate on their difference. (6)

**P.T.O.**

### UNIT-II

- (a) What are jump statements? Discuss control structure. Explain different types of control structures. Elaborate the difference between while and do while loop control structure with the help of C program. (6)
- (b) What is a 2D array? Explain the declaration and initialization of a two-dimensional array. Write a C program to initialize and print values using the 2D array. (6)
- i (a) What is a function? Explain elements of functions. Discuss different types of functions. Write a C program to elaborate on function definition, function call and function prototype. (6)
- (b) What is a string? How string can be declared and initialized? Discuss the following string handling functions with examples. (6)
- |                |                |
|----------------|----------------|
| (i) strlen()   | (iv) strcpy()  |
| (ii) strrev()  | (v) strspn()   |
| (iii) strcat() | (vi) strpbrk() |

### UNIT-III

- 6 (a) Explain file handling. What is the need for file handling? Discuss file access modes for text files: r, w, a, r+, w+, a+ and binary files: rb, wb, ab, r+b, w+b, a+b. (6)
- (b) What is a pointer? How to declare and initialize a pointer? Discuss the significance. (6)
- of \* & operator. Write a C program to add two variables using Pointer.
- 27 (a) Explain structure and union? What is the difference between structure and union? Write a C program to elaborate on their difference. (6)
- (b) Discuss file handling functions for input-output operations. Explain file positioning random access functions. Differentiate text and binary files. <https://www.ggsipuonline.com> (6)

### UNIT-IV

- Q8 (a) What is a header file? Explain library functions of following header files in detail. (6)
- |               |               |
|---------------|---------------|
| (i) stdio.h   | (iv) ctype.h  |
| (ii) stdlib.h | (v) math.h    |
| (iii) conio.h | (vi) string.h |
- (b) What is binary search? Search item 23 from the following sorted data elements using binary search. (6)
- 2, 5, 8, 12, 16, 23, 38, 56, 72, 91
- Q9 (a) What is insertion sort? Write a C program to implement insertion sort. (6)
- (b) Explain selection sort. Sort the following numbers using selection sort. (6)
- 77, 33, 44, 11, 88, 22, 66, 55

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