

**JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY,
WAKNAGHAT**

TEST-3 EXAMINATION- 2024

B.Tech-I Semester (CSE/IT/ECE/CE/BT/BI)

COURSE CODE (CREDITS): 24B11CI111 (3)

MAX. MARKS: 35

COURSE NAME: Problem Solving and Programming

COURSE INSTRUCTORS: RKB, KLK, JTY, NSG, FSL

MAX. TIME: 2 Hour

Note: (a) All questions are compulsory. (b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving the problem.

Q1. Draw the following table in your answer book and fill in the required cells.

Advise: Draw the function call trees in rough and then nicely put them on the table.

Ignore syntax errors if any.

Code Snippet	#snippet A void fun(int n) { if(n==0) return; else { printf("%d ", n); fun(n-1); #line 7 } }	void fun(int n) { if(n==0) return; else { fun(n-1); printf("%d ", n); } }	void fun(int n) { if(n==0) return; else { fun(n-1); printf("%d ", n); fun(n-1); } }
function call tree for the call fun(3)			
Output for function call fun(3)			

What will be the output for function call fun(7) and fun(8) if in code snippet A in line 7, the argument of fun is replaced by n-2 instead of n-1? [CO-5][10 Marks]

Q2. Write a tail-recursive function for computing the factorial of a number, with what arguments it should be called to calculate 7 factorial. [CO-5][2+1=3 Marks]

Q3. Write a program for Bubble Sort and show execution for the first 2 passes for data: 20, 10, 40, 30, 50, 70, 80, 100, 60.
[CO-6][5+2=7 Marks]

Q4. What is a structure and a self-referential structure? How structure can be used to create a data type for complex numbers? What is the importance of self-referential structure in the context of the creation of the data structures?
[CO-6][6Marks]

Q5. What are file and FILE? Give usage of fopen(), fclose(), fputc(), and fgetc() in terms of arguments they take and the value returned.
[CO-7][6Marks]

Q6. Write the name of insertion and deletion operations for stack and queue. What will happen if we try to remove an element from a stack whose top=-1.
[CO-7][3Marks]