

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2023 - 24 Examination

Semester: 2**Subject Code: 303105151****Subject Name: Computational Thinking for Structured Design****Date: 29/05/2024****Time: 02:00 pm to 04:30 pm****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1	Objective Type Questions - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark)	(15)	C O	P O	Bloom's Taxonomy
	1. Which function is used to deallocate memory dynamically allocated by malloc(), calloc(), or realloc() in C? a) free() b) release() c) deallocate() d) remove()		1	1	Remember
	2. Which preprocessor directive is used to specify a function that should be called before the execution of main() function in C? a) #pragma warn b) #pragma startup c) #pragma exit d) #pragma inline		2	2	Remember
	3. The sorting algorithm which uses the principle of Divide and Conquer is - a) Quick sort b) Bubble sort c) Insertion sort d) Merge sort		2	1	Analyze
	4. How do you access members of a structure? a) Dot Operator (.) b) Arrow Operator (->) c) Both a and b d) None of the above		1	1	Create
	5. What is the space complexity of merge sort? a) O(log n) b) O(n) c) O(1) d) O(n log n)		2	1	Remember
	6. The typedef keyword in C is used to create _____ for existing data types.		1	2	Understand
	7. calloc() function initializes the allocated memory block to _____.		2	2	Remember
	8. The _____ directive in C is used to define macros.		1	1	Understand

	9. Enumeration or 'enum' is an _____ data type.		1	5	Remember
	10. Linked List data structure is one of the examples of _____ structure.		1	2	Apply
	11. What is dynamic memory allocation?		2	1	Analyze
	12. What are preprocessor directives?		3	1	Understand
	13. Define Time complexity.		1	2	Apply
	14. What is the use of the typedef keyword in C?		1	1	Apply
	15. Define structure padding.		1	2	Create
Q.2	Answer the following questions. (Attempt any three)	(15)			
	A) Differentiate between selection sort and bubble sort sorting techniques with suitable examples.		2	1	Evaluate
	B) Write a C program to perform a binary search.		2	3	Create
	C) Explain object-like macros and chain macros with an example for each.		1	4	Apply
	D) Explain the concept of DMA with functions. Also, provide an example.		3	2	Understand
Q.3	A) What is the need for Dynamic memory allocation in C? Explain any one library function in detail which is used to dynamically allocate the memory in C language?	(07)	2	4	Understand
	B) Explain the concept of pointers to structures and self-referential structure with examples.	(08)	2	1	Understand
	OR				
	B) Write a code for the following functions for a singly linked list: 1. insert a node at the beginning 2. insert a node at the end 3. delete the node at the beginning 4. delete at the end 5. display the list	(08)	3	2	Apply
Q.4	A) Create a 2D array dynamically. Take user input and print only even numbers.	(07)	3	3	Create
	OR				
	A) Write a code for the following functions for a doubly linked list: 1. insert a node at the beginning 2. delete at the end 3. search a node in a linked list	(07)	3	2	Apply
	B) Explain the Singly Linked List, Circular Linked List, and Doubly Linked List with suitable diagrams for each.	(08)	1	1	Analyze