

PRN No.	
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PAPER CODE	V213-234 (RE)
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December 2023 (REEXAM)

SY B.TECH (SEMESTER - I)

COURSE NAME: FUNDAMENTALS OF DATA STRUCTURE	Branch: COMPUTER ENGINEERING	COURSE CODE: CSUA21204
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(PATTERN 2020)

Time: [2 Hrs]

[Max. Marks: 60]

Instructions to candidates:

- 1) Figures to the right indicate full marks.
- 2) Use of scientific calculator is allowed
- 3) Use suitable data wherever required
- 4) All questions are compulsory. Solve any two sub questions each from each Question 1 ,2, 3,4,5,and 6 respectively

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) What is frequency count method? Explain with example.	[5]	1	Understand
	b) Differentiate between interpreter and compiler.	[5]	1	Understand
	c) Explain the Array and Pointer in detail.	[5]	1	Understand
Q2	a) Explain Sparse matrix Addition and subtraction with suitable example.	[5]	2	Understand
	b) What is Row Major and column major? Explain the address calculation with example.	[5]	2	Understand
	c) Explain the fast transpose of sparse matrix with suitable example.	[5]	2	Understand
Q3.	a) Apply your understanding of sequential and linked organizations to describe how each approach manages memory. Discuss a real-world scenario where one organization would be more advantageous than the other based on memory considerations.	[5]	3	Apply
	b) Apply your knowledge to design an algorithm for efficiently deleting a node from a specified position in a circular linked list. Discuss any unique considerations for deletion in a circular context.	[5]	3	Apply
	c) Apply the principles of an Abstract Data Type (ADT) to design a linked list class in a programming language.	[5]	3	Apply

	Ensure that the class allows for creating the list, inserting at any position, and deleting from any position.			
Q.4	a) Illustrate using stack operations for converting the following arithmetic equation $(A-B)*(D/E)$.	[5]	4	Evaluate
	b) Illustrate stepwise stack contents for converting the following infix notation to postfix notation. $((7-(5+3)) / (9+(6/3)))^3$. Support your answer with appropriate pseudo code.	[5]	4	Evaluate
	c) Evaluate the following postfix expression. Show all steps: $a\ b\ * \ c - d + e +$ where $a=9$, $b=3$, $c=6$, $d=4$ and $e=8$.	[5]	4	Evaluate
Q.5	a) Apply Priority queue for scheduling the CPU in Operating System and demonstrate it with proper example.	[5]	5	Apply
	b) By Applying circular queue with array size of 5, Perform the following operations on this queue and show the sequence of steps with necessary diagrams indicating values of front, rear and contents of queue : i. insert 50 ii. insert 70 iii. insert 30 iv. delete an element v. insert 80 vi. delete an element vii. delete an element viii. insert 90	[5]	5	Apply
	c) Simulate 'School admission Process' using Queue along with overflow and underflow condition. Provide required justification with suitable Java constructs. Analyze the time complexity of this program.	[5]	5	Apply

Q.6)	<p>a) Apply Bubble sort algorithm on the following payment receipt numbers and demonstrating list after every pass. Receipt Numbers: [1563, 1524, 1511, 1521, 1510]</p> <p>b) Apply suitable search algorithm to find the index of the bill numbers 8917 in the following sorted list of bill numbers: 8901, 8904, 8908, 8912, 8917, 8922, 8926, 8931, 8936, and 8940. Provide step-by-step details of the search process.</p> <p>c) The keys 15, 12, 18, 5, 2, 17, 3 and 25 are inserted into an initially empty hash table of length 10 using open addressing with hash function $h(k) = k \bmod 10$ and linear probing. Stepwise show the contents of the hash table after insertion of every key</p>	[5]	6	Apply
		[5]	6	Apply
		[5]	6	Apply