G.R. No.	

PAPER CODE	U212-234 (ESE-DSY)

July 2023 (ENDSEM) EXAM
S.Y. (AY 2022-23 SEMESTER - I)
COURSE NAME: Fundamentals of Data Structure
COURSE CODE: CSUA21204
(PATTERN 2020)

Time: [1Hr]   [Max. Marks: 30]

(*) Instructions to candidates:
1) Use of scientific calculator is allowed
2) Use suitable data where ever required
3) All questions are compulsory

Question No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Investigate the impact of using a dynamic array versus a linked list as the underlying data structure for a stack.	[4]	[4]	[Analyze]
	b) Illustrate stepwise stack contents for converting the following infix notation to postfix notation. **((8-(3+3)) * (3+(6/2))^2**. Support your answer with appropriate pseudo code.	[6]	[4]	[Evaluate]
	OR			
	c) Evaluate the following postfix expression. Show all steps: **ab*c+d-e+** where a=7, b=8, c=24, d=15 and e=5	[6]	[4]	[Evaluate]
Q.2	a) Simulate 'School admission ' as a Queue along with overflow and underflow condition. Provide required justification with suitable Java constructs. Analyze the time complexity of this program.	[4]	[5]	[Apply]
	b) Critically analyze the trade-offs involved in choosing between a bounded and an unbounded queue. Consider factors such	[6]	[5]	[Analyze]

	as memory utilization, scalability, and error handling.			
	OR			
	c) Critique the design and implementation of a circular queue data structure. Analyze the benefits and potential challenges associated with circular queues.	[6]	[5]	[Analyze]
Q.3	a) Write pseudo code for Binary search method. Explain with suitable example.	[4]	[6]	[Apply]
	b) Implement the Merge Sort algorithm to sort an array of integers in ascending order. Sort the following number's by applying this algorithm List: **15, 32, 8, 18, 42, 3**	[6]	[6]	[Apply]
	OR			
	c) The keys **12, 18, 13, 2, 3, 23, 5 and 15** are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. Apply hash table at every step and get result.	[6]	[6]	[Apply]