Total No. of Questions – [3]

Total No. of Printed Pages: 02

G.R. No.	

PAPER CODE	U212-254(ESE-DSY)

July 2023 (ENDSEM) EXAM

SYBtech (DSY) AY 22-23 Sem1 ESE

COURSE NAME: FUNDAMENTALS OF DATA STRUCTURES

COURSE CODE: ITUA21204

(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) Represent matrix A using column major representation with assumption as first element stored at location 100. Explain the address allocation technique and show address calculation of element 7. A [3][3] = {1,4,5,7,3,15,12,8,9}	[4]	[4]	[3]
	b) Represent following polynomials using array: 1. $x^3 + x^2 + x + 16$ 2. $x^5y^4 + x^3y^3 + x^2 + y^2 - 10$	[6]	[4]	[3]
	OR			
	c) Write an algorithm for simple transpose and find the simple transpose of following matrix. Analyze its time complexity. 3 4 4 0 0 5 0 2 0 1 1 3 2 0 0	[6]	[4]	[4]
Q.2	a) Compare sequential organization with linked organization by considering. i) Access any element ii) Insertion and deletion of element iii) Utilization of memory iv) pictorial representation	[4]	[5]	[3]

	b) Demonstrate an iterative and recursive algorithm with example to count the nodes in singly link list.	**[6]**	[5]	[4]
	OR			
	c) Demonstrate with diagram the 'insert node' operation on Circular linked list and write its pseudocode. Analyze its time complexity.	**[6]**	[5]	[4]
Q.3	a) Write stack as an ADT. Enlist the applications of stack in the computer science.	**[4]**	[6]	[2]
	b) Write and demonstrate the algorithms to perform enqueue and deque operations on a circular queue of integers. Show the circular queue of size 6 for the following operations: enqueue 1, enqueue 4, enqueue 7, enqueue 8, enqueue 9, deque, deque, deque, enqueue 5, enqueue 11	**[6]**	[6]	[4]
	OR			
	c) Write an algorithm for postfix expression evaluation. Compute the following expression using the same algorithm. Clearly indicate the contents of stack at each step A B C + - C D B / + * C + (A = 6, B = 2, C = 3, D = 8)	**[6]**	[6]	[4]

**Note: [BT level- 1: Remember, 2: Understand, 3: Apply, 4: Analyze, 5: Evaluate, 6: Create]