

PRN No.	
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PAPER CODE	UMG-314
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May 2024 (ENDSEM) EXAM

F.Y.B. TECH. (SEMESTER - II)

COURSE NAME: Introduction to Data Structure and Algorithm Branch: AI & DS COURSE ADUA12235
CODE:

(PATTERN 2023)

Time: [1Hr. 30 Min]

[Max. Marks: 40]

(*) 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 one sub question from each Question 1 and 2 and any three sub questions each from Questions 3 and 4.

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Explain function in CPP, its types, syntax, calling techniques and describe recursive function with suitable example.	[5]	CO1	UNDERSTAND
	b) Describe different asymptotic notations with example. Write step count and time complexity of given code <pre> 1. int n; 2. for(int i=0;i<n;i++) 3. { 4. cout<<"VIIT"; 5. for(int j=0;j<n;j++) 6. { 7. Cout<<"AI & DS"; 8. } 9. }</pre>	[5]	CO1	UNDERSTAND
Q2	a) Construct a program to perform addition and subtraction of 2-Dimensional array in CPP.	[5]	CO2	APPLY
	b) Construct a program to represent given sparse matrix in 2-Dimensional array using CPP. $\begin{pmatrix} 5 & 0 & 0 & 0 \\ 0 & 8 & 0 & 0 \\ 0 & 0 & 3 & 0 \\ 0 & 6 & 0 & 0 \end{pmatrix}$	[5]	CO2	APPLY

Q.3	a) Marks of subject IDSA given below apply Bubble sort to sort the array and apply binary search to search key 93. 23, 93, 45, 78, 34, 90, 13, 44. Demonstrate answer stepwise. Write Complexity and number of passes required.	[5]	CO3	APPLY
	b) Roll no of present students for guest lecture given below. Sort them using selection sort and quick sort. 55, 23, 12, 67, 98, 34, 55, 11. Demonstrate answer stepwise. Write Complexity and number of passes required.	[5]	CO3	APPLY
	c) Prices of apple in various regions given below sort them using radix sort and merge sort. 23, 56, 123, 456, 3, 78, 980, 345. Demonstrate answer stepwise. Write Complexity and number of passes required.	[5]	CO3	APPLY
	d) Construct a program to perform recursive binary search in CPP. Take input values and search key from user.	[5]	CO3	APPLY
Q.4	a) Construct a program to perform given operations on singly linked list using CPP. 1. Insert at beginning 2. Delete at end 3. Display	[5]	CO4	APPLY
	b) Construct a program to perform given operation on doubly linked list. 1. Insert at end 2. Delete at beginning. 3. Display	[5]	CO4	APPLY
	c) Construct a program to store and display single variable polynomial using singly linked list.	[5]	CO4	APPLY
	d) Construct a program to perform given operation on singly circular linked list. 1. insert at begin 2. delete at end 3. display	[5]	CO4	APPLY