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Department of Computer Science and Engineering
M.Tech in Computer Science and Engineering (CSE)

Course:	Advanced Data Structures and Algorithms	Course Code: 22MCE12TL	Semester : 01
28.03.2023	Duration : 20 minutes	Max Marks: 10	Staff : RS

QUIZ-I Question Paper

Sl. No.	Answer all questions	M	* L1-L6	**CO
1.	The time complexity for the recurrence relation given below, using Master Theorem is: $T(n) = 2\,T\left(\frac{n}{2}\right) + O(n)$	01	L3	CO1
2.	Give an example for Linear Data Structures.	01	L3	CO1
3.	Which abstract data type (ADT) is most suitable to store a list of perishable products such that the product with the nearest expiry date is removed first?	01	L2	CO4
4.	Consider an array of positive numbers between 10345 to 11999, which sorting algorithms can be used to sort theses numbers in linear time?	01	L3	CO2
5.	How to check whether a list of n numbers has two occurrences of the same number in O(n log(n)) time.	01	L4	CO2

6.	Consider the following pseudocode:
	declare a stack of characters
	while (there are more characters in the word to read) {
	read a character
	push the character on the stack }
	while (the stack is not empty) {
	write the stack's top character to the screen
	pop a character off the stack }
	What is written to the screen for the input "carpets"?
		01	L3	CO3

7.	Consider the usual algorithm for determining whether a sequence of parentheses is balanced. What is the maximum number of parentheses that will appear on the stack AT ANY ONE TIME when the algorithm analyzes: (()(()))(())) ?	01	L4	CO3
8.	Suppose we have an array implementation of the stack class, with ten items in the stack stored at data[0] through data[9]. The CAPACITY is 42, where does the push member function place the new entry in the array?	01	L3	CO3
9	Suppose that an algorithm performs f(n) steps, and each step takes g(n) time. How long does the algorithm take?	01	L3	CO4
10	Suppose that an algorithm performs two steps, the first taking f(n) time and the second taking g(n) time. How long does the algorithm take?	01	L1	CO4

****Course Outcome**

CO1: Analyze the efficiency of programs based on time complexity.
CO2: Critically think and apply appropriate design paradigm and algorithm for a specific problem.
CO3: Apply knowledge of computing and mathematics to algorithm design
CO4: Design, implement and evaluate algorithms to solve real world problems

Marks Distribution *(L1-L6)

L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4
1	1	6	2	0	0	2	2	3	3

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QUIZ-I Scheme and Solution

Sl. No.	Answer all questions	Marks
1.	Merge Sort: T(n) = 2T(n/2) + Θ(n). It falls in case 2 as c is 1 and Logba] is also 1. So the solution is Θ(n Logn)	01
2.	Array, Linked lists, Vectors, Queues, etc.	01
3.	Prioprity Queue	02
4.	Radix sort	01
5.	Sort the list, then compare adjacent members. If any two adjacent members are the same, say that there is a duplicate. Otherwise, say that there is no duplicate.	01
6.	steprac	01
7.	One Parenthesis	01
8.	data[10]	01
9.	f(n) * g(n)	01
10.	f(n) + g(n)	01

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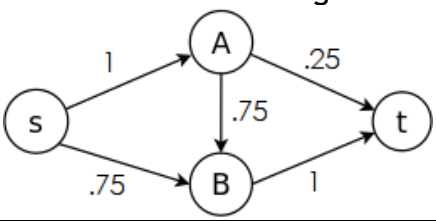
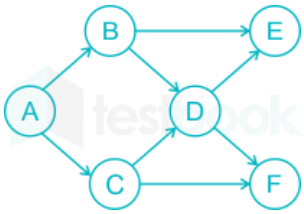
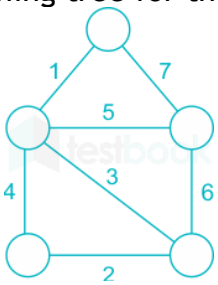
QUIZ-II Question Paper

Course:	Advanced Data Structures and Algorithms	Course Code: 22MCE12TL	Semester : 01
26.04.2023	Duration : 20 minutes	Max Marks: 10	Staff : RS

Sl. No.	Answer all questions	M	* L1-L6	**CO
1.	Check the flow conservation condition for below given graph. If it is satisfied or not. If not satisfied, correct the flow through the nodes. 	02	L3	CO1
2.	List all the Topological Sort Ordering for the below given graph 	02	L3	CO2
3.	What is the minimum cost spanning tree for the given graph? 	02	L3	CO4
4.	Can you find the Topological Sort for a Graph if it has cycles? Justify your answer	02	L3	CO3
5.	How many times the for loop in the Bellman Ford algorithm gets executed?	01	L3	CO3
6.	Mention any one application of Flow Graphs	01	L1	CO1

****Course Outcome**

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Marks Distribution *(L1-L6)

L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4
1	1	6	2	0	0	3	2	3	2

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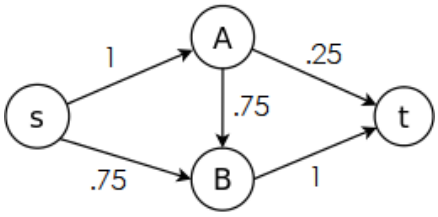
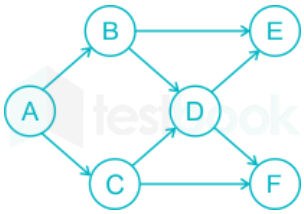
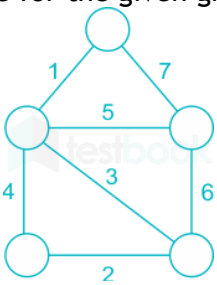
QUIZ-II Scheme and Solution

Course:	Advanced Data Structures and Algorithms	Course Code: 22MCE12TL	Semester : 01
26.04.2023	Duration : 20 minutes	Max Marks: 10	Staff : RS

1.	Check the flow conservation condition for below given graph. If it is satisfied or not. If not satisfied, correct the flow through the nodes.  **No**, the mapping is not an admissible flow. While the mapping satisfies the feasibility condition (check that the flow for each edge is between zero and the capacity for that edge), the flow conservation condition is not satisfied. Specifically, the total flow exiting node b is 1, while the total flow entering node b is 1.5. Changing the flow of edge sb⃗sb from .75 to .25 will make this an admissible flow.	1+1
2.	List all the Topological Sort Ordering for the below given graph  A B C D E F , A C B D F E, A C B D E F, A B C D F E	0.5x4=2
3.	What is the minimum cost spanning tree for the given graph?  Minimum Cost Spanning Tree Cost : 11	02
4.	Can you find the Topological Sort for a Graph if it has cycles? Justify your answer No, if a graph has a cycle Toplogical sort cannot be found	02
5.	How many times the for loop in the Bellman Ford algorithm gets executed? |V|-1	01
6.	To find the maximum flow of water/oil/etc refinenaries	01