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Daffodil International University

Faculty of Science & Information Technology

Department of Computing and Information System

Final Examination, Summer-2026

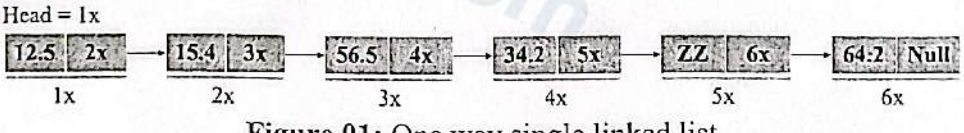
Course Code: CIS122, Course Title: Data Structure

Level: 1 Term: 2

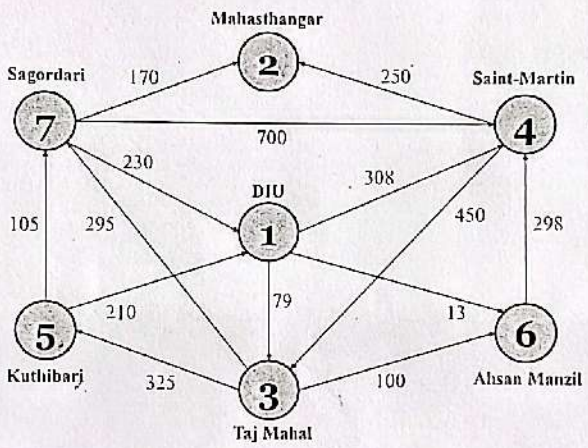
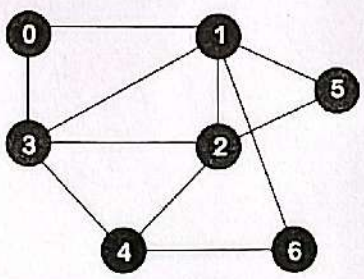
Exam Duration: 2 Hours **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	(a)	Suppose an array M contains 15 elements. Draw a flowchart to insert the value 200 at the 8th position of array M (using an appropriate array structure).	[5]	CO2
	(b)	A web browser maintains the history of visited pages using a stack. A user visits the following pages in order: **Home → Profile → Courses → Results → Payment** The user then presses the **Back** button three times. I. Show the stack after each Back operation. II. Which page will be displayed after the third Back operation?	[5]	
	(c)	A simple queue has a size/capacity of 5 (index starts from 0) and currently contains two elements: 30 and 40, where F = 1 and R = 2. After inserting 50, 60, and 70, what will be the new values of F and R? Next, delete two elements from the queue and then insert 80 and 90. Show the sequence of steps with necessary diagrams, including the values of F and R at each stage. [F = Front, R = Rear]	[5]	
	(d)	Consider the following unsorted array: A = [17, 42, 9, 31, 65, 23, 50, 11] Apply the **linear search** technique, what would be the result if the search value were 80?	[4]	
	(e)	Develop pseudocode to calculate the summation of all float values stored in the given linked list (refer to **Figure 01**). Here, **ZZ** = your assigned float value, which will be within the range of 60.2 to 98.7.  **Figure 01:** One way single linked list	[5]	

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2.		"Suppose you randomly select 7 distinct positive integers between 50 and 240 (inclusive). The first, second, fourth, fifth, and seventh numbers are 110, 60, 90, 156, and 85, respectively. Note that there are only three numbers greater than 100." Based on this information, **draw the Binary Search Tree (BST) and explain how binary search is applicable to find the fourth number?**	[6]	CO4
3.	(a)	Calculate the minimum travel distance from **Kuthibari to Ahsan Manzil** in the following diagram (refer to **Figure 02**). Also, identify the corresponding shortest path.  **Figure 02:** Different historical places with their corresponding traveling distance.	[6]	CO3
	(b)	If Breadth-First Search (BFS) starts from vertex 4 in the following graph (refer to **Figure 03**), what will be the sequence of vertices visited?  **Figure 03:** Undirected graph	[4]	

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