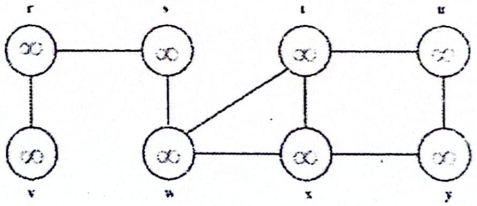
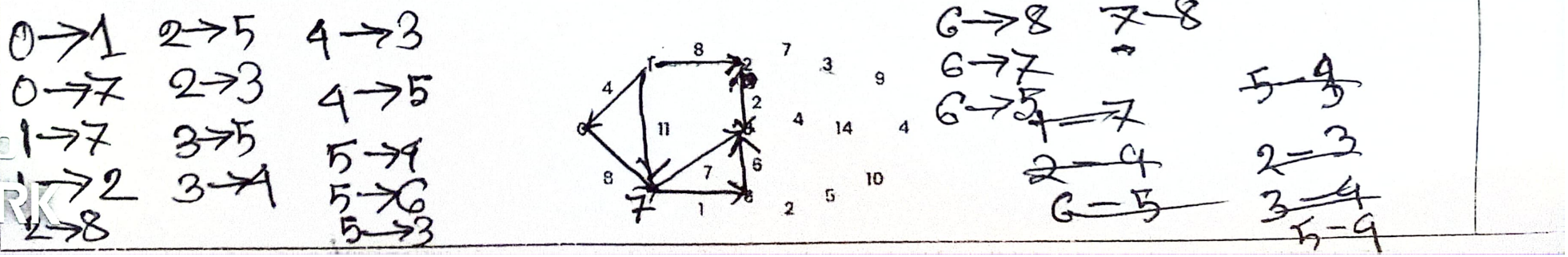
Bangladesh Army University of Engineering & Technology
Department of Computer Science and Engineering
Fall-2023 2nd Year 2nd Semester (15th Batch)
Course Code: CSE-2213 Course Title: Data Structures and Algorithms-II
Class Test-02 Full Marks: 15 Time: 30 Min

		Marks
1.	Explain how Breadth-First Search (BFS) can be used to find the shortest path between two nodes in an unweighted graph. Discuss the algorithmic steps involved.	4
2.	Consider a scenario where you have to find the shortest path from a starting node to a target node in a maze represented as a grid. Discuss how you would use BFS to solve this problem using the following graph efficiently 	4
3.	Suppose you are planning a road trip from city A to city E. Using Dijkstra's algorithm, find the shortest path from 0 to 4 and the total distance traveled. Show your step-by-step process of traversing the graph and selecting the shortest path at each iteration. 	7

Bangladesh Army University of Engineering &Technology (BAUET)

Department of Computer Science and Engineering (CSE)

Course Title: Data Structure and Algorithms II Course Code: CSE-2213

2nd Year 2nd Semester CT-3 Fall-23

Marks: 15 Time: 30 Mins

Marks

Q1. Illustrate the properties of heap with proper example and mention the application, advantages and disadvantages of heap. **[CO-4, C2]** 5

Q2. Construct the binary tree from the given traversals: **[CO-4, C3]** 5

Preorder:	ABDCEF	/ + * 1 $ 2 3 4 5	A B D G C E H I F
In-order:	BDAEFC	1 + 2 * 3 $ 4 – 5	D G B A H E I C F
Postorder:	DBFECA		

Q3. Define Binary search tree. Construct the BST for the given data: **[CO-4, C3]** 5

100,170,55,95,125,130,60,35,180,30,200

Write down all the three traversals for the above tree.

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Course Title: Data Structure and Algorithms II Course Code: CSE-2213

2nd Year 2nd Semester CT-1 Fall-23

Marks: 15 Time: 30 Mins

		Marks
Q1.	Construct the Huffman tree based on the frequency of each character in the given sentence. Encode each character using the generated Huffman tree to obtain the binary representation. Present the final binary code for the entire sentence. Also find out the fixed length coding for the given sentence and explain which one is better. **[CO-1, C3]** "The quick brown fox jumps over the lazy dog."	10
Q2.	Prepare the sorted list using Quick sort algorithm for the following example **[CO-1, C3]** 25,36,12,4,5,16,58,54,24,16,9,65,78	5

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Fall-2023 2nd Year 2nd Semester (15th Batch)
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Class Test-04 Full Marks: 15 Time: 30 Min

		Marks
1.	Explain approximation algorithm mentioning its type.	3
2.	You are provided with a list of artifacts, each with its own weight and value. Your task is to select the artifacts to include in your backpack in such a way that the total weight does not exceed the capacity of your backpack, while maximizing the total value of the artifacts carried. Develop a solution for this problem using the 0/1 Knapsack algorithm and determine the maximum total value of artifacts you can carry. Capacity: 8	6
3.	A warehouse manager needs to efficiently pack a set of items into a minimum number of bins for shipping. The items are represented by their weights in kilograms, and each bin has a maximum capacity of 10 kilograms. Using the **First Fit** and **Best Fit algorithm** pack the following items into bins: Item 1: 5 kg Item 2: 8 kg Item 3: 3 kg Item 4: 4 kg Item 5: 6 kg Item 6: 2 kg Item 7: 7 kg Item 8: 9 kg	6

Object	1	2	3	4
Weight	2	3	7	3
Profit	4	5	2	4