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May 2024 (ENDSEM) EXAM

SY /TY/B.TECH (SEMESTER - II)

COURSE NAME: **Branch: All Branch** **COURSE CODE:** UBCA7689

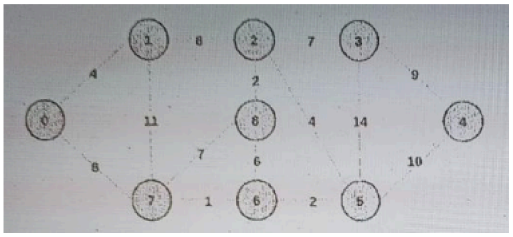
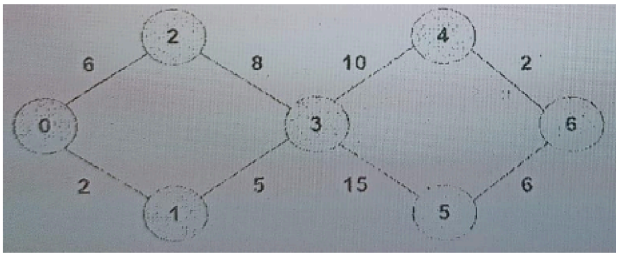
(PATTERN 2020)

Time: [1Hr 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

- **Figures to the right indicate full marks. Use of scientific calculator is allowed**
- **Use suitable data wherever required**
- **All questions are compulsory. Solve any one sub question each from Questions 1 and 2 and solve any three sub questions each from Q.3 and Q.4**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Match the correct data structure to its time complexity for searching (e.g., Hash Table - O(1))?	[5]		
	b) Discuss the principles of cybersecurity, explaining concepts such as encryption, authentication, and intrusion detection.	[5]		
Q2	a) Compare the different types of file systems (e.g., FAT32, NTFS, ext4) used in operating systems, discussing their features and limitations.	[5]		
	b) Solve a hypothetical scenario involving a data breach in a healthcare organization and propose strategies for mitigating the impact on patient privacy.	[5]		
Q3	a) A transportation agency is planning a road widening project to accommodate increasing traffic volumes and improve traffic flow. Analyze the traffic management strategies (e.g., lane reconfiguration, signal synchronization, roundabout implementation) and recommend solutions for minimizing disruptions to traffic during construction and maximizing safety for road users.	[5]		
	b) Your team is designing a sustainable building envelope for a high-rise office tower to enhance energy efficiency and occupant comfort. Compare the thermal insulation materials (e.g., spray foam insulation, cellulose insulation, rigid foam boards) and recommend solutions for achieving thermal performance targets and reducing heating and cooling loads.	[5]		

	c) Examine and construct MST using Prim's Algorithm. Assume the following graph as an example for which we need to find the Minimum Spanning Tree (MST).  d) Assess the effectiveness of flood mitigation measures in reducing the risk of urban flooding in coastal cities.	[5] [5]		
Q4	a) Identify the shortest path from Node 0 to all other Nodes in the following graph using Dijkstra's Algorithm. Find shortest paths from node 0 to node 6, node 0 to node 4 and node 2 to node 6.  b) Judge the reliability of a finite element analysis (FEA) model in predicting the structural behavior of reinforced concrete buildings. c) You are tasked with developing a sustainable transportation infrastructure for a metropolitan city to promote multimodal mobility and reduce traffic congestion. Create an integrated transportation network that includes public transit systems, bicycle lanes, pedestrian walkways, and smart mobility solutions such as ride-sharing and electric scooters, incorporating traffic simulation models, travel demand forecasting, and accessibility analysis for efficient and equitable urban transportation planning. d) Analyze the potential risks and benefits of using facial recognition technology for law enforcement and surveillance purposes.	[5] [5] [5] [5]		