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May 2024 (ENDSEM) EXAM

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

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

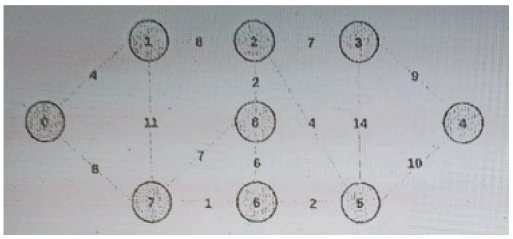
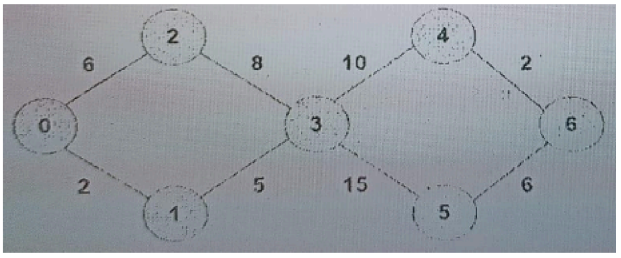
(PATTERN 2020)

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
Q1	a) Compare the different types of transmission impairments (e.g., attenuation, distortion, noise) in communication channels, discussing their effects on signal quality. b) Critically evaluate the role of artificial intelligence in autonomous vehicles and its potential impact on road safety and ethics.	[5] [5]		
Q2	a) List the advantages of using a geosynthetic material in pavement design? b) Evaluate the efficiency of different heat exchanger designs for maximizing heat transfer rates while minimizing pressure drop.	[5] [5]		

Q3	a) Develop a transportation demand management strategy for reducing traffic congestion and carbon emissions in urban areas, incorporating public transit incentives and carpooling programs.	[5]		
	b) Innovate a cybersecurity training platform that simulates real-world cyber attacks and provides hands-on experience for security professionals.	[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). 	[5]		
	d) Analyze the performance metrics of different machine learning models to select the most suitable algorithm for a given dataset.	[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. 	[5]		
	b) Identify the characteristics of a culvert in hydraulic engineering?	[5]		
	c) Discuss the role of cache memory in improving CPU performance, explaining the concepts of cache hit and cache miss.	[5]		

	d) As a telecommunications engineer, you are deploying a microwave point-to-point link for high-speed data transmission between two locations. Explain how you would apply Fresnel zone clearance calculations and link budget analysis to ensure line-of-sight connectivity and signal reliability.	[5]		