
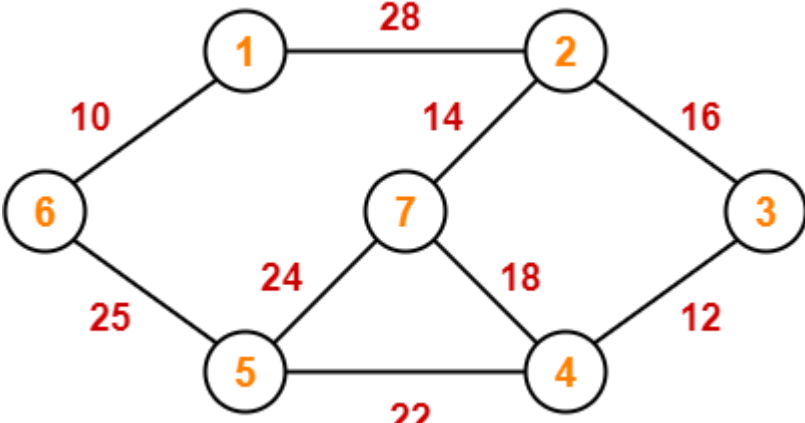
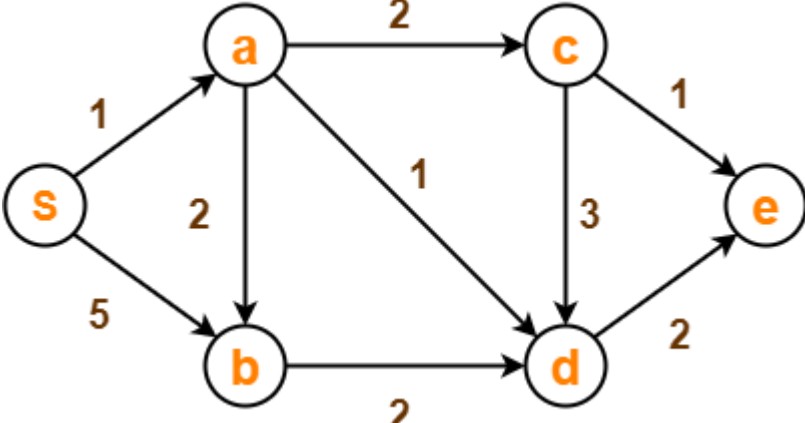


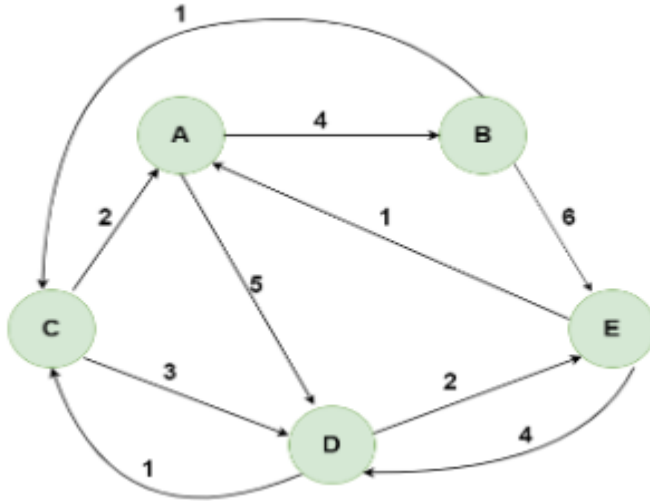
Name:			
Enrolment No:			
UPES End Semester Examination, May 2024			
Course: Design and analysis of algorithm Program: B.Tech MECHATRONICS Course Code: MECH3036_3		Semester: VI Time : 03 hrs. Max. Marks: 100	
Instructions: Use diagrams to support the explanation where possible.			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Discuss the algorithm steps for selection sort.	4	CO2
Q 2	Discuss the measures to analyze the performance of an algorithm.	4	CO1
Q 3	Explain in brief the divide and conquer approach for problem solving with a suitable example.	4	CO2
Q 4	Find the time complexity of following code in best case and worst case: <pre>void fun(int n) { if (n < 5) printf("Hello"); else { for (int i = 0; i < n; i++) { printf("%d", i); } } }</pre>	4	CO1
Q 5	Consider the process of “Fill the bath with water” in following steps: (1) Turn on the hot and cold taps. (2) Is it too hot or cold? If it is, go to step 3, otherwise go to step 4. (3) Adjust the hot and cold taps and go back to step 2. (4) Wait for 2 minutes. (5) Is the bath full? If it is, go to step 7, otherwise go to step 6. (6) Go back to step 4. (7) Turn off the hot and cold taps. Draw a flow chart to represent the scenario.	4	CO1
SECTION B (Attempt any 4 questions) (4Qx10M= 40 Marks)			

Q 6	Discuss the quick sort algorithm with a suitable example. Also discuss the time complexity in different cases.	10	CO2																					
Q7	<p>Given the jobs, their deadlines and associated profits as shown-</p> <table border="1" data-bbox="240 338 1073 552"> <thead> <tr> <th>Jobs</th> <th>J1</th> <th>J2</th> <th>J3</th> <th>J4</th> <th>J5</th> <th>J6</th> </tr> </thead> <tbody> <tr> <td>Deadlines</td> <td>5</td> <td>3</td> <td>3</td> <td>2</td> <td>4</td> <td>2</td> </tr> <tr> <td>Profits</td> <td>200</td> <td>180</td> <td>190</td> <td>300</td> <td>120</td> <td>100</td> </tr> </tbody> </table> <p>Answer the following questions-</p> <ol style="list-style-type: none"> 1. Write the optimal schedule that gives maximum profit. 2. Are all the jobs completed in the optimal schedule? 3. What is the maximum earned profit? 	Jobs	J1	J2	J3	J4	J5	J6	Deadlines	5	3	3	2	4	2	Profits	200	180	190	300	120	100	10	CO3
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Q8	<p>Construct the minimum spanning tree (MST) for the given graph using Prim's Algorithm-</p> 	10	CO3																					
Q9	Discuss the solution for 4-queens problem using branch and bound approach.	10	CO4																					
Q10	<p>Using Dijkstra's Algorithm, find the shortest distance from source vertex 'S' to remaining vertices in the following graph-</p> 	10	CO3																					

SECTION-C (Attempt any 2 questions)
(2Qx20M=40 Marks)

Q 11

Find out shortest path between all pairs of nodes of the graph given below:



20

CO3

Q12

A thief enters a house for robbing it. He can carry a maximal weight of 5 kg into his bag. There are 4 items in the house with the following weights and values. What items should thief take if he either takes the item completely or leaves it completely?

Item	Weight (kg)	Value (\$)
Mirror	2	3
Silver nugget	3	4
Painting	4	5
Vase	5	6

20

CO3

Q13

Solve Travelling Salesman Problem using Branch and Bound Algorithm in the following graph-

20

CO4

