

Note: (a) Answer any 7.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	<p>(i) Perform Prim's algorithm to find Minimum spanning tree for below picture.</p> <p>(ii) What kind of algorithm is Kruskal? Justify your answer.                      (iii) Proof the correctness of Prim's or Kruskal algorithm.</p>	CO5	2+1+2
Q2	<p>(i) Identify the shortest path between <math>s</math> to <math>t</math> for above picture with a single change on edge <math>(b, e)</math> as <math>-3</math>.                      (ii) Design a graph example which could be suitable for Dijkstra's shortest path algorithm despite having negative edge.                      (iii) Verify the below procedure to speed up the Bellman-Ford algorithm to find shortest path.                      Procedure: if successive path length do not change for every vertex then iteration could be stopped.</p>	CO5	3+1+1
Q3.	<p>(i) How does Floyd-Warshall's all-pair shortest path algorithm perform cycle detection?                      (ii) Write the pseudocode for Dijkstra's shortest path algorithm and its complexity?</p>	CO5	1+4
Q4.	<p>(i) What are the applications for Breadth first search and Depth first search?                      (ii) Write the pseudocode for Breadth first search or Depth first search.</p>	CO5	2+3
Q5.	<p>(i) Explain the <math>n</math>-queen problem with pseudocode.                      (ii) Modify this in order to become an optimization problem.</p>	CO5	4+1

Q6.	(i) Perform knuth morris pratt (KMP) algorithm for finding number of occurrence of pattern (p) with given text (t). p= abaababaabaab t= abaababaabababaabaabaab (ii) How this problem differ from longest common subsequence?	CO4	4+1
Q7.	$T(n)=8T(n/2)+100n^2$ (i) Solve the above recurrence relation with master theorem. (ii) Solve the above recurrence relation with substitution method. (iii) Which method is more general and why?	CO3	2+2+1
Q8.	(i) Use given graph of Q1 to demonstrate graph representation with modern adjacency list. (ii) Justify that adjacency list could not be used instead of modern adjacency list for same purpose (Q8. (i)). (iii) Find the time complexity for vertex deletion and edge addition in Adjacency matrix.	CO5	2+1+2

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