

**II B.Tech II Semester Supplementary Examinations, April/May 2005**  
**DESIGN AND ANALYSIS OF ALGORITHMS**  
**(Computer Science & Engineering)**

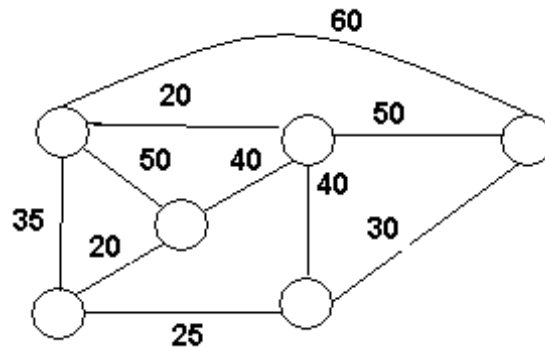
Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
 All Questions carry equal marks

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- Given three sets  $\{1, 3, 5, 7\}$ ,  $\{2, 4, 8\}$  and  $\{6\}$  in which  $n=8$  with external names 1, 2 and 3 respectively with the corresponding internal names 2, 3 and 1. Write the data structure for UNION-FIND algorithm using a linked list. Then write the data structure after UNION instruction
- Write an algorithm of Quick sort and explain in detail.
  - Suggest refinements to Merge sort to make it in-place.
- Write and explain the Kruskal algorithm, applying the algorithm construct a minimal spanning tree for graph given below.



- Write algorithms to split an AVL tree and to concatenate two AVL trees. The algorithms should work in time proportional to the heights of the trees.
- What do you mean by forward and backward approach of problem solving in Dynamic Programming?
  - What are the differences between Greedy and dynamic programming method of problem solving techniques?
- What do you mean by an instance of a game tree.
  - What is a finite game?
  - Write a procedure for post order evaluation of a game tree and explain.
- Draw the portion of the state space tree generated by LCKNAP for the knap-sack instances:  $n=5$ ,  $(P_1, P_2, P_3, P_4, P_5) = (10, 15, 6, 8, 4)$ ,  $(w_1, w_2, \dots, w_5) = (4, 6, 3, 4, 2)$  and  $M=12$ .

- (b) What do you mean by bounding? Explain how these bound are useful in branch and bound methods
8. Consider the LCBB traveling salesperson algorithm described using the dynamic state space tree formulation. Let A and B be nodes. Let B be a child of a. using the edge (A,B ) represents the inclusion of edge  $\langle i,j \rangle$  in the tour, then in the reduced matrix for B all entries in row i and column j are set to  $\infty$  . In addition, one more entry is set to  $\infty$  . obtain an efficient way to determine this entry.

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