

7. (a) Consider the knapsack instance  $n = 3$ ,  
 $\{w_1, w_2, w_3\} = \{4, 4\}$ ,  $\{p_1, p_2, p_3\} = (1, 2, 5)$   
and  $m = 6$ . Solve the 0/1 Knapsack, solve  
the above instance. (10)

(b) What do you mean by clique decision  
problem? Show that the clique decision  
problem is NP-complete. (10)

8. Write short notes on (20)

(a) Cook's theorem

(b) Graph colouring

(c) Branch and bound

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23068

**M.Tech. 1st Semester  
(Computer Engg.) Examination-  
December, 2016**

**ANALYSIS AND DESIGN OF ALGORITHMS**

**Paper : MTCE-605A**

**Time : 3 hours**

**Max. Marks : 100**

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after the examination.

**Note :** Attempt any five questions. All questions carry equal marks.

1. (a) How does amortized analysis contribute to the analysis of algorithms? Explain the technique of aggregate method of amortized analysis. (10)

(b) Explain asymptotic notation and its different types with suitable examples. (10)

2. (a) Explain Quick Sort and its algorithm. Also give its recurrence relation. (10)

(b) What are the various sorting algorithms? Compare and contrast explaining which is best approach. (10)

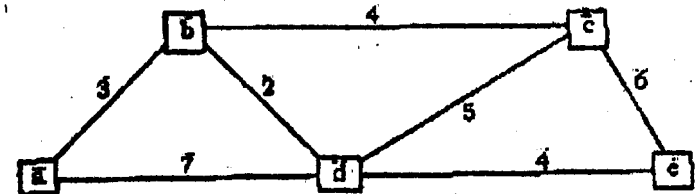
3. (a) What is a minimum spanning tree? Which approach or algorithm is used to generate a minimum spanning tree. Discuss Prim's algorithm for generating a minimum spanning tree. (10)

(b) Sort the following elements using Heap sort. (10)

20, 30, 10, 5, 7, 8, 80, 60, 68, 76,

70, 22, 89, 75

4. (a) Write greedy method and using greedy method, trace the following graph to get shortest path from vertex 'a' to all other vertices. (10)



(b) Explain Red-black tree. (10)

5. (a) Explain Fractional and 0-1 Knapsack problem. (10)

(b) Explain binary search with three order traversal with example. (10)

6. (a) Describe in detail about the backtracking solution to solve 8-queens problem. (10)

(b) Define P, NP and NP complete problems in detail. (10)