

Fourth Semester B.E. Degree Examination, June/July 08
Analysis and Design of Algorithms

Time: 3 hrs.

Max. Marks:100

Note : Answer FIVE full questions, choosing at least two questions from each part

Part - A

- 1 a. With a neat diagram, explain the algorithm design and analysis process. (10 Marks)
 b. Define asymptotic notations for worst case, best case and average case time complexities. Give examples. (10 Marks)
- 2 a. Write a algorithm for selection sort method. Show that its worst case time complexity is $O(n^2)$. (08 Marks)
 b. Sort the following list using bubble sort method 66,55,44,33,22,11 in ascending order. (06 Marks)
 c. With an example, show how an exhaustive search may be applied for traveling salesman problem. (06 Marks)
- 3 a. Explain the general concept of divide – and conquer method. Show how binary search problem can be solved using the same method. (10 Marks)
 b. Define Master theorem. Compute the time complexity for the following recurrence equation using the same.
 i) $T(n) = 4T(n/2) + n$, $T(1) = 1$; ii) $T(n) = 4T(n/2) + n^2$, $T(1) = 1$
 iii) $T(n) = 4T(n/2) + n^3$, $T(1) = 1$; iv) $T(n) = 2T(n/2) + Cn$, $T(1) = 0$. (10 Marks)
- 4 a. Discuss about major variants of decrease – and – conquer method. Give one example for each. (10 Marks)
 b. Show how DES method can be used to conduct topological sorting. (05 Marks)
 c. Explain the minimal change method to generate permutations. Using the same, generate permutations of (1,2,3,4) (05 Marks)

Part - B

- 5 a. What are the properties of an AVL tree? Explain rotations used to construct on AVL tree. Get an AVL tree for the set 5,6,8,3,2,4,7 (10 Marks)
 b. Develop an algorithm for bottom up heaping method. (04 Marks)
 c. Sort the list S,O,R,T,I,N,G using heap sort. (06 Marks)
- 6 a. Explain the horspool method for matching two strings with an example. (10 Marks)
 b. Explain open hashing and closed hashing methods with examples. (10 Marks)
- 7 a. Design an algorithm to find binomial coefficient and derive its time complexity. (10 Marks)
 b. Using Floyd's algorithm, find all pair shortest path for the following graph, fig Q 7(b) (10 Marks)

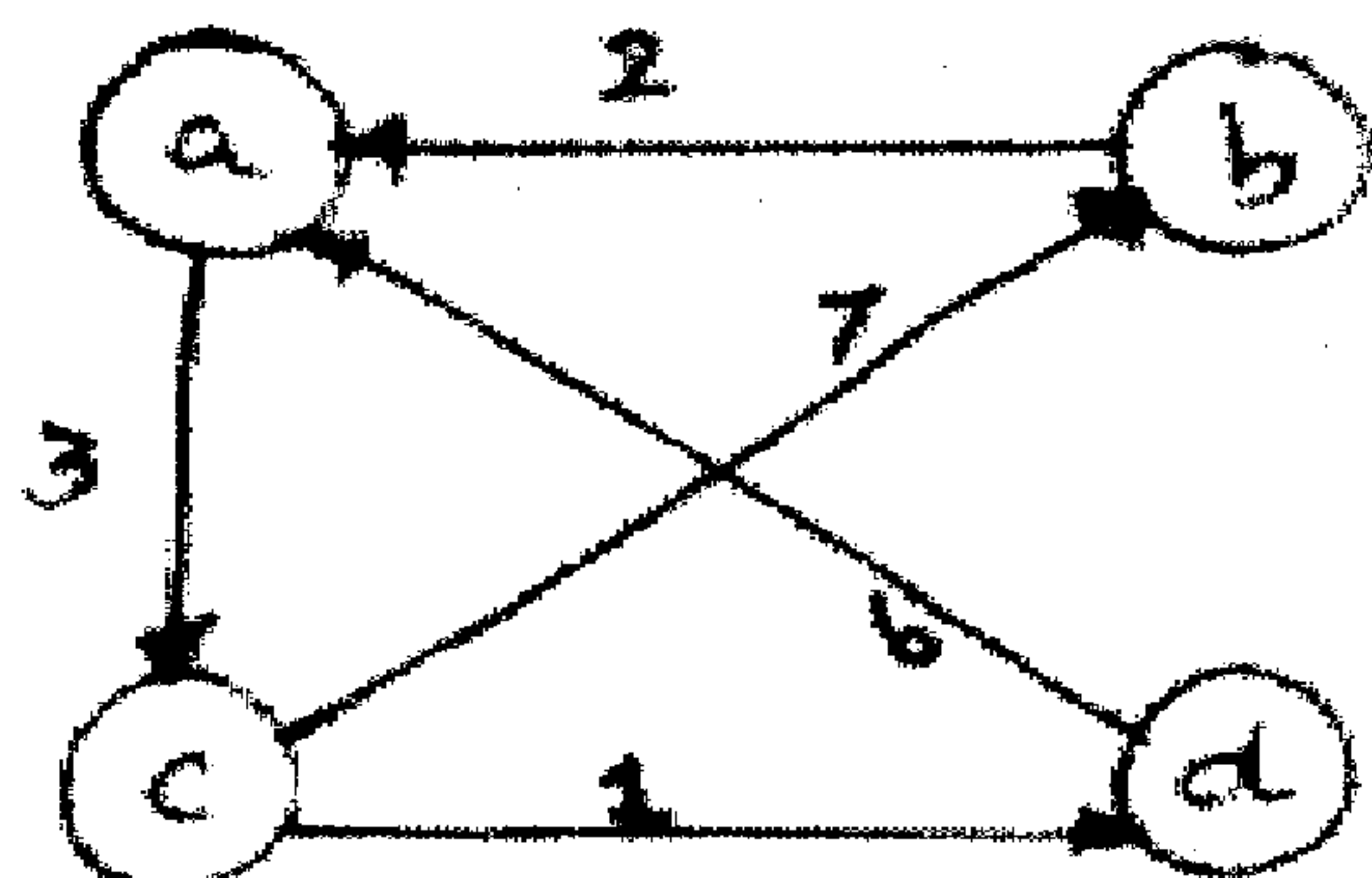


Fig Q 7 (b)

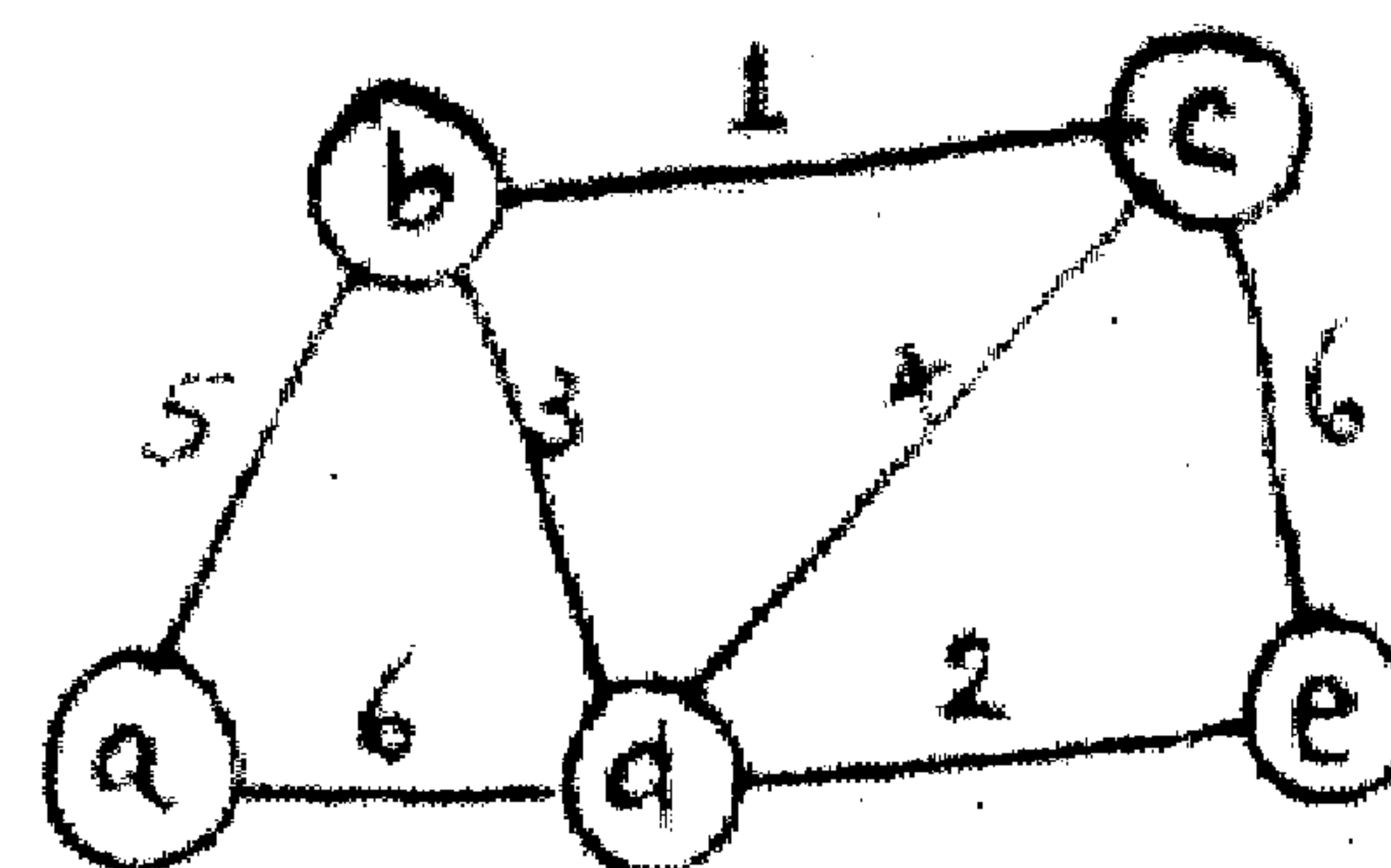


Fig Q 8 (a)

- 8 a. Find minimum spanning tree using prim's methods for the following graph, shown in fig Q 8 (a) (08 Marks)
 b. Define P, NP, NP – complete problems. (06 Marks)
 c. Explain the general principle of backtracking method, taking an example. (06 Marks)
