Total No. of Questions – 8] [Total No. of Printed Pages – 2

BE-VI/6(A)

216755

COMPUTER/I.T. ENGINEERING **COURSE NO. COM– 602**

(Analysis & Design of Algorithm)

Maximum Marks - 100

Time Allowed – 3 Hours

Note: Attempt ***five*** questions in all selecting at least two questions from each Section. Each question carries ***20*** marks.

Section – A

1. (a) Discuss the time and space complexity of a program in detail.

   (b) What is the significance of using notations in analysis of algorithm? Explain the various notations in brief. (10, 10)

2. (a) What is heap? Discuss how to insert and delete an element from heap? (10)

   (b) Write short notes on:

   (a) Sparks language (b) Hashing functions. (10)

3. (a) Discuss technique to derive lower bounds through reduction.

   (b) Comment on statement that "Parallel Comparison tree is very powerful".

   (c) Give control abstraction for LC search. (10, 5,5)

[Turn Over

4. (a) Differentiate between deterministic and non deterministic algorithms.
   (b) What do you mean by P, NP, NP-Hard and NP-complete problems? Write down the reduction method for NP-completeness. (10, 10)

Section – B

5. (a) Explain the divide and conquer technique for designing algorithms in detail with an example.
   (b) Give the general recurrence relation for time complexity of Divide and conquer algorithms. Also derive the time complexity for merge sort algorithm. (15, 5)

6. We have set of n jobs to execute, each of which takes unit time. At any time T = 1,2------we can execute exactly one job. Job i earn us a profit Pi>O if and only if it is executed no late than the Di (deadline) Develop a greedy algorithm to solve the above problem. Run the above algorithm for n=4 and the following values.

i	1	2	3	4
Pi	50	10	15	30
Di	2	1	2	7

7. (a) Explain "Backtracking". Discuss the "n-queens problem" giving its algorithm too.
   (b) The sum of subsets problem is to find all combinations of the n given distinct numbers whose sum is M. Draw the space tree for the problem with the numbers (7, 5, 12, 18, 20, 8) and M=25. (10, 10)
8. (a) Explain the term Least Cost search and write an LC – Branch and bound algorithm for 0/1 knapsack problem.
   (b) Write a short note on Reliability Design using Dynamic Programming. (10, 10)