

**R18**

Code No: 156AN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, August - 2022

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, ITE)

Time: 3 Hours

Max.Marks:75

Answer any five questions  
All questions carry equal marks

1. Show that the following equalities are correct:

- a)  $5n^2 - 6^n = \theta(n^2)$
- b)  $n! = O(n^n)$
- c)  $2n^2 2^n + n \log n = \theta(n^2 2^n)$
- d)  $n^3 + 10^6 n^2 = \theta(n^3)$ .

[4+4+4+3]

2.a) What are asymptotic notations? Explain with examples.

b) Write and explain quick sort algorithm with an example.

[8+7]

3.a) Write and explain find algorithm with collapsing rule.

b) Describe the general method of backtracking.

[8+7]

4.a) What are union and find operations? Explain with suitable examples.

b) Explain about graph coloring algorithm.

[8+7]

5.a) Solve the following 0/1 knapsack problem using dynamic programming  
 $n=3$ ,  $(W_1, W_2, W_3) = (2, 3, 3)$   $(P_1, P_2, P_3) = (1, 2, 4)$  and  $m=6$ .

b) Differentiate between dynamic programming and divide and conquer.

[8+7]

6. Consider four elements  $a_1 < a_2 < a_3 < a_4$  with  $q(1, 2, 3, 4) = (1/8, 3/16, 1/16, 1/16)$  and  $(p_1, p_2, p_3, p_4) = (1/4, 1/8, 1/16, 1/16)$ . Construct the table of values of  $W(i, j)$ ,  $R(i, j)$  and  $C(i, j)$  computed by the algorithm to compute the roots of optimal sub-tree. [15]

7.a) Describe Greedy method control abstraction for the subset paradigm.

b) Write an algorithm of Greedy knapsack.

[8+7]

8.a) Write a non-deterministic algorithm of sorting a list of elements in an array.

b) Explain the applications of branch and bound.

[8+7]

---oo0oo---