Code No: 156AN **R18**

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
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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, (W1, W2, W3) = (2, 3, 3) (P1, P2, P3) =(1,2,4) and m=6.
b) Differentiate between dynamic programming and divide and conquer. [8+7]

6. Consider four elements a1 < a2 < a3 < a4 with q(1, 2, 3, 4) = (1/8, 3/16, 1/16, 1/16) and (p1, p2, p3, p4) = (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]

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