Hall Ticket Number:

Code No.: 234 S

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

M.C.A. II Year I-Semester Supplementary Examinations, May-2017

Design and Analysis of Algorithms

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 X 2=20 Marks)

1. Define time complexity.
2. What is the best case for creation of heap?
3. When we will get worst case in quick sort?
4. Difference between greedy method and dynamic programming.
5. Which data structure is used in BFS and DFS?
6. What is the time complexity of travelling sales man problem?
7. What is backtracking?
8. Define branch and bound in terms of E- node.
9. What is deterministic algorithm?
10. What do you mean by intractable problems?

Part-B (5 × 10 = 50 Marks)

11. a) Develop UNION and FIND algorithms for disjoint sets using weighing and collapsing rules respectively. [5]
    b) Explain about asymptotic notation. [5]
12. a) Use Quick sort algorithm to sort the list A, L, G, O, R, I, T, H, M in alphabetical order. [5]
    b) Explain the Knapsack problem. Find an optimal solution to the Knapsack instance n = 7, m = 15, $(p_1, p_2, p_3, \ldots, p_7) = (10,5,15,7,6,18,3)$ and $(w_1, w_2, w_3, \ldots, w_7) = (2, 3, 5, 7, 1, 4, 1)$. [5]
13. a) Using algorithm OBST compute W(i, j), R(i, j) and C(i, j), $0 \le i < j \le 4$, for the identifier set (a_1, a_2, a_j, a_4) = (end, goto, print, stop) with P(1) =1/20, P(2) =1/5, P(3) =1/10, P(4) =1/20. Q(0) = 1/5, Q(1) = 1/10, Q(2) = 1/5, Q(3) = 1/20, Q(4) = 1/20. Using the R(i,j)s construct the optimal binary search tree. [7]
    b) Explain DFS with an example. [3]
14. a) Write an algorithm for n – queens problem. [4]
    b) Draw the portion of the state space tree generated by LCBB (Least Cost Branch and Bound) for the knapsack instance: n=5, $(P_1,P_2, \ldots, P_5) = (10,15,6,8,4)$, $(w_1\ w_2,\ldots,w_5) = (4,6, 3, 4, 2)$ and M =12. [6]
15. a) Explain Clique Decision problem. [5]
    b) State cook's theorem and explain its importance. [5]
16. a) Define little o notation. Give an example. [5]
    b) Use Greedy strategy, find the solution for optimal storage on tapes problem instance n = 3, $(l_1, l_2, l_3) = (5, 10, 3)$. [5]
17. Answer any **two** of the following:
    a) Explain the principal of optimality. [5]
    b) Explain about live node, E-node and dead node. [5]
    c) Describe P and NP class of problems. [5]

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