Hall Ticket Number:

Code No. : 214

VASAVI COLLEGE OF ENGINEERING*(Autonomous)*, HYDERABAD
M.C.A. II Year I-Semester(Main) Examinations, January - 2016
Design and Analysis of Algorithms

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

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

Part-A (10 × 2 = 20 Marks)

1. Define the space complexity of an algorithm.
2. Define the terms min heap and max heap.
3. Write the Average time complexity of quick sort.
4. Define spanning tree.
5. Explain Dynamic programming technique.
6. Differentiate BFS and DFS.
7. Illustrate Hamiltonian Cycle with example.
8. Find chromatic number of a K_4 graph.
9. Define NP-hard problem.
10. Explain the Node cover decision problem.

Part-B (5 × 10 = 50 Marks)

11. a) Show that the following are correct.   [5]
    i) $10n^2+4n+2=O(n^2)$ ii) $3n+3= O(n)$

    b) Explain dictionaries with examples.   [5]

12. a) Describe the merge sort algorithm using divide and conquer method.   [5]

    b) Describe the Prims algorithm for Minimum cost spanning tree with example.   [5]

13. a) Using algorithm OBST, compute $W(i,j)$, $R(i,j)$ and $C(i,j)$ for the identifier set   [7]
    $(a1,a2,a3,a4) = (do, if, int, while)$. with $p(1:4) = (3,3,1,1)$ and $q(0:4) = (2,3,1,1,1)$ using
    $R(i,j)$ and construct the optimal binary search tree.

    b) Formulate a Reliability Design problem.   [3]

14. a) Explain backtracking using 4 queens problem.   [5]

    b) Discuss the General method of Branch and Bound.   [5]

15. a) Explain NP completeness theory.   [5]

    b) Write a Non deterministic algorithm to solve satisfiability problem and analyze its   [5]
    complexity.

16. a) Derive the time complexity of quick sort in average case.   [5]

    b) Write an algorithm for optimal storage on tapes.   [5]

17. Write short notes on any *two* of the following:

    a) Algorithm for All pairs shortest path using dynamic programming technique.   [5]
    b) TSP using branch and bound technique.   [5]
    c) Reducibility   [5]

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