

**R09****Code: 9A05403**

B.Tech II Year II Semester (R09) Supplementary Examinations December/January 2015/2016

**DESIGN & ANALYSIS OF ALGORITHMS**

(Common to CSS, IT &amp; CSE)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Write Miller – Rabin primality testing algorithm.  
(b) How one can identify the repeated elements?
- 2 (a) Write a pseudo code to determine bi – components.  
(b) Define articulation point. Explain it with example.
- 3 (a) Analyze the average case time complexity of quick sort.  
(b) Prove that the Worst Case time complexity for merge sort is  $O(n \log n)$ .
- 4 (a) Present an algorithm by using Greedy method to generate shortest paths.  
(b) Give brief description about the general method of Greedy Technique.
- 5 Construct the optimal binary search trees when  $n = 4$  such that  $a_1 < a_2 < a_3 < a_4$  with  $(q_0, q_1, q_2, q_3, q_4) = \left(\frac{1}{4}, \frac{3}{16}, \frac{1}{16}, \frac{1}{16}, \frac{1}{16}\right)$  and  $(P_1, P_2, P_3, P_4) = \left(\frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}\right)$ .
- 6 (a) Explain 8-queen problem.  
(b) Generate all permutations of  $\{a, b, c, d\}$  using backtracking.
- 7 Draw the portion of the state space tree generated by LC branch and bound for an instance  $n = 5$ ,  $(P_1, P_2, P_3, P_4, P_5) = (W_1, W_2, W_3, W_4, W_5) = (4, 4, 5, 8, 9)$  and  $m = 15$ .
- 8 (a) Show that the job sequencing with deadlines problem is NP-hard.  
(b) Show that optimal code generation for leaf days on an infinite register machine (Hint: Use FNS) is NP-hard.

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