

**B.Tech. – VIEP – COMPUTER SCIENCE AND
ENGINEERING (BTCSVI)**

00646

Term-End Examination

December, 2014

**BICS-014 : DESIGN AND ANALYSIS OF
ALGORITHM**

Time : 3 hours

Maximum Marks : 70

Note : Attempt any seven questions. All questions carry equal marks.

1. (a) Define Big-Oh notation. Explain the terms involved in it. Give an example. 3
- (b) What is probabilistic analysis ? How do we analyse the running time of algorithm ? 4
- (c) Define cost amortisation. Give some examples. 3
2. (a) Trace the Quicksort algorithm to sort the list C,O,L,L,E,G,E in alphabetical order. 5
- (b) Write the following : 5
 - (i) Worst-case time for Quicksort
 - (ii) Best-case time for Quicksort
 - (iii) Average-case time for Quicksort

3. (a) What is hashing ? Explain the different methods. 5
- (b) Write a short note on – amortized balanced tree. 5
4. Write an algorithm which multiplies two $n \times n$ matrices. Compute its time complexity. Determine the precise number of multiplications, additions and array element accesses. 10
5. (a) Prove that the algorithm for the construction of optimal binary search tree requires $O(n^3)$ time. 5
- (b) Find the shortest tour of TSP for the following instance using dynamic programming : 5

	A	B	C	D
A	∞	12	5	7
B	11	∞	13	6
C	4	9	∞	18
D	10	3	2	∞

6. (a) Explain the Prim's algorithm with an appropriate example. 5
- (b) Describe the solution of Travelling Salesman Problem using branch and bound algorithm. 5

7. (a) Differentiate between NP Complete and NP Hard. 5
(b) State Cook's theorem and prove it. 5
8. (a) Using vertex-cover problem, find the vertex cover of minimum size in a given graph. 5
(b) Using NP Complete solve the subset-sum problem with example. 5
9. Write an algorithm for 8-Queens problem. Explain it with an example. 10
10. (a) Briefly explain the universal bushing. 5
(b) What is Polard's rho heuristic? Explain. 5
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