

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

Term-End Examination

December, 2015

00088

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

Time : 3 hours

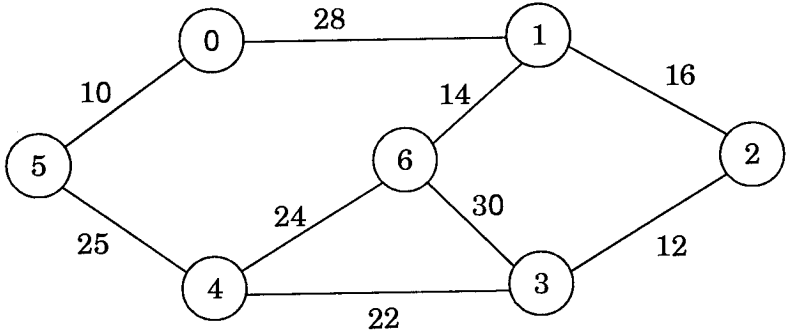
Maximum Marks : 70

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

1. (a) Explain the characteristics of a problem that can be solved efficiently by using Dynamic programming technique. 3
- (b) Differentiate between generating function and bounding function. 3
- (c) Discuss string matching algorithm with the help of an example. 4
2. (a) Illustrate the operations of Heap-extract max on the heap 5
 $A = \{15, 13, 9, 5, 12, 8, 7, 4, 0, 6, 2, 1\}$.
- (b) Describe the performance of quick-sort. 5

3. How does backtracking work on the 8 Queens problem ? Describe with the help of suitable examples. 10
4. (a) What is hashing ? Explain the different methods of hashing. 5
- (b) Explain amortized balanced tree. 5
5. (a) Solve the recurrence relation, where $T(1) = 1$ and $T(n)$ for $n \geq 2$ satisfies $T(n) = 3T(n/2) + n$. 5
- (b) Explain matrix multiplication using divide and conquer technique. 5
6. (a) What are P, NP, Co-NP, NP-Hard and NP-Complete problems ? 5
- (b) Prove that the vertex-cover is NP-Complete. 5
7. (a) Write an algorithm for BFS. Solve the water jug problem using BFS, considering two jugs, one of which can store 4 gallons of water and the other can store 3 gallons of water. How will you measure 2 gallons of water in 4-gallons jug ? 5

- (b) Write Prim's algorithm. Find the minimum cost spanning tree using Prim's algorithm for the tree below. 5



8. (a) Define the Hamiltonian cycle problem. 5
(b) Explain Monte Carlo algorithm. 5
9. Explain, with the help of an example, Las Vegas algorithm for search. 10
10. Write short notes on any **two** of the following : 2×5=10
- (a) Floyd-Warshall Algorithm
 - (b) Bellman-Ford Algorithm
 - (c) Universal Hashing
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