14. a.i. Write and explain an algorithm for sum of subsets problem.

ii. Find all possible subnets of the following
$n = 6, m = 30 \quad w = \{4,6,10,12,18,20\}$

(OR)

b. Write a short note on the following
(i) Branch and bound method
(ii) 0/1 Knapsack problem using branch and bound method.

15. a. Write a short note on
(i) NP-completeness
(ii) Deterministic algorithm

(OR)

b. What is non deterministic algorithm? Explain any two non-deterministic algorithm.

* * * *

Reg. No.										

B.Tech. DEGREE EXAMINATION, JUNE 2017
Third Semester

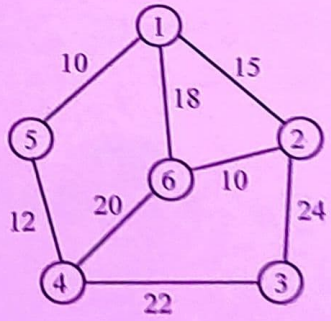
CS0203 – DESIGN AND ANALYSIS OF ALGORITHMS
(For the candidates admitted from the academic year 2007-2008 to 2012-2013)

Time: Three hours Max. Marks: 100

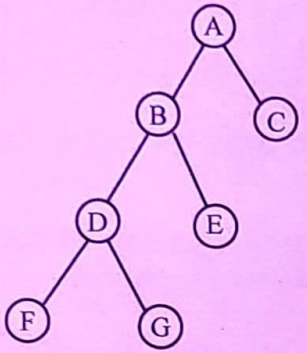
Answer **ALL** Questions

PART – A (10 × 2 = 20 Marks)

1. Define time and space complexity.
2. What is meant by infimum and supremum?
3. Write the best, worst and average case time complexity for successful recursive binary search.
4. Construct minimum cost spanning tree for the following graph



5. What is dynamic programming?
6. Find out inorder and preorder traversal for the following tree.



7. State Hamilton cycle problem.
8. Define knapsack problem in terms of Backtracking.
9. What is non-deterministic algorithm?
10. State NP-hard problem.

PART – B (5 × 16 = 80 Marks)

11. a.i. Explain Big-oh, omega and theta notation.

ii. Prove that $\sum_{i=1}^{n} i^3 = \left[\frac{n(n+1)}{2}\right]^2$ for all $n \geq 1$.

(OR)

b.i. Prove that $\sum_{i=0}^{n} ar^i = \frac{a(r^{n+1}-1)}{r-1}$ for all $n \geq 0$, if a and $r \neq 1$ are real numbers.

ii. Explain time and space complexity of an algorithm.

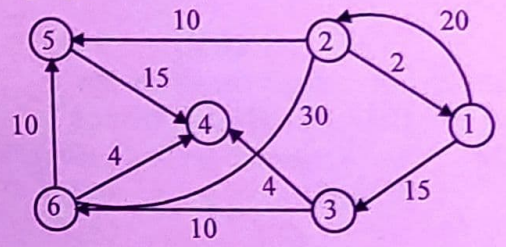
12. a.i. Write an algorithm for quick sort.

ii. Sort the following numbers using quick sort.
42, 65, 70, 75, 86, 90, 85, 60, 62, 55.

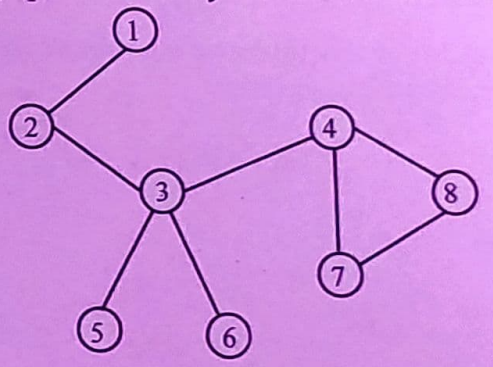
(OR)

b.i. Write an algorithm for single source shortest path using greedy method.

ii. Find the shortest path from 1 to all other vertices from the following digraph



13. a. Explain an algorithm to determine Biconnected components and find the articulation point for the following graph and identify the biconnected components



(OR)

b.i. Explain 0/1 Knapsack problem suing dynamic programming.

ii. Solve the following using the same algorithm
$n = 3, m = 6 (w_1, w_2, w_3) = (2,3,4)$
$(p_1, p_2, p_3) = (1,2,5)$