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30/12/15 FN

**Question Paper Code : 95308**

5 Years M.Sc. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fifth Semester

Software Engineering

ESE 053 — DESIGN AND ANALYSIS OF ALGORITHMS

(Regulations 2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define algorithm.
2. What is space and time complexity?
3. Define optimal solution. Give example.
4. What is dynamic programming?
5. What are the various graph traversal techniques?
6. Define articulation point.
7. What is Hamiltonian cycle?
8. Define backtracking.
9. What is the purpose of E-approximation algorithm?
10. An NP - hard problem can be solved in deterministic polynomial time, how?

PART B — (5 × 16 = 80 marks)

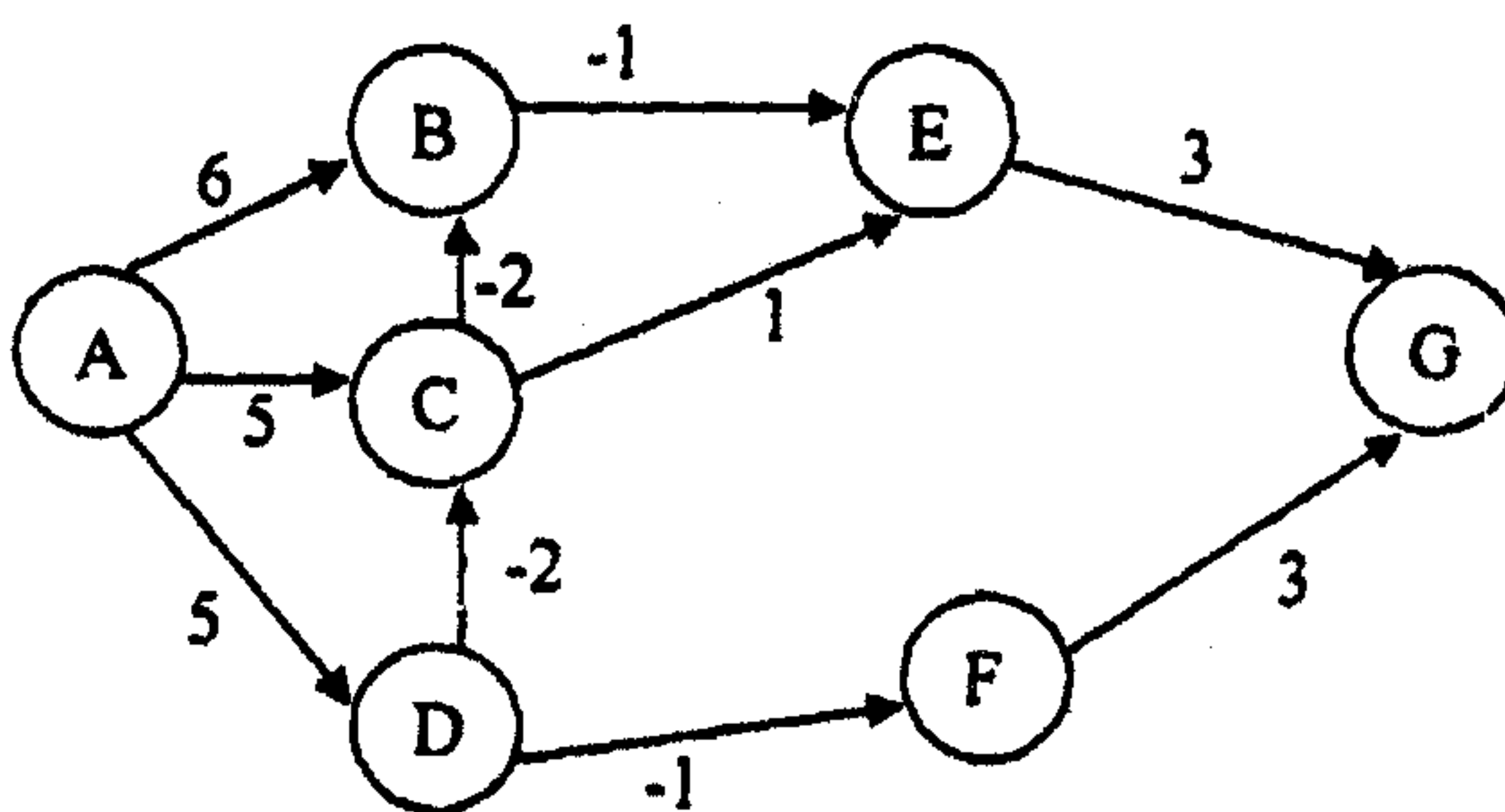
11. (a) (i) With an example explain quick sort algorithm. (8)
- (ii) How do you find the maximum and minimum number using divide and conquer method. (8)

Or

- (b) (i) Trace the steps of merge sort algorithm for the elements 122,25,70, 175,89,90,95,102,123 and also compute its time and space complexity. (8)
- (ii) Explain the binary search algorithm with an example. (8)
12. (a) (i) Explain how travelling salesman problem is solved using greedy method with an example. (8)
- (ii) Distinguish forward and backward approach in multistage graph. (8)

Or

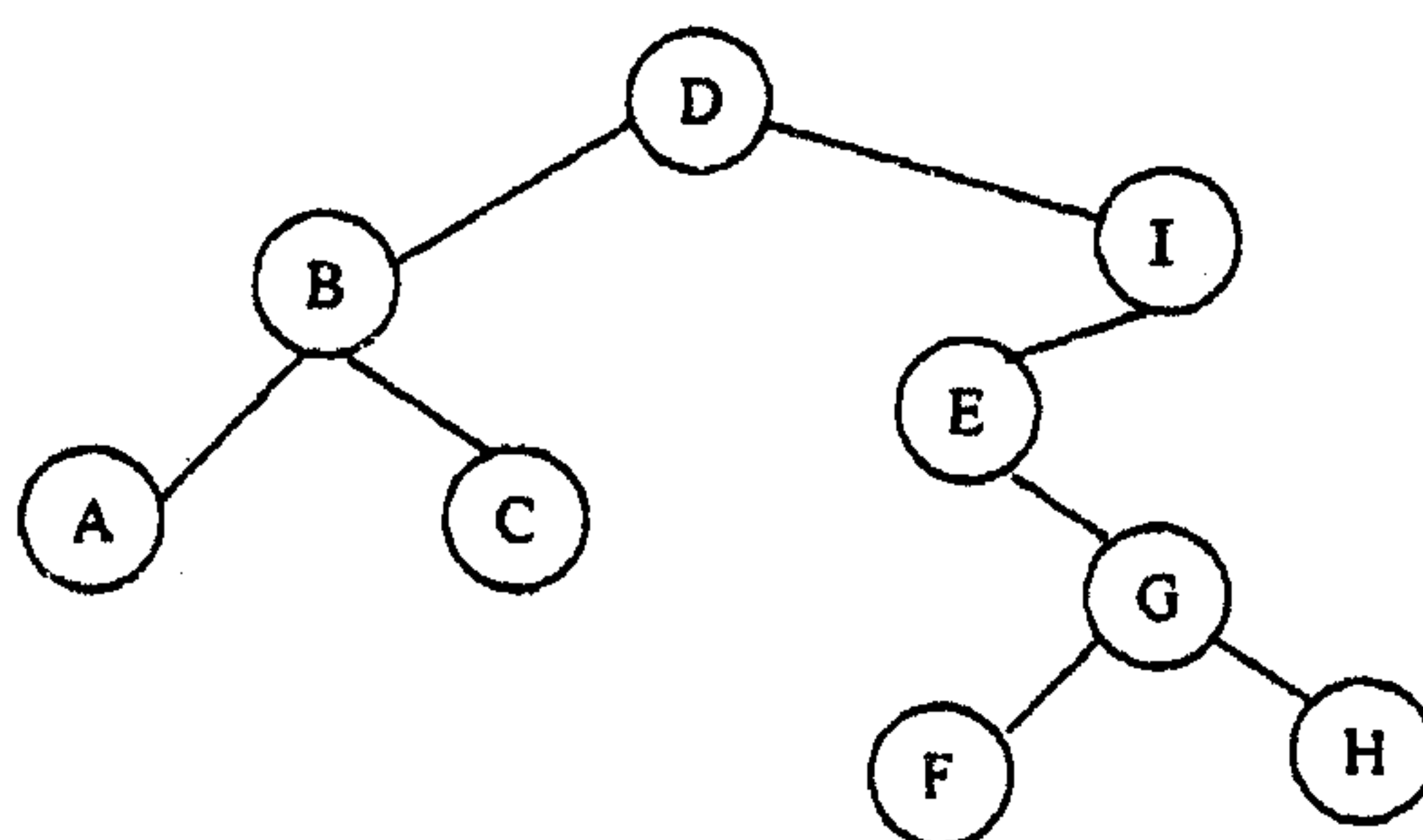
- (b) Discuss Dijkstra's single source shortest path algorithm for the given directed graph. (16)



13. (a) Differentiate Tree and Binary tree. Construct a binary search tree with the following node elements, 77,50,65,44,85,70,89,93,80. After construction, represent the output of the given binary search tree after
- (i) Inserting a new node with value 83
- (ii) Deleting the node with value 77 is deleted

Or

- (b) Explain various Tree traversal techniques with algorithm. For the given binary tree, find the In-order, Pre-order and Post-order traversal nodes



14. (a) (i) Explain the algorithm for graph coloring problem with suitable example. (8)
- (ii) What do you mean by 0/1 knapsack problem? Explain. (8)

Or

- (b) (i) Explain how backtracking works on a eight queen problem with a suitable example. (8)
- (ii) Briefly discuss about branch and bound technique for problem solving. (8)
15. (a) (i) Differentiate NP-complete and NP-hard problem with example. (8)
- (ii) Write a brief note on Cooke's theorem. (8)

Or

- (b) (i) Discuss about various approximation algorithms. (8)
- (ii) Explain why job shop scheduling is termed as NP-Hard problem. (8)
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