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**Question Paper Code : 60500**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Third Semester

Electrical and Electronics Engineering

EE 2204/EE 36/080300003/10133 EE 306 — DATA STRUCTURES  
AND ALGORITHMS

(Common to Instrumentation and Control Engineering and Electronics and  
Instrumentation Engineering)

(Regulations 2008/2010)

(Also common to PTEE 2204 – Data Structures and Algorithms for  
B.E. (Part-Time) – Second Semester – EEE – Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define stack. What are the operations performed on a stack?
2. Mention the applications of list.
3. Draw the expression tree for  $(a + b * c) + ((d * e + f) * g)$ .
4. Write the pseudo code to insert an element at the end of a linked list.
5. State the need for indexing.
6. What is a hash function? Give example.
7. Define in-degree and out degree of a graph.
8. What is meant by strongly connected and weakly connected in a graph?
9. What are the drawbacks of greedy algorithms?
10. Which performance measures are used to analyse an algorithm?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Given two sorted lists, L1 and L2, write a procedure in pseudo-code to compute  $L1 \cap L2$  using only the basic list operations. (8)
- (ii) Write down the procedure for implementing various stack operations. (8)

Or

- (b) Write a function to add two polynomials. Do not destroy the input. Use a linked list implementation. If the polynomials have M and N terms respectively, what is the time complexity of your program? (16)
12. (a) Formulate 14 different all possible binary tree structures that can be constructed with just 4 nodes.

Or

- (b) Formulate a binary search tree with the following data and sort the same using tree traversal technique 8, 15, 11, 22, 7, 18, 3, 14, 12, 1.

13. (a) Write the algorithm to find the shortest path between 2 nodes. Trace the algorithm to find the minimum distance between node A and G in the graph shown in Fig.13(a).

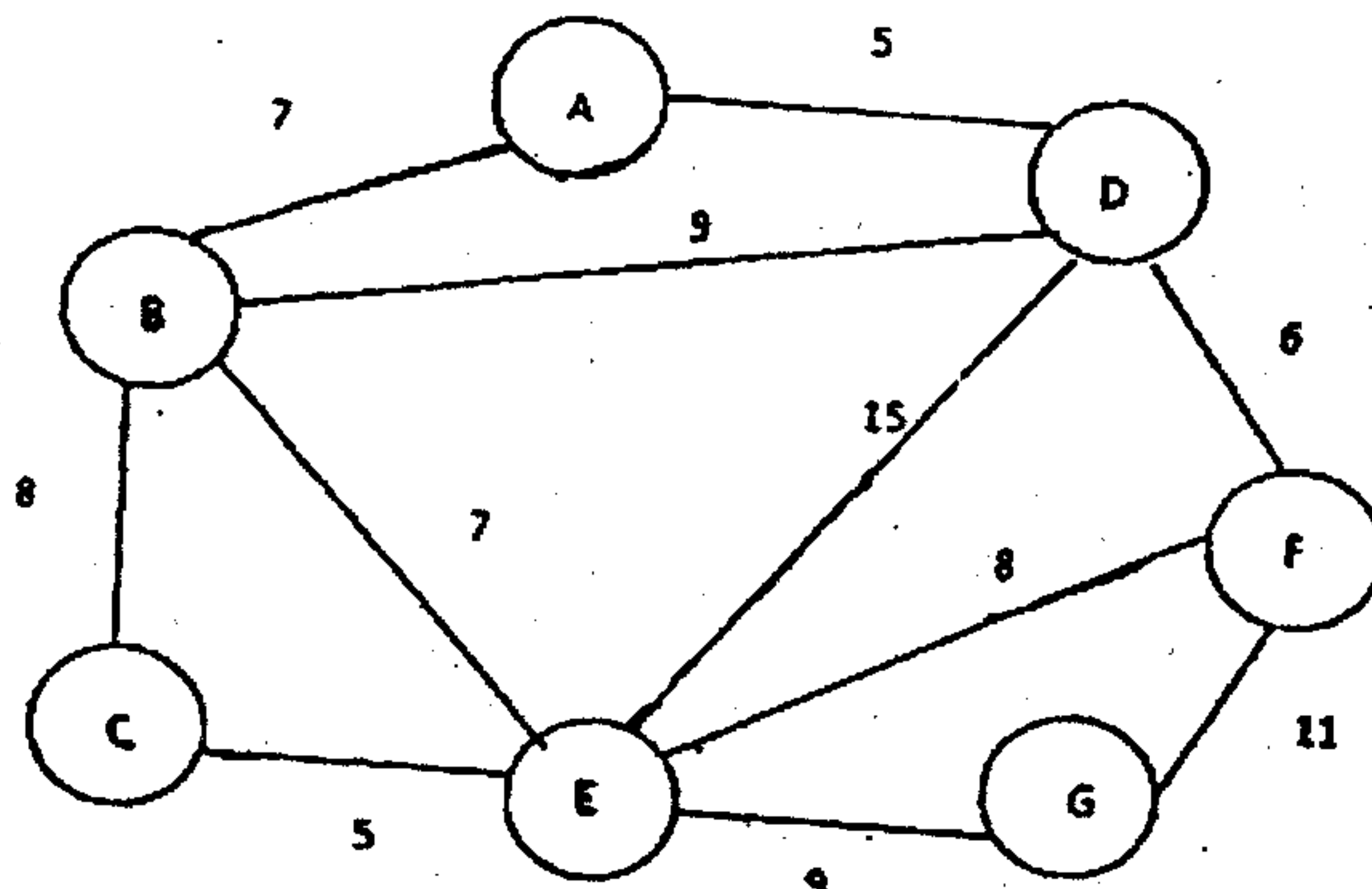


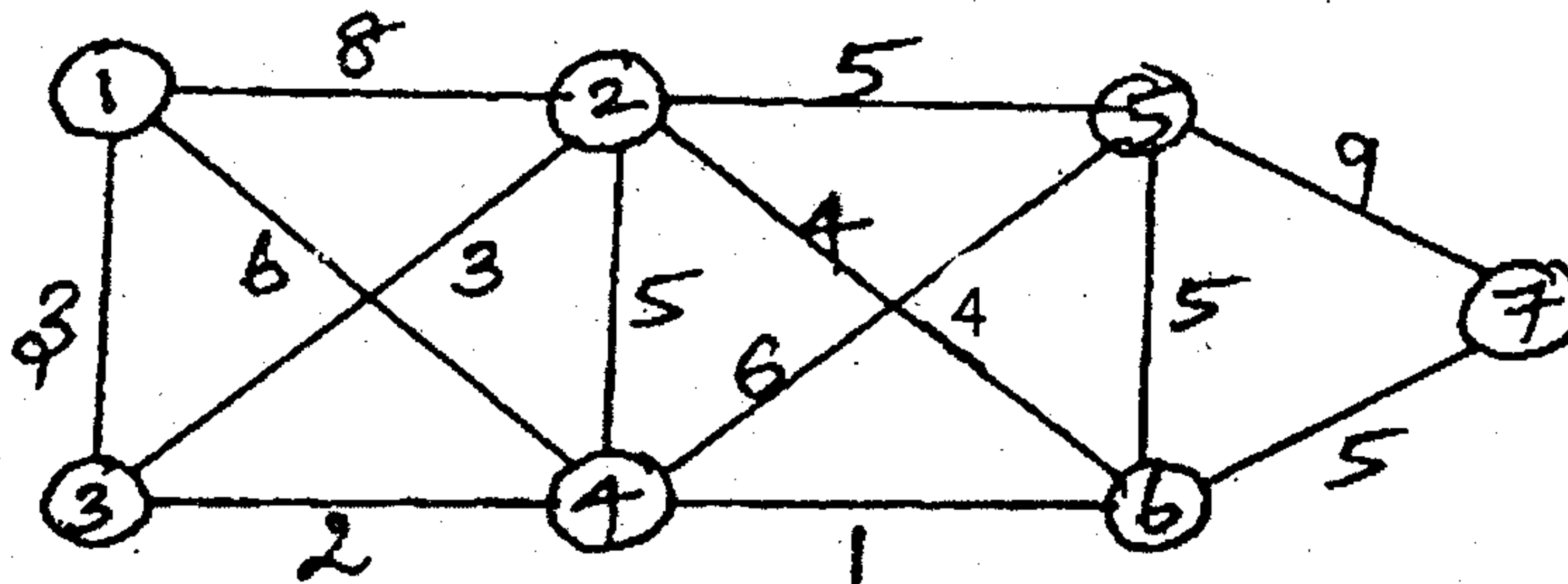
Fig.13(a)

Or

- (b) Explain the steps involved in Branch and Bound algorithm design technique. Apply this technique to solve the following instance of knapsack problem. Draw the state space tree.

ITEM	PROFIT	WEIGHT
0	0	0
1	11	1
2	21	11
3	31	21
4	33	23
5	43	33
6	53	43
7	55	45
8	65	55

14. (a) (i) Define Graph. Briefly explain the graph traversal algorithms with an example. (8)
- (ii) Find the shortest path from node 1 to 7 using shortest path algorithm. (8)



Or

- (b) With an example, explain Kruskal's algorithm for finding minimum spanning tree. (16)
15. (a) Explain with an example how a greedy approximation algorithm can be used for a simple scheduling problem. (16)

Or

- (b) What is backtracking? Explain the turnpike reconstruction problem with an example. (16)