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**Question Paper Code : 51500**

**B.E/B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**Third Semester**

**Electrical and Electronics Engineering**

**EE 2204/EE 36/10133 EE 306/080300003 – DATA STRUCTURES AND ALGORITHMS**

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

**(Regulations 2008/2010)**

**(Common to PTEE 2204 – Data Structures and Algorithms for B.E. (Part-Time)**

**Second/Third Semester – EEE – Regulations 2009)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. Give an example for abstract data type.
2. Write an algorithm for deleting an element in a queue which is implemented using arrays.
3. What is a complete binary tree ? Give example.
4. Represent the infix expression  $A + (B - C) * D / E$  as a binary tree.
5. What is the need for height balanced trees ?
6. What is meant by collisions while hashing the data structures ?
7. What is meant by digraph ? Define the terms in-degree and out-degree with respect to a digraph.

8. Write the adjacency matrix for the following graph.

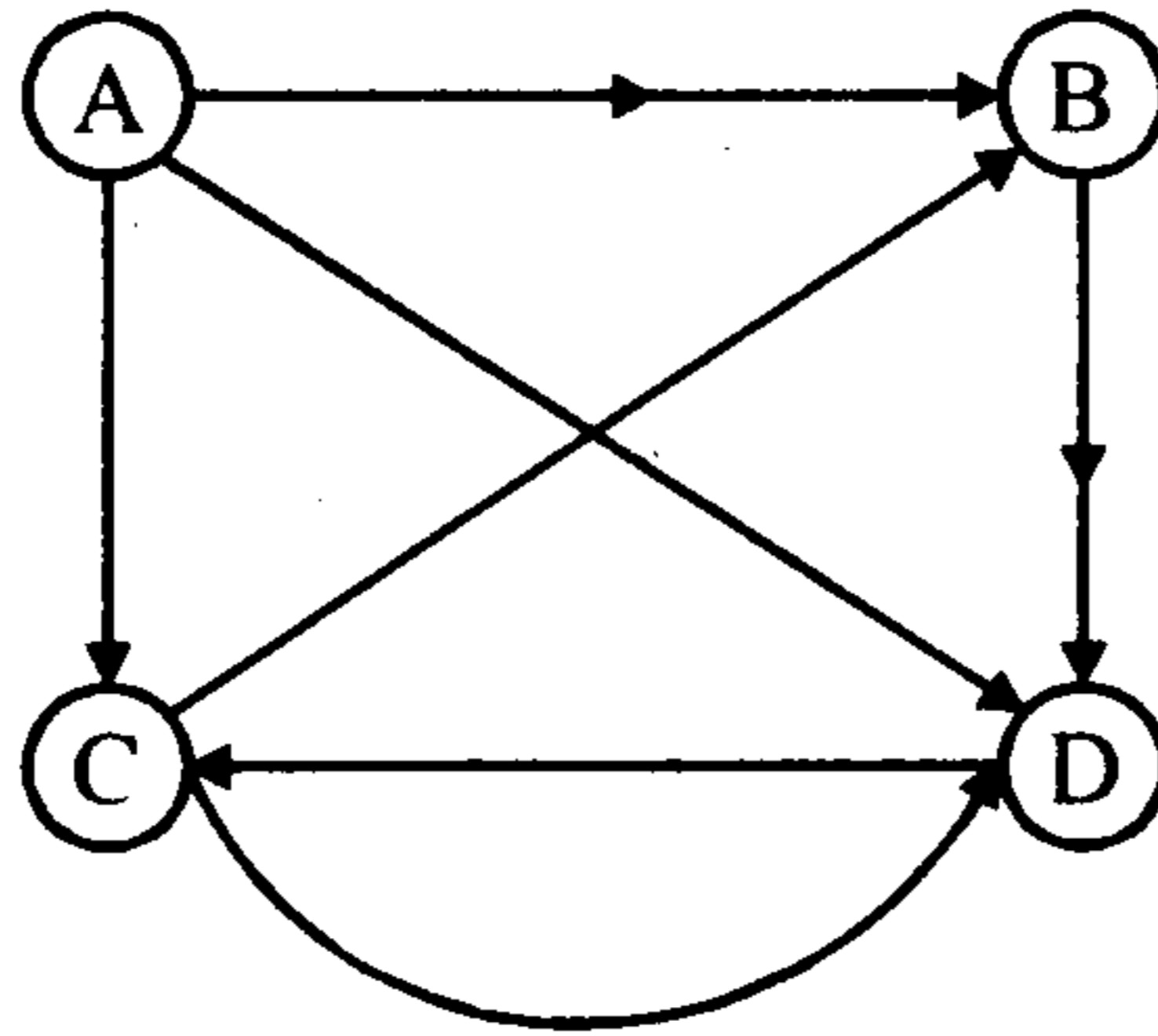


Fig. 1

9. What is back tracking ?  
 10. What is meant by program testing, and proof of termination ?

**PART – B (5 × 16 = 80 Marks)**

11. (a) Explain the different types of linked lists and its implementation. (16)

**OR**

- (b) What are the different operations that can be performed in a queue ? Explain in detail. (16)

12. (a) (i) Write the algorithm for insert and delete operation in BST. (8)  
 (ii) Insert 17, 21, 13, 15, 10, 16, 4, 24, 27, 23, 11, 25, 26 into an initially empty binary search tree. Delete 4, 10, 27 and 13 from the tree. (8)

**OR**

- (b) Write Prim's Algorithm to find the minimum spanning tree for a connected weighted undirected graph. Trace the algorithm for the following graph. (16)

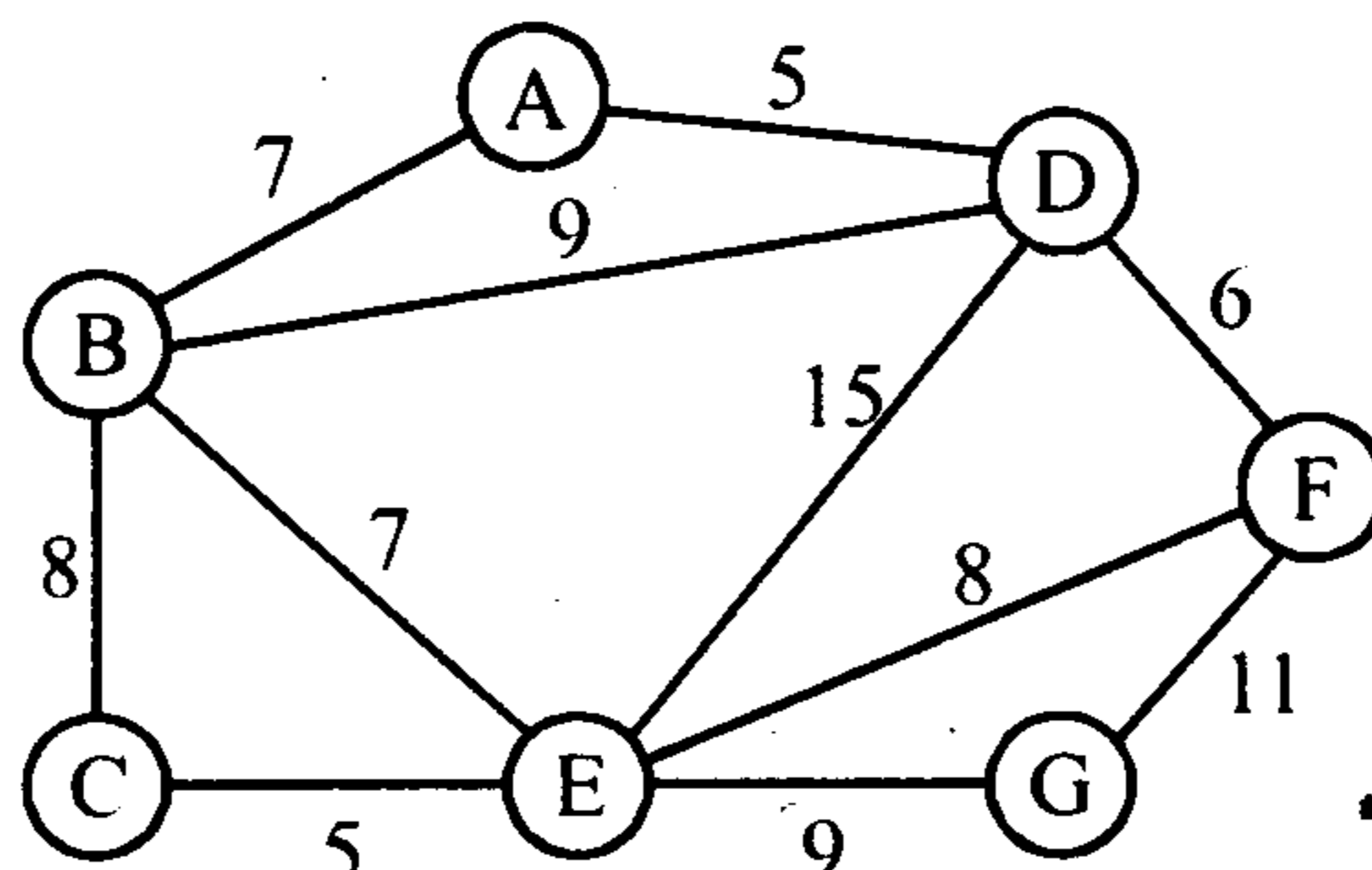


Fig. 2

13. (a) Explain with algorithm how insertion and deletion is performed in a AVL tree. Explain how the tree is balanced after the operation. (16)

**OR**

- (b) (i) Write a procedure in C that will traverse a linked B-tree, visiting all its entries in order of keys (smaller to larger). (10)
- (ii) What is meant by collision in hashing ? Explain the separate chaining collision resolution strategy. (6)
14. (a) (i) Explain with an example breadth first search traversal of a graph. (6)
- (ii) Explain single-source shortest-path problem with an example. (6)
- (iii) What are Euler circuits ? Explain with an example. (4)

**OR**

- (b) What is a minimum spanning tree ? Explain with an example Kruskal's algorithm for constructing a minimum cost spanning tree. (16)
15. (a) (i) Design an algorithm to evaluate the function  $\sin(x)$  as defined by the infinite series expansion  $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \dots\dots$  (8)
- (ii) Write an algorithm to generate and print the first n terms of the Fibonacci series where  $n \geq 1$  the first few terms are 0, 1, 1, 2, 3, 5, 8, 13. (8)

**OR**

- (b) Explain in detail about divide and conquer algorithm and Greedy algorithm with an example for each. (16)