Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 21394

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

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)

(Regulation 2008/2010)

(Common to PTEE 2204 – Data Structures and Algorithms for B.E. (Part-Time) Second/Third Semester – EEE – Regulation 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. 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. Insert 3,2,1,4,5,6,7,16,15 into an empty AVL tree.

6. What is a biconnected graph?

7. Define big O notation.

8. Differentiate NP hard and NP complete problem.

9. Insert the following letters into an empty B-tree of order 5: C N G A H E K Q M F W L T Z.

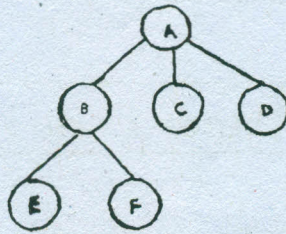10. Find the Breath first search for the following instance of a graph.

Fig. 1

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the implementation of cursor based Linked List with example. (8)

    (ii) Write an algorithm to insert and delete a given node from doubly linked list. (8)

Or

(b) (i) Write the algorithm for inorder, preorder and postorder traversal of a tree. (9)

    (ii) Draw the binary tree whose Inorder traversal is A, B, C, D, E, F, G, H, I and the Preorder traversal is F, B, A, D, C, E, G, I, H. (7)

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.
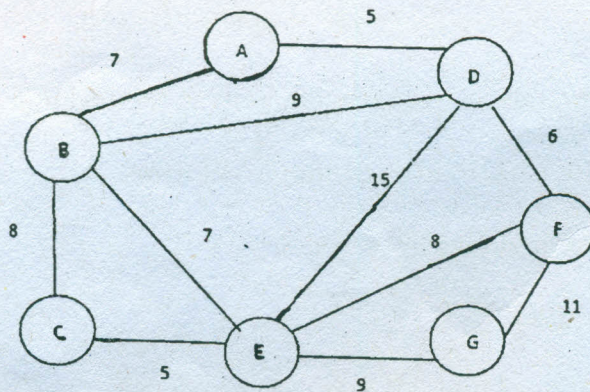

Fig. 2

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.2.

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) What is hashing? Explain any two methods of hashing. What is meant by collision resolution? What are the methods used to resolve collisions?

Or

(b) Explain the principles of dynamic programming. Given a list of words a, am, and, egg, if, the, two and their corresponding probabilities 0.22, 0.18, 0.20, 0.05, 0.25, 0.02, 0.08 respectively, Construct an optimal binary search tree.

15. (a) Write an algorithm for basic operations on stack. Formulate an algorithm to check for balanced parenthesis.

Or

(b) What is a max heap? Explain the steps involved in inserting elements into a heap with an example. Write an algorithm to insert an element into max heap.

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