

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code : 51434

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Third Semester

Electrical and Electronics Engineering

EE 2204/EE 36/080300003/10133 EE 306 — 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 B.E. (Part-Time) — Second Semester, Electrical and Electronics Engineering — Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write an algorithm to insert after node p in a singly linked list.
2. Write the infix and postfix expression of the following Prefix expression $(((* A(+ BC))D)$.
3. Differentiate Tree and a Binary tree.
4. State the applications of trees.
5. State the need for collision resolution and the various techniques used.
6. Define bi-connectivity and articulation points.
7. What is a spanning tree? Name any two algorithms used to find MST.
8. State the purpose of AVL trees and the various rotation methods.
9. Differentiate Dynamic Programming from Divide and Conquer and Greedy method.
10. Calculate the space, time complexity for the following code.

```
{Func (int a [ ] , int n)
{
for(i=1;i<=n;i++)
Sum:=Sum+a[i];
}
```

PART B — (5 × 16 = 80 marks)

11. (a) (i) In a row major representation, find the address of the element A[5,3] of an array A of size[1:8,1:6] considering base address as 100 and word size as 2. (3)
- (ii) Write the algorithm for insertion and deletion in a circular queue. (5)
- (iii) Write an algorithm to search for a number in a singly linked list. (8)

Or

- (b) (i) Explain the advantage of circular queue with an example. (3)
- (ii) Write the algorithm for singly linked list which reverses the direction of links. (5)
- (iii) Write the algorithm to convert infix to postfix expression. Explain with an example. (8)
12. (a) (i) Construct the binary tree from the following preorder and inorder traversal sequence : Preorder : ABCDEF Inorder : CBAEDF (4)
- (ii) Explain the terms Level, Sibling, Degree with respect to trees. (6)
- (iii) How a tree can be converted to a binary tree? Explain with an example. (6)

Or

- (b) (i) Write in short about expression trees. (4)
- (ii) What is a Binary search tree? Explain the algorithm to insert in BST. (6)
- (iii) Write the recursive algorithm for three types of Binary tree traversals. (6)

13. (a) Given the input {4872, 1824, 6174, 4197, 4344, 9677, 1987, 2872, 1231} and a hash function of $h(X) = X(\text{mod})10$ show the resulting
- (i) Separate Chaining hash table. (5)
- (ii) Open Addressing hash table using linear probing. (5)
- (iii) What are the advantages and disadvantages of various collision resolution strategies? (6)

Or

- (b) (i) What is height balanced tree? Construct an AVL tree for the following elements : 3, 2, 1, 4, 5, 6, 7, 16, 15, 14. (8)
- (ii) Discuss the importance of B-tree and explain the procedure for inserting and deleting an element in a B-tree with an example. (8)

14. (a) (i) Explain topological sort algorithm with an example. (8)
(ii) Write the algorithm for BFS and explain with an example. (8)

Or

- (b) (i) Explain finding the minimum cost Spanning tree using Prim's algorithm. (8)
(ii) Write the algorithm for DFS and explain with an example. (8)
15. (a) Explain in detail about Divide and Conquer method and explain with algorithm how Quick sort is performed on an array using this technique. (16)

Or

- (b) (i) With an example, explain how will you measure the efficiency of an algorithm. (8)
(ii) Explain how All pairs shortest path can be found in a graph using Dynamic Programming. (8)
-