

3E1496	Roll No. : _____	Total Printed Pages : 3
	3E1496	
B. E. II Year (Sem. III) Examination, February - 2010 Data Structures & Algorithms (Common for 3EC6, 3EI6 & 3BM6 (Main & Back))		

Time : 3 Hours]

[Total Marks : 80
[Min. Passing Marks : 24

Attempt overall *five* questions. All questions carry *equal* marks.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. _____ Nil _____ 2. _____ Nil _____

- ✍ (a) Why space and time complexity must be considered while writing a code ?
- (b) Explain big oh and omega notations along with their significance.

8+8

OR

- 1 (a) Explain the representation of linked list in a memory.
- (b) Write C function to insert the element x after a given node in a doubly linked list.

8+8

- 2 Suppose a three-dimensional array MAZE is declared using MAZE (2:8, -4:1, 6:10). Suppose the programming language stores MAZE in memory in row-major order and suppose Base (MAZE) = 200 (base address) and there are $W = 4$ words per memory cell. Then calculate :

- (i) Total number of elements of MAZE.
- (ii) The address of element at location MAZE [5, -1, 8].

4+12

OR



- 2 (a) Write a C code to perform matrix multiplication operation.
 (b) Explain the sparse matrices representation and its significance.

8+8

- 3 (a) Convert infix expression X into postfix expression showing stack status after every step in tabular form :

$$X : A + (B * C - (D / E \uparrow F) * G) * H$$

- (b) Explain the tower of Hanoi problem using recursion.

10+6

OR

- 3 What is Queue ? What are the different operations perform on it ? How the queue is implemented using linked list ? Write algorithm for common operation perform on it.

16

- 4 (a) A binary tree T has 9 nodes. The inorder and preorder traversals of T yield the following sequences of nodes :

In order	E	A	C	K	F	H	D	B	G
Pre order	F	A	E	K	C	D	H	G	B

Draw the tree T.

- (b) Differentiate between Binary Search tree and indened-binary search tree.

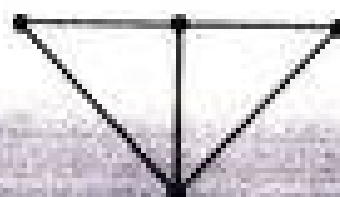
10+6

OR

- 4 (a) Write an algorithm for deleting a node from a binary search tree.
 (b) Explain the insertion of an element in an AVL tree by taking suitable example.

8+8

- 5 (a) Explain Warshall's shortest path algorithm.
 (b) Define spanning tree. Find all spanning trees of the following graph.



8+8

OR



- 5 (a) Suppose an array A contains 8 elements as follows :
77, 33, 44, 11, 88, 22, 66, 55
Sort this array using selection sort.
Show all intermediate steps.
- (b) Differentiate between :
(i) Heap sort and Merge sort
(ii) BFS and DFS.

8+8

