PART – A
UNIT 1
BASIC CONCEPTS

1. What is a pointer variable? Can we have multiple pointer to a variable? Explain Lvalue and Rvalue expression. (June / July08),(dec 2010), (may/jun 2010),(dec09/jan10)

2. Give atleast 2 differences between : i. Static memory allocation and dynamic memory allocation.

ii. Malloc() and calloc().   (June / July08), (dec 2010)

3. i) Write a C program using pass by reference method to swap 2 characters.

ii) Give any 2 advantages and disadvantages of using pointers.   (June / July08)

4. What is an algorithm? Briefly explain the criteria that an algorithm must satisfy.(dec 2011)

5. Write a recursive function to implement binary search.(dec 2011)

6. What is the output of the following code?

```
Int num[5]= { 3,4,6,2,1};
Int *p=num;
Int *q= num+2;
Int *r =&num[1];
Printf("%d%d",num[2],*(num+2));
Printf("%d%d", *p,*(p+1));
Printf("%d%d", *q,*(q+1));
Printf("%d%d", *r,*(r+1));    (dec 2010)
```

UNIT 2
ARRAYS and STRUCTURES

1. How does a structure differ from an union? Mention any 2 uses of structure. What is a bit field? Why are bit fields used with structures? (June / July08),(dec 2010), (may/jun 2010)

UNIT 3
STACKS AND QUEUES

1. How do you define a data structure? How is stack a data structure? Give a C program to construct a stack of integers and perform all the necessary operations on it. (June / July08), (dec 2011), (dec 2010), (may/jun 2010), (dec09/jan10)

2. Write an algorithm to convert a valid infix expression to a postfix expression. Also evaluate the following suffix expression for the values: A=1 B=2 C=3.

AB+C-BA+C$-   (dec 2011),(June / July08), (dec 2010), (may/jun 2010), (dec09/jan10)

3. What is the advantage of circular queue over ordinary queue? Mention any 2 applications of queues. Write an algorithm CQINSERT for static implementation of circular queue. (June / July08),(dec 2010)

4. Explain the working of a simple queue. (may/jun 2010)

UNIT 4
LINKED LISTS

1. List out any two applications of linked list and any two advantages of doubly linked list over singly linked list. (June / July08)(dce 2011)

2. Write a C program to simulate an ordinary queue using a singly linked list. (June / July08), (dec 2011), .(dec 2010)

3. Give an algorithm to insert a node at a specified position for a given singly linked list. (June / July08), may/jun 2010)

4. Write a C program to create a linked list and interchange the elements to the list at position m and n and display contents of the list before and after interchanging the elements. (June / July08)

5. Briefly explain the structures of different types of linked lists. Write a c function to count number of elements present in a singly linked list.(dec 2010)

6. Write a c program to perform the following operations on doubly linked list : i) insert a node ii) delete a node. (dec 2010)

7. Write short note on circular lists.(dec 2010)

PART – B
Unit 5
TREES – 1

1. Define the following:
i) Binary tree
ii) Complete binary tree
iii) Almost complete binary tree
iv) Binary search tree
v) Depth of a tree (June / July08),(dec 2010),(may/jun 2010), (dec09/jan10)

2. Given the following graph, write the inorder, preorder and postorder traversals. (June / July08)
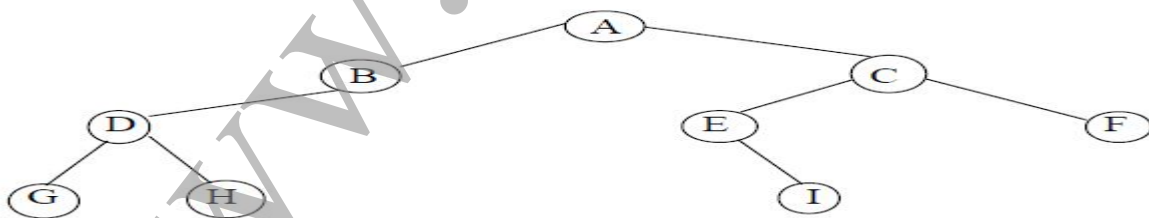
3. In brief describe any 4 applications of trees. (June / July08)

4. Construct a binary tree from the traversal order given below:
PREORDER = A B D E F C G H L J K
INORDER = D B F E A G C L J H K (June / July08)

5. Construct a binary tree for : $((6+(3-2)*5)^2+3)$.(June / July08)

6. What is threaded binary tree? Explain right in and left in threaded binary trees. (June / July08), (dec 2010)

7. (dec 2011)

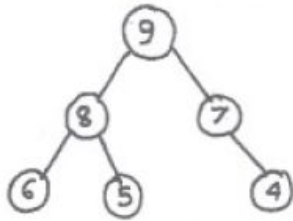With reference to the Fig.Q5(a), answer the following:

Fig.Q5(a)

i)   Is it a binary tree?
ii)   Is it a complete tree?
iii)   Give the preorder traversal.
iv)   Give the inorder traversal.
v)   Give the postorder traversal
vi)   Give the list notation (using pairs of round brackets)
vii)   Where will be the left child of node 4 pointing to, if it is converted to a threaded b-tree?
viii)   Is it a max heap?

8. Write c function for the following tree traversals: i)inorder ii)preorder iii)postorder(dec 2010)

Unit 6
TREES – 2, GRAPHS

1. Explain the following with an example: i) forest ii) graph iii) winner tree .(dec 2011)

2. Describe the binary search tree with an example. Write a iterative function to search for a key value in a binary search tree. .(dec 2011)

UNIT 7
PRIORITY QUEUES

1. What is binomial heap? Explain the steps involved in the deletion of min element from a binomial heap.(dec 2011)
2. Define Fibonacci heap. Briefly explain the different types. .(dec 2011)
3.Explain priority queue?(dec09/jan10)

UNIT-8
EFFICIENT BINARY SEARCH TREES

1. Describe the following with an eg: i) height balanced trees ii) optimal bst.(dec 2011)
2. Explain the Red-black tree. State its properties .(dec 2011)
3. What is splay tree? Briefly explain the different types of splay trees. .(dec 2011)