



**S.E. (Comp.) (Semester – IV) (Revised 07-08) Examination, May/June 2010**  
**DATA STRUCTURES**

Duration : 3 Hours

Total Marks : 100

**Instructions :** i) Answer any five questions, at least one from each Module.  
ii) Make suitable assumptions, wherever necessary.

## MODULE – I

1. a) Explain declaration, initializing and accessing of 2D array elements with an example.
- b) Explain four commonly used functions from string.h header file.
- c) What is the output of following programs.

i) void main

```
int num=50,*temp,total= 0;
temp=&num;
*temp=200;
temp=&total;
*temp=num;
printf(“%d%d%d”,num,*temp,total);
```

```
ii) #include<stdio.h>
```

```
main( )
```

1

```
int a[7]={ 1,2,3,4};
```

```
printf("%d%d%d%d%d\n",(*a),*(&*a),a[*a*0],*a);
```

3

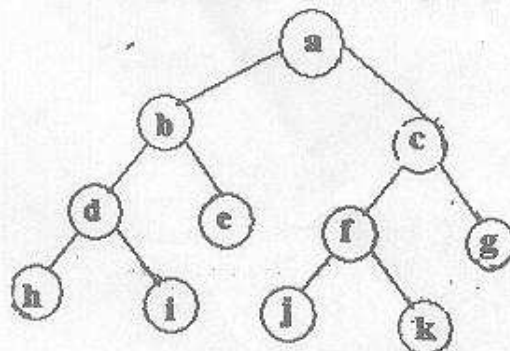
- d) Explain structure with an example.



2. a) Explain recursion with the example of factorial function in C. 4
- b) Comment on efficiency of recursion. 4
- c) Explain the code to insert and delete nodes in dynamic implementation of Linked list. 8
- d) Compare the dynamic and array representation of linked list. 4

## MODULE – II

3. a) Define stack. State and explain the code for checking empty or overflow conditions of stack. 5
- b) Write short notes on : 6
  - i) queues
  - ii) circular queues
  - iii) priority queues.
- c) Write a C program to perform push and pop operations on a stack. 6
- d) Define binary trees, strictly binary trees and complete binary tree. 3
4. a) Explain the operations used in constructing a binary tree. 3
- b) Explain balanced trees with an example. 4
- c) State the steps in the three traversal methods of a binary tree. Perform them for following tree. 8



- d) Explain with an example and diagrams the structure for tree node using array implementation and where all sons of a node or linked together in a linear list. 5



MODULE – III

5. a) Explain the following terms with respect to graphs. 8
- i) Digraph ii) Degree
  - iii) Path of length k iv) Successor and predecessor
- b) Explain the declaration for a weighted graph with fixed number of nodes. 4
- c) When is a graph called connected ? What is connected component.  
Explain with an example. 6
- d) What is spanning tree. 2
6. a) Explain briefly the two principle methods of automatic list management. 5
- b) Why is dynamic memory management required ? Explain with an example. 4
- c) State the First-Fit allocation algorithm. 5
- d) Compare the First-Fit and Best-Fit methods with an example. 6

MODULE – IV

7. a) Write a C code that implements eval function to evaluate the postfix expression using stack. 8
- b) State and explain the Josephus problem. 4
- c) Write a C program to perform insertion sort. Give an example. 8
8. a) Explain binary search method for the following array input.  
1, 3, 4, 5, 17, 18, 31, 33 5
- b) Construct the binary search tree for the following input.  
14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, 5 4
- c) Define hashing, rehashing and chaining. 3
- d) Explain the general coalesced hoshing and varied insertion coalesced hashing. 8