

[Total No. of Questions: 12]

[Total No. of Printed Pages: 5]

**UNIVERSITY OF PUNE**

**[4362]-225**

**S.E. (I.T.) Examination-2013**

**DATA STRUCTURES AND FILES (2008 Course)**

**[Time: 3 Hours]**

**[Max. Marks: 100]**

**Instructions:**

- (i) Answer Question Nos. **1** or **2**, **3** or **4**, **5** or **6** from **Section-I** and Question Nos. **7** or **8**, **9** or **10** and **11** or **12** from **Section-II**.
- (ii) Answers to the two Sections should be written in separate answer-books.
- (iii) Neat diagrams must be drawn wherever necessary.
- (iv) Figures to the right square brackets indicate full marks.
- (v) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- (vi) Assume suitable data, if necessary.

**SECTION-I**

- Q.1
- (a) What is file? Explain the different types of file organization? [8]
  - (b) What is collision? Explain linear probing with and without replacement for student database with roll numbers: [8]  
55, 88, 26, 37, 70, 60, 62, 41, 86, 64  
Hash Table Size = 11 and Hash Function = Key mod 11

**OR**

- Q.2** (a) Write a pseudo code to perform the following operations on Direct Access files: [8]
- (i) To modify record with given key value
  - (ii) To delete record with given key value
  - (iii) Insert record at specific location with given key value
- (b) What do you understand by Hash Table? Why they came into existence? Discuss different Hash functions. [8]

- Q.3** (a) What is stack? Explain the different ways of implementation with application. [8]
- (b) Explain Multistacks. Convert the following expression into postfix form using stack representation of each step. [8]
- $((A + B) * C - (D - E)) * (F + G)$

**OR**

- Q.4** (a) Write a pseudo code to evaluate following postfix expression: [8]
- 6 2 3 + - 3 8 2 / + \* \* 3 +
- (b) What is importance of stack in recursion? Explain importance of implicit and explicit stack. [8]

- Q.5** (a) What is priority queue? Explain insert and delete operations in detail using multidimensional array implementation. [8]

- (b) Write a pseudo code to perform insertion and deletion of element in a Circular queue using linked list representation [6]
- C) Explain applications of Queue. [4]

**OR**

- Q.6** (a) What is Queue? Explain types of queues with application. [8]
- (b) What is dequeue? Write a pseudo code to perform insertion and deletion of element in a Linked implementation of dequeue. [10]

## **SECTION-II**

- Q.7** (a) What is Binary search tree? Write a pseudo for deletion and insertion of a node in Binary search tree. [8]
- (b) Write a non recursive function in C to traverse a binary tree in inorder traversal and preorder traversal. [8]

**OR**

- Q.8** (a) What is threaded binary tree? Explain with example. [8]
- (b) For a binary tree, the inorder and postorder traversal is as follows: [8]

Inorder:- H,D,I,B,E,A,J,F,K,C,G

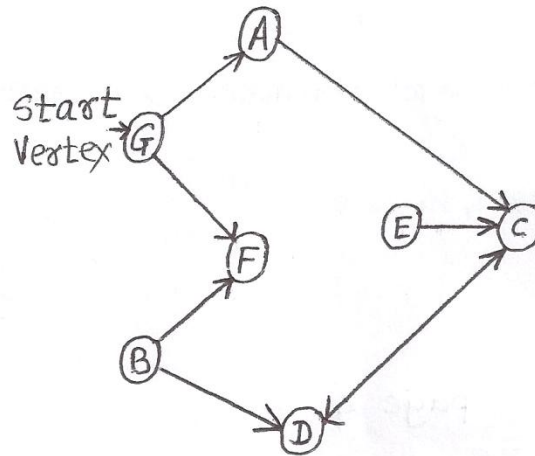
Postorder:- H,I,D,E,B,J,K,F,G,C.A

Create a binary tree & write pseudo code to print non leaf nodes of the tree and find height of the tree.

- Q.9** (a) Explain different types of representation of graphs with [4]

example.

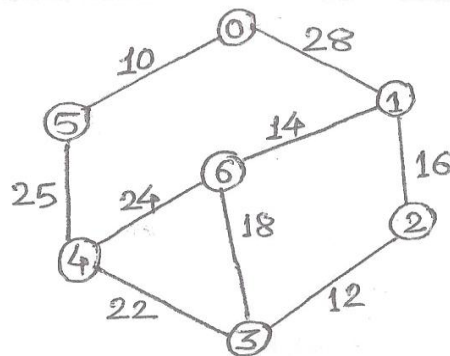
- (b) Write a non recursive pseudo code to perform DFS and BFS traversal for following a graph: [10]



- (c) Define: [4]
- (i) Complete graph
  - (ii) Path

**OR**

- Q.10** (a) What is topological sorting? Explain with example. [6]
- (b) Write a pseudo 'C' code to find minimum spanning tree using Kruskal's algorithm for following graph: [8]



- (c) What is a minimal spanning tree? How it is different from the shortest path sequence of a given graph? Justify your answer with an example. [4]

- Q.11** (a) Construct an AVL tree by inserting the following elements in the order of their occurrence. Show the balance factor and type of rotation at each stage. [12]

**55,66,77,15,11,33,22,35,25,44,88,99**

- (b) Write a note on OBST [4]

**OR**

- Q.12** (a) What is Heap? Sort the following numbers in ascending order using heap sort. [8]

**12,2,16,30,8,28,4,10,20,6,18**

- (b) Draw a Huffman's tree for the given data set and find the corresponding Huffman codes: [8]

Data	Frequency
A	15
B	6
C	7
D	12
E	25
F	4
G	6
H	1
I	15