

May-June-2011  
SE-IT Sem-II

Total No. of Questions—12]

[Total No. of Printed Pages—7

**[3962]-215**

**S.E. (Information Technology) (Second Semester)**

**EXAMINATION, 2011**

**DATA STRUCTURES AND FILES**

**(2008 PATTERN)**

**Time : Three Hours**

**Maximum Marks : 100**

- N.B. :—** (i) Answer *three* questions from Section I and *three* questions 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 indicate full marks.
- (v) Assume suitable data, if necessary.

**SECTION I**

1. (A) Explain the concept of command line arguments with suitable examples. [6]
- (B) Distinguish between logical and physical deletion of records and illustrate it with an example. [6]
- (C) Write an algorithm for linear probing with replacement used as a technique for synonym resolution. [6]

P.T.O.



Or

2. (A) For the given set of values 9, 45, 13, 59, 12, 75, 88, 11, 205, 64 create a hash table and resolve collision using linear probing with and without replacement. [8]
- (B) Write a note on Rehashing. [4]
- (C) What is direct access file ? Write pseudocode for performing primitive operations on direct access file. [6]
3. (A) Write an algorithm to convert an infix expression to postfix form and explain with an example. [8]
- (B) Implement the stack using array to perform the following operation :
- (i) Push
  - (ii) POP
  - (iii) Display top
  - (iv) Stack empty
  - (v) Stack full
- [8]

Or

4. (A) Explain the concept of implicit and explicit stack and give its importance. [4]
- (B) Write a note on Multistack. [4]
- (C) Write a C function to evaluate prefix expression and solve the following : [8]

+ - \$ ABC \* D \*\* EFG



5. (A) How do circular queues help to overcome the disadvantages of linear queues ? [4]
- (B) Define Multiqueues. [2]
- (C) What is priority queue ? How to represent it using linked organization ? Explain its any *one* application in detail. [10]

Or

6. (A) Specify which of the following applications would be suitable for a first-in-first-out queue and Justify your answer : [4]
- (i) A program is to keep track of patients as they check into a clinic, assigning them to doctors on a first come, first-served basis.
- (ii) An inventory of parts is to be processed by part number.
- (iii) A dictionary of words used by spelling checker is to be created.
- (iv) Customers are to take numbers at a bakery and be served in order when their numbers come-up.
- (B) Explain the implementation of circular queue using sequential organization. [6]
- (C) Explain the implementation of simple queue using linked organization. [6]



## SECTION II

7. (A) Define and give example of in-order threaded binary tree. [2]
- (B) Write an algorithm to accept a postfix expression and construct its binary tree and perform recursive and non-recursive in-order traversal of the tree. [10]
- (C) Suppose the following sequences list the nodes of a binary tree T in pre-order and in-order, respectively. Draw the tree : [6]

### Pre-order

### In-order

A

B

B

C

C

A

D

E

E

D

F

G

G

H

H

F

I

I

*Or*

8. (A) What is the necessity of converting a tree into binary tree? Show the conversion of tree with at least 12 nodes into a binary tree and list down the steps for the same. [6]



(B) Write an algorithm to delete a node from a binary search tree. [6]

(C) Write a recursive algorithm to find the mirror image of binary tree and explain it with a suitable example. [6]

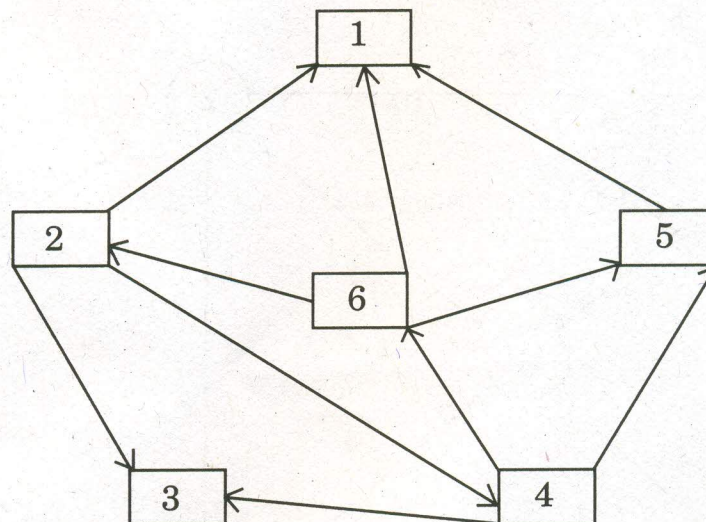
9. (A) For the following graph, obtain :

(i) the in-degree and out-degree of each vertex;

(ii) its adjacency matrix;

(iii) its adjacency list representation;

(iv) its strongly connected components. [8]



(B) Write a note on Kruskal's Algorithm. [6]

(C) Define MST with an example. [2]

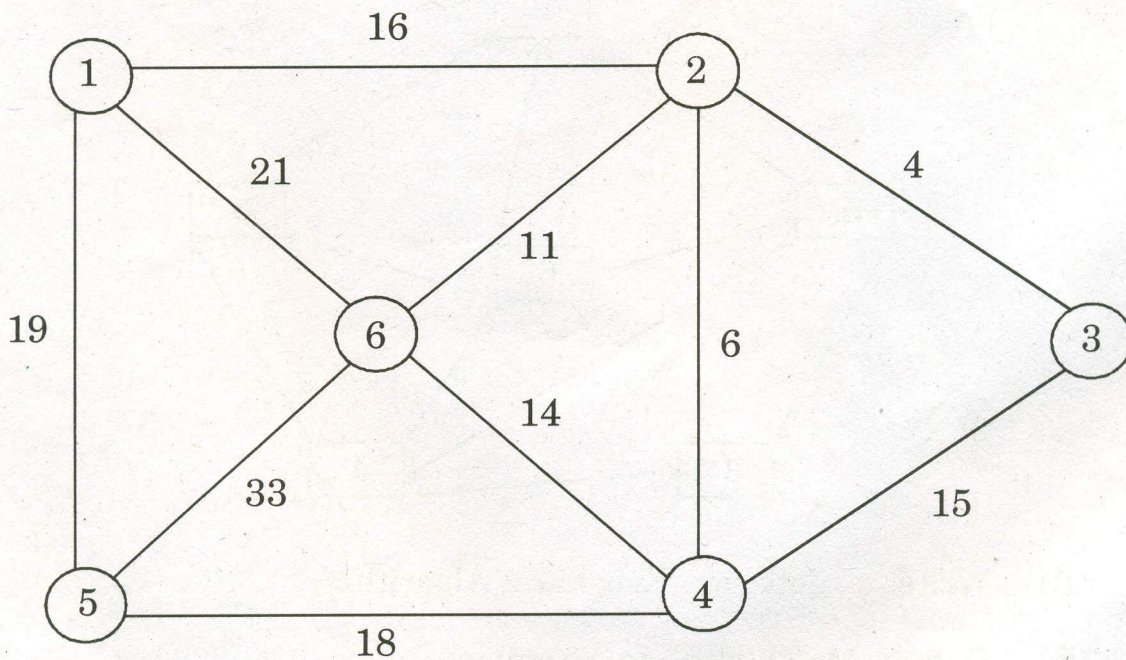


Or

10. (A) Write pseudocode for Prim's method of finding MST of graph. Find MST for the graph having the weight matrix in Figure below : [8]

$$W = \begin{matrix} & \begin{matrix} X & Y & S & T \end{matrix} \\ \begin{matrix} X \\ Y \\ S \\ T \end{matrix} & \begin{bmatrix} 0 & 0 & 3 & 0 \\ 5 & 0 & 1 & 7 \\ 2 & 0 & 0 & 4 \\ 0 & 6 & 8 & 0 \end{bmatrix} \end{matrix}$$

- (B) Write the pseudocode for finding MST using Prim's algorithm. Find the same for the graph given below : [8]





11. (A) Explain the four rotations performed in AVL tree with an example for each. [8]

(B) Sort the following numbers using heapsort : [8]

48, 0, -1, 82, 108, 72, 54

Show the sorting stepwise.

*Or*

12. (A) Explain the mechanism to create Huffman's tree and use it for encoding and decoding. Assume suitable data. [6]

(B) Obtain an AVL tree by inserting one integer at a time in the following sequence :

150, 155, 160, 1115, 110, 140, 120, 145, 130, 147.

Label the rotation at each stage. [10]