b) Define the terms.

i) Edge and vertices

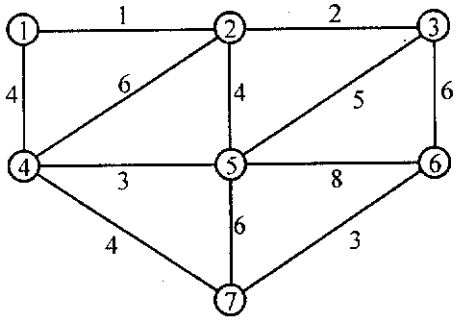
ii) Acyclic graph

iii) Degree of a graph

iv) Path and circuit.

OR

10. Consider the given graph :



i) Find the adjacency matrix and adjacency list representation.

ii) Using prim's algorithm find the minimal spanning tree.

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Roll No .....

CS/IT - 305

B.E. III Semester

Examination, December 2013

Data Structures

Time : Three Hours

Maximum Marks : 70

Note: Total no. of questions 10. Attempt one question (including all parts) from each unit. All questions carry equal marks.

Unit - I

1. a) What do you mean by algorithm complexity? Discuss a priori analysis and posteriori testing of an algorithm.

   b) Explain different nonprimitive data structures and the operations associated with them.

OR

2. a) Write an algorithm to obtain the sum of the first ten terms of the following series using recursion. Also give iterative algorithm.

$$x - x^3/3! + x^5/5! - x^7/7! + x^9/9! \ldots\ldots$$

   b) Write the advantages and disadvantages of array and linked list data-structures.

Unit - II

3. a) Write a function that creates a new linear linked lists by selecting alternate elements of a given linear linked list.

b) Convert the following expressions into postfix and prefix form.

i) $(A+B)*C/D+E\uparrow F\uparrow G$

ii) $B*(-C)*D+A\uparrow D$

OR

4. a) Explain the following :

i) Multiple stacks

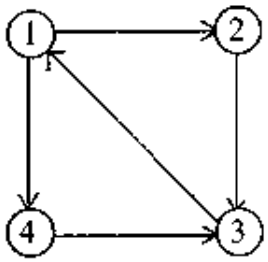
ii) D-queue

iii) Multidimensional array.

b) Discuss about the implementation of fixed size block and variable size block dynamic memory allocation.

Unit - III

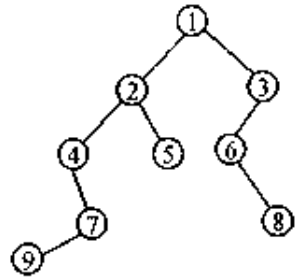
5. a) Obtain the adjacency-matrix, adjacency list and adjacency multilist representations of the following graph.



b) Create B-Tree of order 5 from the following lists of data items : 20, 30, 40, 10, 5, 40, 50, 60, 55, 65.

OR

6. a) What is threaded binary tree? Explain, and create the threaded binary tree for the given tree.



b) Write the recursive Inorder, Preorder and Postorder tree traversal algorithms.

Unit - IV

7. a) Compare merge sort and quick sort algorithms in terms of storage space and time required to execute them.

b) What is min heap? Create the min heap for the given data set:

6, 15, 50, 3, 33, 45, 40, 80, 80, 10

OR

8. a) What are the different types of search techniques? Explain the one which is more efficient among them.

b) Explain the following :

i) Symbol table

ii) Hash table

iii) Dynamic tree table.

Unit - V

9. a) Write an algorithm to find all the connected components of a graph. Also give the time analysis of your algorithm.