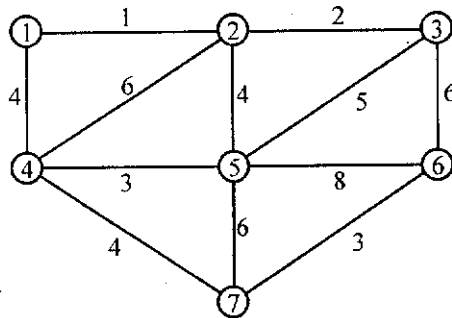


b) Define the terms.

- 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.

\*\*\*\*\*

Roll No .....

**CS/IT - 305****B.E. III Semester**

Examination, December 2013

**Data Structures****Time : Three Hours**rgpvonline.com **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.

$$x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} \dots\dots\dots$$

- 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

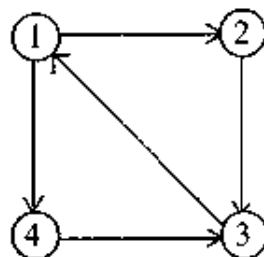
4. a) Explain the following :

- Multiple stacks
- D-queue
- Multidimensional array.

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

### Unit - III

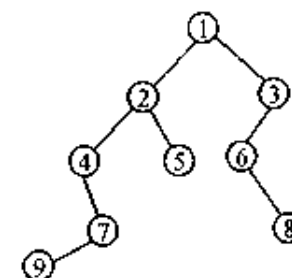
5. a) Obtain the adjacency-matrix, adjacency list and adjacency multilist representations of the following graph.



- 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 :
- Symbol table
  - Hash table
  - 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.