Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **B.Tech**
BE2106

2nd Semester Back Examination 2015-16
DATA STRUCTURE USING 'C'
BRANCH: ALL
Time: 3 Hours
Max Marks: 70
Q.CODE: W407

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: **(2 x 10)**

a) If the base address of int a[4][6] is 100, calculate the address of a[2][4] in both row major order and column major order (assume the size of int to be four bytes).

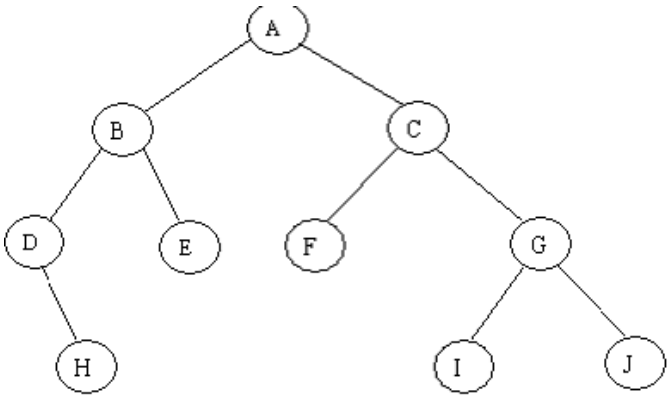
b) The following operations are performed on an empty stack. push(1), push(2), pop(), push(3),push(4), pop(), push(8), push(7), push(10), pop(), pop(). Write the sequence of popped items.

c) Write the segment of the code in C to check "over flow" and "under flow "condition in circular queue using array.

d) Represent the following polynomial using linked-list.

$$5x^3y^4-11x^2y^2+3xy^2-9x+5.$$

e) a) Obtain pre-order and post-order traversal of the given Binary Tree.



f) What is the infix form of the following prefix expression.

/ - a b + c d

g) Construct an expression tree of the following expression.

m= a - b / c + e * f

h) For an undirected graph G with "n" vertices and "e" edges, find the sum of the degrees of each vertex.

i) Write a recursive algorithm for binary search.

j) What is Hashing? Explain the division method hash function.

Q2 **a)** What is data structure? Briefly discuss the classification of data structure. **(5)**

b) What is sparse matrix? Discuss the 3-tuples method of representing a sparse matrix with example. **(5)**

Q3 **a)** Write a menu driven C program to insert a node at the end of a single linked list and display the linked list. **(5)**

b) What is circular linked list? Write a C program to create and traverse a circular linked list. **(5)**

Q4 **a)** Convert the following infix expression to postfix using stack. **(5)**

$$Q = [(A - B) * (C + D) \uparrow (E * F)] + (G + H) / I$$

b) Write algorithms for push and pop operations on a linear queue. **(5)**

Q5 **a)** construct a binary tree from the following traversals. **(5)**

Pre order sequence **A, B, D, E, F, C, G, H, I**

In order sequence **E, D, F, B, A, G, C, H ,I**

b) Create a binary search tree from the following data. **(5)**

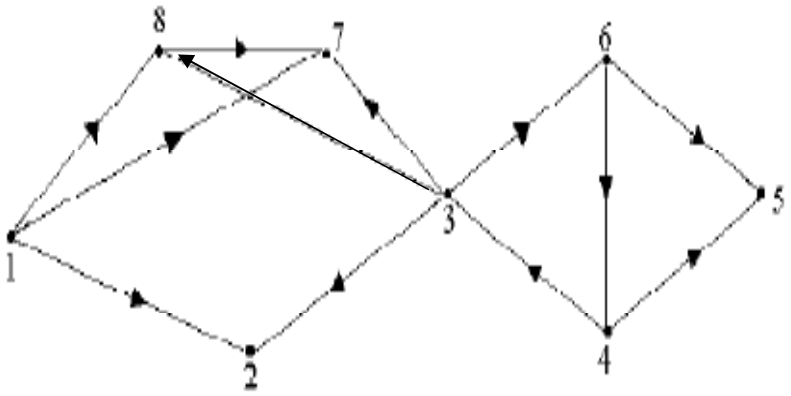
50,19,90,30,80,20,1,40,70,10,5,7

Q6 **a)** Insert the following strings into an empty AVL tree in the given order. **(5)**

Jan, feb, mar, apr, may, jun, jul, aug, sep, oct, nov, dec.

b) Write the insertion sort algorithm. **(5)**

Q7 Represent the following graph in adjacency matrix and show the result of BFS and DFS traversals on it using vertex 3 as source. **(3+7)**



Q8 **a)** Construct a max-heap using the following data **(5)**

66, 33, 40, 20, 50, 99, 60, 10, 77, 32, 42, 65.

b) What is collision in hashing? Briefly Discuss the methods to handle collisions. **(1+4)**