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10CS/IS35

Third Semester B.E. Degree Examination, January 2013
Data Structures with C

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What are pointer variables? How to declare a pointer variable? **(05 Marks)**
b. What are the various memory allocation techniques? Explain how memory can be dynamically allocated using malloc ( )? **(10 Marks)**
c. What is recursion? What are the various types of recursion? **(05 Marks)**

2 a. What is the difference between int *a and int a[5] and int *[5]? **(06 Marks)**
b. What is a structure? How to declare and initialize a structure? **(06 Marks)**
c. Write a program in C o read a sparse matrix of integer values and search this matrix for an element specified by the user. **(08 Marks)**

3 a. Define stack. List the operations on stack. **(08 Marks)**
b. Obtain the postfix and prefix expression for $(((A+(B-C)*D)\hat{}E)+F)$. **(06 Marks)**
c. What is system stack? How the control is transferred to or from the function with the help of activation record? **(06 Marks)**

4 a. What is a linked list? Explain the different types of linked list with diagram. **(10 Marks)**
b. Write a function to insert a node at front and rear end in a circular linked list. Write down sequence of steps to be followed. **(10 Marks)**

PART – B

5 a. What is a tree? Explain: i) root node, ii) child, iii) siblings, iv) ancestors using structure representation. **(06 Marks)**
b. What is a binary tree? How it is represented using array and linklist? **(10 Marks)**
c. What is a heap? Explain the different types of heap? **(04 Marks)**

6 a. What is a binary search tree? Draw the binary search tree for the following input:
14, 5, 6, 2, 18, 20, 16, 18, -1, 21. **(10 Marks)**
b. What is a forest? Explain the different method of traversing a tree with following tree:

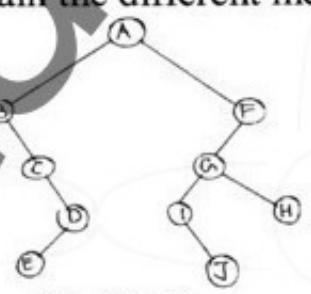

Fig.Q6(b) **(10 Marks)**

7 a. What is priority queue? Explain the various types of priority queues. **(08 Marks)**
b. Write short notes on: i) Binomial heaps, ii) Fibonacci heap. **(06 Marks)**
c. What is leftist tree? Explain different types of leftist trees. **(06 Marks)**

8 a. What is an AVL tree? Write the algorithm to insert an item in to AVL tree. **(08 Marks)**
b. Write short notes on: i) Red-Black tree, ii) Splay trees. **(06 Marks)**
c. Explain the different types of rotations of an AVL tree. **(06 Marks)**

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