Total No. of printed pages = 6

CS 131602

Roll No. of candidate | | | | | | | | | | |

2017

B.Tech 6th Semester End-Term Examination

DATA STRUCTURES

Full Marks–100 Pass Marks–35 Time–Three hours

The figures in the margin indicate full marks for the questions.

Notes : (i) Attempt *all* questions.

(ii) Make suitable assumptions wherever necessary.

(iii) Notions/symbols used have usual meaning.

1. Answer the following questions : 2×6=12

(a) What is a circular singly linked list ?

(b) What is doubly linked list ? Explain with the help of node structure.

[Turn over

(c) What is the number of edges in k-regular graph with n number of vertices ?

(d) What is Minimal Spanning Tree ?

(e) Define : pendent node and Clique.

(f) Explain sparse matrix using an example.

2. Answer the following questions : 3×6=18

(a) What is recursion ? Write two types of recursion with examples.

(b) Briefly describe Breadth First Search with an example.

(c) What do you mean by abstraction and abstract data type (ADT) ?

(d) What is the basic difference between array and stack ?

(e) What is 'priority queue' ?

(f) Differentiate between weakly connected and strongly connected components.

3. Answer the following questions : (any *eight*) 8×5=40

(a) Write Prim's algorithm.

(b) Explain the algorithm for Tower of Hanoi.

(c) For stack and queue, write the underflow and overflow conditions.

(d) Give the linked list representation of polynomial, sparse matrix and queue.

(e) Choose the correct options : 1×5=5

(i) In Input restricted queue :

(a) insertion takes place at one end and deletion at both the end.

(b) insertion and deletion take place at one end only.

(c) insertion and deletion take place at both ends.

(d) deletion takes place at one end and insertion at both the end.

(ii) Which of the following is NOT a Linear Data Structure :

(a) Array

(b) Stack

(c) Linked list

(d) None of the above.

(iii) The term "push" and "pop" is related to the :

(a) Array

(b) Lists

(c) Stacks

(d) All of the above.

(iv) Which of the following is related to queue ?

(a) FIFO lists

(b) LIFO list

(c) Piles

(d) Push-down lists.

(v) When new data are to be inserted into a data structure, but there is no available space ; this situation is usually called :

(a) Underflow

(b) Overflow

(c) Housefull

(d) Saturated.

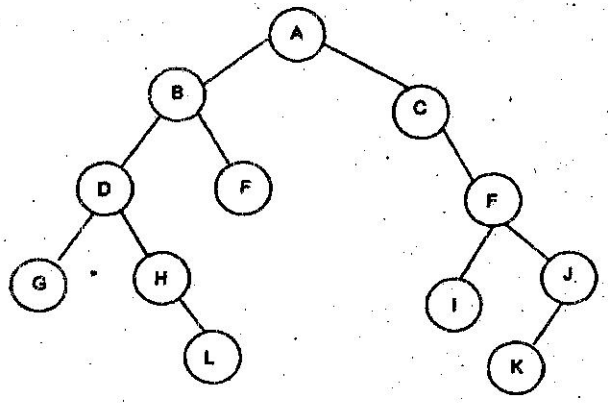
(f.) Convert following infix expression to the prefix expression using stack :

(A+B) * C – (D–E) * (F+G)

(g) Write a C- function to implement insertion at desired location in a singly linked list.

(h) Write an algorithm for infix to postfix conversion.

(i) What is binary tree ? Write the pre order, post order traversal of tree below : 1+2+2=5



(j) (i) Give the difference between array and linked list. 3

(ii) Describe Isomorphism and Forest. 2

4. Answer any *three* of the following questions : 3×10=30

(a) Construct a B-tree of order 4 with following data : 34, 12, 21, 3, 18, 67, 44, 87, 47, 54, 56, 17, 8, 30, 45, 5, 7 After constructing the B-tree, delete the following nodes (data) : 18, 67, 54, 8, 45, and 5 from the constructed B-tree.

(b) Construct AVL tree with the following data : 55, 24, 12, 65, 90, 100, 45, 5, 2, 15 and after constructing AVL tree delete the following data : 65, 12, 90, 55.

(c) Explain the algorithm for QUICK sort and give a suitable example.

(d) (i) Write the algorithm for binary search.

5+5=10

(ii) Sort the numbers below using radix sort : 349, 654, 914, 127, 542, 493, 515, 811, 909.

(e) Construct a minimum spanning tree of the given graph using Prin's algorithm start from vertex D :

10