3E1138

Roll No. Total No of Pages: 3

3E1138

B. Tech. III - Sem. (Main) Exam., Dec. - 2018
PCC Computer Science & Engineering
3CS4 – 05 Data Structures and Algorithms
CS, IT

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, selecting five questions from Part B and four questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What are the applications of stack?

Q.2 Write down the recursive algorithm to solve tower of Hanoi problem?

Q.3 What are the differences between normal queue and circular queue?

Q.4 Write down the advantages and disadvantages of singly linked list?

Q.5 Write down the asymptotic upper bound of bubble sort, selection sort, quick sort and heap sort?

Q.6 Write down the algorithm of binary search.

Q.7 Write down the differences between B tree and B+ tree.

Q.8 Write down the differences between BFS and DFS.

Q.9 What do you mean by spanning tree?

Q.10 Write short note on hash functions.

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Translate infix expression into its equivalent postfix expression:

(a) (A - B) * (D/E)

(b) (A + B↑D) / (E - F) +G

Q.2 Write down the algorithm for insertion of a node in the middle of doubly linked list.

Q.3 Sort the following elements using quick sorting algorithm.

< 2, 10, 9, 6, 1, 15, 5, 11 >

Q.4 A Binary tree T has 9 nodes, The in order and pre order traversal for T yield the following sequences of nodes:

IN order: E A C K F H D B G

Pre order: F A E K C D H G B

Draw the tree T

Q.5 What are the different AVL tree rotations? Explain with suitable example.

Q.6 Write down the algorithm to important stack using linked list.

Q.7 Suppose a binary tree T is in memory write a recursive procedure which finds the depth Dp of T.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]

Attempt any four questions

Q.1 Write a C program to perform following operations over singly linked list.

(a) Create

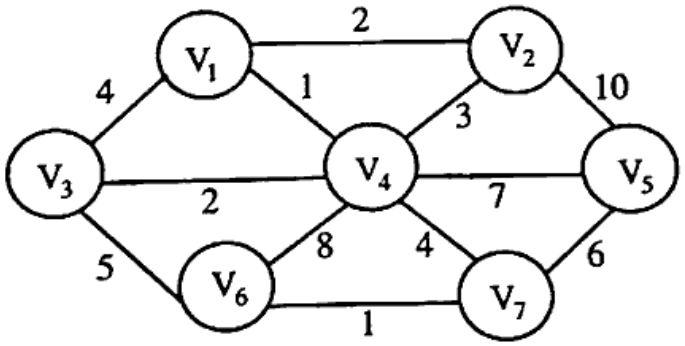
(b) Traversal

(c) Insertion of node at user specified location

Q.2 Write down the algorithm of counting sorting and sort following elements using counting sorting.

< 2, 1, 3, 9, 6, 1, 3, 9, 6, 5, 6, 8, 5, 3 >

Q.3 Obtain minimal spanning tree using prim's and Kruskal's algorithm on the following graph



Q.4 Write a C program to implement merge sorting.

Q.5 What do you mean by hash functions? Explain common hashing functions along with all address calculation techniques.
