

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**ersahilkagyan.com**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. NIL2. 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.

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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) $(A + B \uparrow D) / (E - F) + G$
- 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.
- $\langle 2, 10, 9, 6, 1, 15, 5, 11 \rangle$
- Q.4 A Binary tree T has 9 nodes, The in order and pre order traversal for T yield the following sequences of nodes: <http://www.rtuonline.com>
- 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.

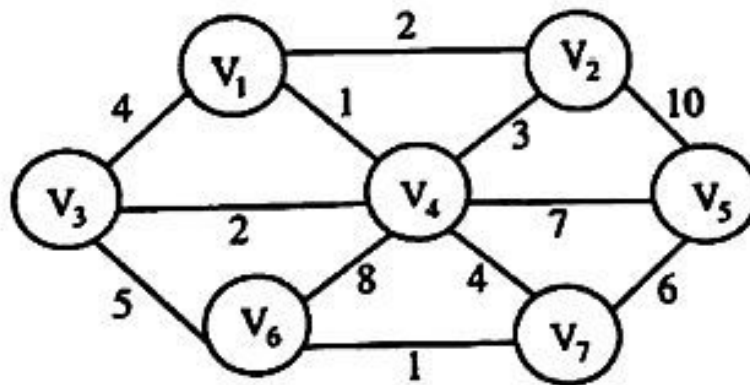
- (a) Create
- (b) Traversal
- (c) Insertion of node at user specified location

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

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< 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.
