KUMARAGURU
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B.TECH. DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Third Semester

INFORMATION TECHNOLOGY

U18ITI3202**:** Data Structures

COURSE OUTCOMES

CO1:   Explain various sorting algorithms.
CO2:   Explain various searching algorithms.
CO3:   Explain the concepts of List, Stack and queue.
CO4:   Explain the concepts of trees and graphs.
CO5   Implement the given problem using Linear and Non-Linear Data Structures.

**Time: Three Hours**   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1. Apply bubble sort for the following elements {9,1,3,5,4,8} and mention the passes involved.   CO1   [K3]

2. Differentiate linear search and binary search.   CO2   [K2]

3. Convert the following infix expression ((A-(B+C))*D)/(E+F) to prefix and postfix form using stack.   CO3   [K3]

4. IIustrate the applications areas of stack and queue with an example.   CO5   [K2]

5. Draw the open hash table for the given element 345,75,78,65,43,21,11,14,6,0   CO5   [K3]

6. Discuss about the tree traversal algorithm for the following tree structure and also find inorder, preorder, postorder.   CO4   [K3]
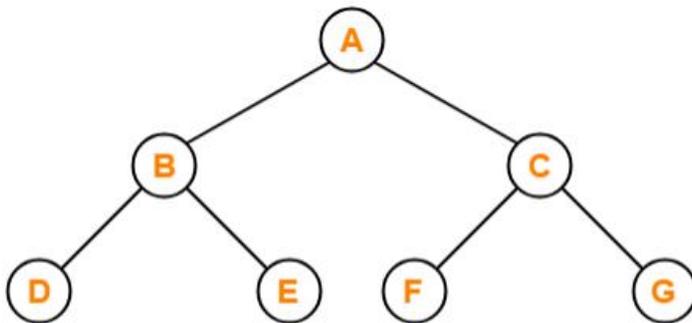

7. Illustrate the algorithm for insertion sort with an example.   CO1   [K2]

8. Compare the depth first search and breadth first search.   CO4   [K2]

| 9. | Explain the graphs and its representation with example. | | CO4 | [K2] |

9. Explain the graphs and its representation with example. CO4 [K2]

10. Sketch the circularly linked list for the following elements Insert 44,55,78 delete 78 then insert 67,23 CO3 [K2]

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Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

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11. a) Elaborate the quick sort algorithm for the following elements arr[] = { 2, 1, 6, 10, 4,0, 3, 9, 7} 8 CO1 [K3]

    b) i)Implement   Merge   sort   algorithm   for   the   following   elements 8,23,4,7,5,2,3,1,34,0,12 8 CO1 [K3]

        ii) Discuss collision resolution strategy

12. a) Explain the Towers of Hanoi problem in detail with steps involved. 8 CO3 [K2]

    b) Discuss about the Doubly Linked List and its operations with Example. 8 CO3 [K2]

13. a) Construct an expression tree for the expression (J + h* a) +((d * e + 1) * g)+k. Give the outputs when you apply preorder, in order and post order traversals. 8 CO5 [K3]

    b) Elaborate the AVL tree insertion and with suitable example. 8 CO4 [K2]

14. a) Infer about the Minimum spanning tree using Kruskal's algorithm for the following graph 8 CO4 [K3]
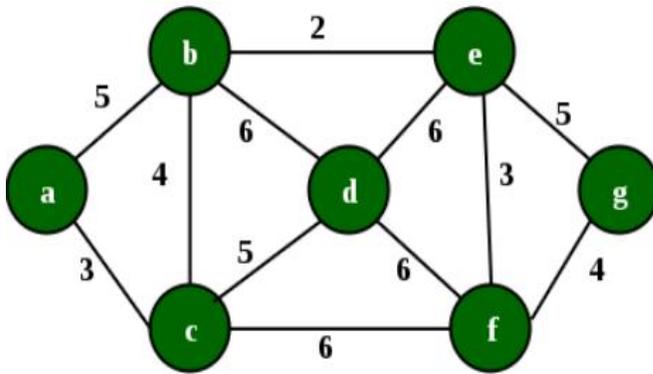
    b) i)Explain the about Dijkstra algorithm with example 8 CO4 [K2]

        ii)Discuss about various application trees and graph .

15. a) Discuss about the Following Expression Evaluation using stack 8 CO5 [K3]
        i)2 * (5 * (3 + 6)) / 5 – 2 ii)5+2*(3-4+2/3)*4+2

    b) Create a binary search tree for the following numbers start from an empty binary search tree. 45,26,10,60,70,30,40 Delete keys 10,60 and 45 one after the other and show the trees at each stage. 8 CO5 [K3]

16. a) Sort the following elements using Heap sort Algorithm 81,89,9,11,14,76,54,22 8 CO1 [K3]

    b) Illustrate the program to add two polynomials using Linked list 8 CO3 [K3]

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