'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

BCA Honours 3rd Semester Examination, 2021

CC5-BACHELOR OF COMPUTER APPLICATION (31)

DATA STRUCTURES

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Answer all questions with internal choices.

GROUP-A

Answer any *five* questions from the following 1×5 = 5

1. Write the advantages and disadvantages of double linked lists.

2. Define a full binary tree.

3. Convert the following infix expression into postfix expression:

$$A + B\hat{}(C + D) - E^{*}F + G\,.$$

4. Write the importance of a threaded binary tree.

5. List the advantages of circular linked list over single linked list.

6. Convert following expression

$$X + (Y * Z) - ((N * M + O)/Q)$$

into postfix form.

7. What are the properties of Abstract Data Type?

8. What is the difference between a queue and a stack?

GROUP-B

Answer any *three* questions from the following 5×3 = 15

9. Convert the given infix Expression

$$((A + B) * C - (D - E) \wedge (F + G))$$

into its Equivalent Prefix and Postfix Notations.

10. Explain Warshall's algorithm to find transitive closure of a graph with a suitable example.

11. How to represent binary tree using arrays and linked list?"

12. Arrange the following list of elements in ascending order using heap sort: 9, 3, 5, 27, 4, 67, 18, 31, 13, 20, 39, 21. Clearly show the sorting process at each step.

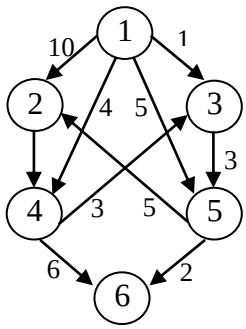
13. What is a binary search tree? Write an algorithm for inserting and deleting a node in a binary search tree.

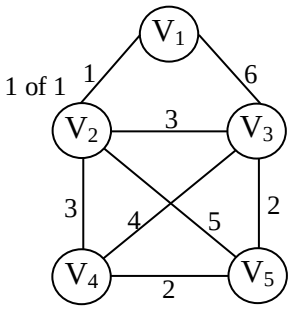
GROUP-C

Answer any *two* questions from the following 10×2=20

14. Define heap with example. Further, explain heap sort with an example.

15. Show how the Dijkstra's algorithm works on each of the graphs. The source vertices are denoted by think circle.





16. How to select pivot element in quick sort? Explain how partition is done in quick sort. Explain the quick sort algorithm with an example.

17. Write an algorithm to insert new node at the beginning, at middle position and at the end of a doubly linked list.

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