



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 3rd Semester Examination, 2023

CC5-COMPUTER SCIENCE (31)

DATA STRUCTURES

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

Answer any five questions

1×5 = 5

1. Define a complete binary tree.
2. Are linked lists linear or non linear? Justify.
3. Which data structure is needed when dealing with recursive functions?
4. What do you understand by the term data structure?
5. What is a Sparse Matrix?
6. Differentiate between linear and non linear data structure.
7. Name some applications of stacks.
8. How is a matrix stored in the memory?

GROUP-B

Answer any three questions

5×3 = 15

9. Define the Polish and Reverse Polish notation of expressions with suitable examples.
10. Convert the infix expression into prefix and postfix
 $(P + (Q * R) / (S - T))$
11. Write algorithms for PUSH and POP operations of a stack.
12. How can we convert a general tree to a binary tree? Write down the steps and explain with an example.
13. Differentiate between linear search and binary search.

2+3

GROUP-C

Answer any two questions

10×2 = 20

- 14.(a) What is a Queue?
2+2+1+5
- (b) What is the disadvantage of a simple queue? How can it be overcome?
- (c) Write down the insertion algorithm for a circular queue.

- 15.(a) What is hashing? 2+2+6
(b) What is a collision?
(c) Discuss the different collision resolution techniques.
- 16.(a) Differentiate between an array and a linked list stating the advantages and disadvantages of each. 5+5
(b) Write down an algorithm for deletion of an element from an array.
17. Write algorithms for insertion of a node into a singly linked list at the following positions: 5+5
(a) At the beginning
(b) Anywhere in the middle.

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