



'সমানো মন্ত্র: সমিতি: সমানী'

**UNIVERSITY OF NORTH BENGAL**

B.Sc. Honours 3rd Semester Examination, 2021

**CC5-COMPUTER SCIENCE (31)**

**DATA STRUCTURES**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.*

1. Answer any **five** of the following: 1×5 = 5
  - (a) What is the use of dynamic data structures?
  - (b) Are linked lists of linear or non-linear type? Justify.
  - (c) Differentiate a dynamic array from a linked list.
  - (d) Explain the difference between file structure and storage structure.
  - (e) Which data structures are applied when dealing with a recursive function? Why?
  - (f) How does dynamic memory allocation help in managing data?
  - (g) What do you understand by data abstraction?
  - (h) Is it true that all declaration statements result in a fixed reservation in memory?
  
2. Answer any **three** of the following: 5×3 = 15
  - (a) Differentiate linear from a nonlinear data structure.
  - (b) What do you understand by an ADT? Explain with an example.
  - (c) How are linked lists more efficient than arrays?
  - (d) Compare and contrast a stack and a queue.
  - (e) How a complete binary tree is different from a full binary tree? Explain with suitable example.
  
3. Answer any **two** of the following: 10×2 = 20
  - (a) A program S read 600 integers in the range [0 .... 100] representing the scores of 600 students. It then prints the frequency of each score above 50. What would be the best way for S to store the frequency? Explain. Write down an algorithm to convert a 2D array storage from row major to column major.
  - (b) Write down an algorithm to insert an item, delete item and display items of a circular queue.
  - (c) Explain DFS algorithm for a graph and how does it work?
  - (d) Write down an algorithm to convert an infix expression to its postfix equivalent using stack.

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