



UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 3rd Semester Examination, 2020

CC5-COMPUTER SCIENCE (31)

DATA STRUCTURES

Full Marks: 40

ASSIGNMENT

The figures in the margin indicate full marks.

Answer any two questions from the following

20×2 = 40

1. (a) Discuss linear and non-linear data structure with examples. 4+2+4+5+5
(b) Give a proper definition of Multidimensional Array.
(c) Briefly discuss row major and column major 2D Array representation.
(d) Write an algorithm for matrix multiplication.
(e) Define sparse matrices. Give the array and linked sparse representation of the following matrix using suitable diagrams:

1	0	0	0
0	0	0	4
0	0	0	0
0	6	0	0

2. (a) Explain the concept of stack data-structure and its associate operations. 5+5+5+5
(b) Discuss polish and reverse polish notation with examples.
(c) Find the infix form of an expression from the following expressions:

Prefix: *-A/BC-/AKL

Postfix: ABC/-AK/L-*

- (d) Write an algorithm for postfix evaluation using stack. Hence evaluate the following expression using the same algorithm:

$$48+65-*32-22+*/$$

3. (a) Discuss the advantages of linked-list over array data structure. 3+9+8
(b) Write algorithms to insert a node in a singly (one-way) linked list at the following position:
i. At the Beginning
ii. Anywhere in the middle
iii. At the end.

- (c) Discuss the implementation details of a circular linked list in any programming language.
4. (a) Discuss the difference between LIFO and FIFO data-structure. 5+10+5
(b) Briefly describe and explain different queue operations.
(c) What do you understand by Priority queue?
5. (a) What do you understand by Recursive problem? Give a simple example. 5+5+10
(b) State the advantages and limitations of recursion.
(c) Draw a call stack for the tower of Hanoi problem. Assume that you start with a stack of three disks.

—x—