

MSc DS (NEP) Semester-2 Examination

DSC-C-DTSC-121 (T)

Algorithms & Data Structure

Time : 2-00 Hours]

April-2024

[Max. Marks : 50]

Instructions: All questions are compulsory. Use of non-programmable scientific calculator is allowed.

Q.1 (a) Discuss binary number system developed by Acharya Pingla. (05)
 (b) Explain meru-prastar in brief. (05)

OR

(a) Discuss Bhaskracharya Lilavati decimal system. (05)
 (b) Explain place value number system. How it is better than signed value number system. (05)

Q.2 (a) What is stack? Write an algorithm / program to implement stack using an array. (05)
 (b) What is Link-List? How it differs from an array? List and explain different types of it. (05)

OR

(a) Write an algorithm / program to perform quick sort. (05)
 (b) Convert the following given Infix expression to Postfix. (05)

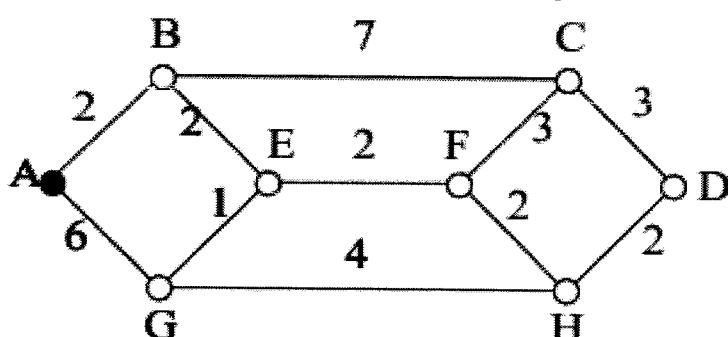
$$K + L - M * N + (O ^ P) * W / U / V * T + Q$$

Q.3 (a) What is Queue? List and explain different types of Queues you know. (05)
 (b) Write an algorithm / program to implement circular queue. (05)

OR

(a) What is File? Discuss different file organization in brief. (05)
 (b) Write a short note on: Dictionary. (05)

Q.4 (a) What is Graph? Discuss traversal methods of graph. (05)
 (b) Find a shortest path from vertex A to D using Dijkstra's algorithm. (05)

**OR**

(a) Insert the following values in the AVL-Tree. (05)

21, 26, 30, 9, 4, 14, 28, 18, 15, 10, 2, 3, 7

(b) What is BST? Discuss different traversal method of BST with an example. (05)

Q.5 Attempt any **TEN** out of **TWELVE**: (Each carries 01 mark) (10)

- (1) Best case complexity of an Linear Search algorithm is _____.
- (2) Complexity of a bubble sort algorithm is _____.
- (3) _____ data structure implements FIFO ordering.
- (4) A link-list in which address of the first node is stored in the next part of the last node, is known as _____ link-list.
- (5) _____ data structure is used in Breadth First Search algorithm.
- (6) Evaluation of postfix expression: 2 3 4 * + 8 2 1 + % - will be _____.
- (7) Visit sequence for Post-order traversal of BST is _____.
- (8) _____ algorithm is used to find shortest path problem.
- (9) To convert a graph into MST, _____ and _____ algorithms are used.
- (10) _____ sorting algorithm is based on divide and conquer method.
- (11) Backtracking can be done using _____ data structure.
- (12) Simulation is an application of _____ data structure.
