

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)

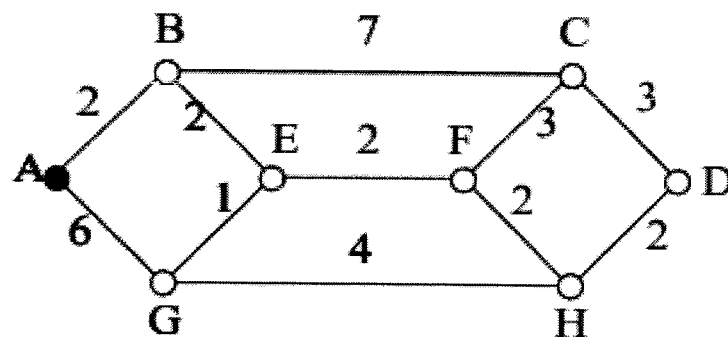
$$K + L - M * N + (O \wedge P) * W / U / V * T + Q$$

- 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)

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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.
