POKHARA UNIVERSITY

Level: Bachelor | Semester: Spring | Year : 2021
Programme: BE | Full Marks: 100
Course: Data Structure and Algorithm | Pass Marks: 45
Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Explain the role of Data Structure in computer programming. Explain how you can represent a stack as an ADT. 8
   b) What are the advantages of postfix expression over infix expression? Write an algorithm to convert postfix expression to prefix expression. Convert the following postfix expression into prefix expression AB+CD* 7
2. a) Explain the application area of queue. What will happen if front is equal to rear in linear queue? Demonstrate the concept of enqueue, dequeue and traverse operation in a linear queue with suitable example and supporting algorithm. 8
   b) Differentiate between singly circular linked list and singly linked list. Implement queue using Linked list. 7
3. a) How are the higher order polynomials represented using linked list? With necessary supporting figures, write an algorithm to insert a node in given position of doubly linked list. 8
   b) In which conditions recursive algorithms are suitable? Explain with the problem of printing Fibonacci series. 7
4. a) Construct an AVL tree by inserting the following data: 7
   14, 17, 11, 7, 53, 4, 13, 12, 8, 60.
   Also delete the item 8, 7, 14, 17 from the constructed tree showing every step.
   b) What is B-Tree? What are the features of B-Tree? Discuss on the importance of B-Tree. 8

5. a) Sort the following data using quick sort explaining every step: 7
   21,43,51,32,20,35,8,12
   b) What is the principle of hash function in searching? For the data {1,16,49,25, 64,0,81,4,9} and a hash function h (x) = x mod 10, find the resulting: 8
      i) Hash Table using linear and quadratic probing.
      ii) Hash table using chaining.
6. a) What is a graph? Mention any two applications of graph in real world. What are the two methods used to represent a graph? Explain with examples. 8
   b) Define graph traversal. Differentiate between DFS and BFS with an example. 7
7. Write short notes on: **(Any two)** 2×5
   a) Priority Queue
   b) Bubble Sort
   c) Big O notation