POKHARA UNIVERSITY

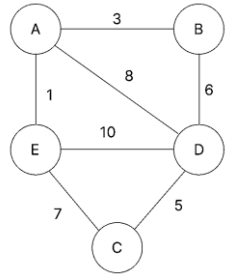
Level: Bachelor | Semester: Spring | Year : 2024
Programme: BE | Full Marks: 100
Course: Data Structure and Algorithms | Pass Marks: 45
Time : 3 hrs.

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

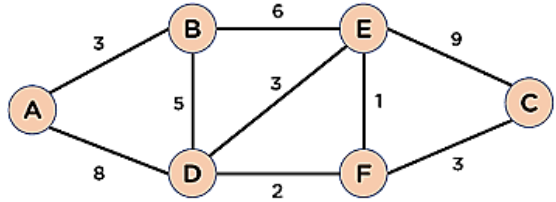
The figures in the margin indicate full marks.

Attempt all the questions.

1.	a)	Define Abstract Data Type (ADT). Explain how ADTs provide data abstraction with an example.	7
	b)	Define a stack ADT. Explain and write algorithms for basic operations of stack.	8
2.	a)	Define priority queue. Write C/C++ functions to implement the operations in a circular queue.	8
	b)	Explain List ADT. Write down an algorithm to delete the last node in a singly circular linked list. Explain each steps in detail.	7
3.	a)	Write an algorithm to delete a node from the specific position of doubly linked list.	7
	b)	What is a linked stack? Implement its push and pop operations using singly linked list.	8
4.	a)	How do you use recursion to solve a problem? Explain in detail with your own example.	7
	b)	Define a binary tree. Write algorithms for insertion and deletion operation in a complete binary tree.	8
5.	a)	Explain the significance of a balanced tree over unbalanced tree. Construct an AVL tree from the following data: 10, 20, 30, 15, 5, 12, 25, 50.	8
	b)	Why do you think sorting is necessary? Sort the following data using quick sort: 5, 3, 8, 6, 2, 7, 1, 4	7
6.	a)	Why spanning tree is important? Find minimum spanning tree of following graph using Prim's algorithm:	7



b) Find the shortest path from source vertex A to other vertices using Dijkstra's algorithm for the following graph. 8



7. Write short notes on: (**Any two**) 2×5

a) Binary search

b) Big O Nation

c) Hash System