POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2022
Programme: BE | Full Marks: 100
Course: Data Structure and Algorithm | Pass Marks: 45
Time : 3hrs.

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.

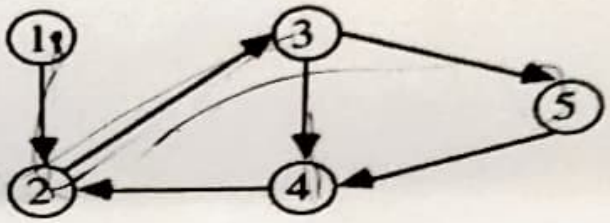
1. a) What is the role of data structures for algorithms? Create an ADT for Stack using C or C++ code. 7
   b) Why do you need to convert an infix expression to postfix? How do you use stack to convert the following expression to postfix notation? (A+B)*C-(D ^E)/F) 8
2. a) How does circular queue solve the problem of a linear queue? Implement the enqueue and dequeue operations in circular queue using C or C++ code. 8
   b) In which condition you use linked list implementation of a queue? Explain with example. 7
3. a) Write an algorithm to insert a node at the beginning of a singly linked list. Also illustrate with an example. 7
   b) What is the advantage of using recursive algorithms? Implement the recursive algorithms to solve the Tower of Hanoi problems using C or C++ code. 8
4. a) Construct an AVL tree in which elements are inserted in the following order. 50, 72, 96, 94, 107, 26, 12, 11, 9, 2. Show how the tree would look after the deletion of 26, 50, 16, and 10 respectively. Explain each steps of deletion. 8
   b) Why do you need to balance binary search tree? Generate the Huffman code for the following character with the given frequency: 7

Character	K	O	P	R	H	A
Frequency	20	9	17	12	1	7

5. a) Use insertion-sort to sort the following data: 7
   24, 11, 49, 35, 98, 72, 34, 44

b) How is the divide and conquer strategy used to search an item using binary search? Explain with a suitable example. 8

6. a) What do you mean by transitive closure of a graph? Find the transitive closure of the given graph 7



b) What is the purpose of Krushkal's algorithm? Explain with a suitable example. 8

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

a) Hash Table and Hash Function

b) Big O Notation

c) B Tree