

POKHARA UNIVERSITY

Level: Bachelor Semester: Spring Year : 2015
 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) "To write an efficient program, we should know about data structure." 5
 Explain the above statement.
- b) What is ADT? Explain different primitive operations that we can 5
 perform on data structures.
- c) List the applications of stack in computing as well as non-computing 5
 world.
2. a) What is infix, prefix and postfix expression? Convert the following 7
 infix expression into postfix expression showing the content of stack in each step.

$$P = A + (B * C - (D / E * F) * G) * H$$
- b) Compare circular queue with linear queue. Write **Enqueue** and 8
Dequeue algorithm of circular queue.
3. a) How dynamic list is different from static list? What are the primitive 7
 operations that we can perform in a list? Explain with suitable example.
- b) What is doubly linked list (DLL) and Circular Linked List (CLL)? 8
 Write an algorithm to insert a node in specified position of doubly linked list.
4. a) Define BST. Construct a BST using the following data 7
 U, N, I, V, E, R, S, I, T, Y, O, F, P, O, K, H, A, R, A.
 Also Perform pre-order, in-order and post order traversal
- b) Generate the Huffman code for the symbol A, B, C, D, E, F with the 8
 probability of occurrence are 0.2, 0.28, 0.2, 0.16, 0.12, 0.04 respectively. Also construct Huffman tree.
5. a) Why do we need to balance the tree? Perform the balancing algorithm 7

- according to AVL for the following sequence of numbers.
- b) Differentiate bubble sort with selection sort. Explain the divide and 8
 conquer approach in quick sort algorithm. Trace the algorithm to sort the following unordered list. 25, 30, 18, 16, 45, 40, 60, 20, 10, 7, 30, 100, 12, 14.
 6. a) Define graph. What are the difference between traversing in graph and 7
 traversing in tree? Explain with suitable example.
 - b) Define Hash Collision. 66, 47, 87, 90, 126, 140, 145, 153, 177, 285, 8
 393, 395, 467, 566, 620, 735. From above data, store the values into hash table with 20 positions, using division method (**key%tablesize**) of hashing and the linear probing and quadratic probing method for resolving collision.
 7. Write short notes on: (**Any two**) 2×5
 - a) Recursion vs Iteration
 - b) Deque
 - c) Serial and Parallel algorithm.