POKHARA UNIVERSITY

Level: Bachelor Semester: Fall 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) Differentiate ADT and C++ class. Write an ADT for natural numbers. 7
   b) Trace the algorithms to convert postfix expression with the following infix expression 8
   ((A+B)-C*D/E)$*(H-I)*F+G
   Evaluate postfix expression obtain from above with the following values for:
   A=4,B=2,C=4,D=3,E=8,F=2,G=3,H=5 and I=1.
2. a) What are the difference between stack and queue? Write enqueue and dequeue algorithm of circular queue. 8
   b) What is doubly linked list (DLL) and Circular Linked List (CLL)? Represent the following polynomial equation using singly linked list. 7
   $P(x,y,z)=3x^3yz - 5x^2y^3 + 5x^2y^3 + 8y^2x^2z - 4xy^7z^3 + 2x^7yz$
3. a) State the advantage of a linked list over contiguous list. Write the steps involved in deleting an item in a contiguous list. 8
   b) How the representation of data in memory is cheaper using linked list than in array? Write an algorithm to search an element and insert a node at the specified position in a single linked list. 7
4. a) What is tree traversal? Explain preorder, inorder and postorder tree traversal by constructing expression tree of the given expression: b*b-4*a*c. 7
   b) How does the Huffman algorithm work? Explain with a complete example. 8
5. a) Sort the following data using merge-sort algorithm. 66, 33, 40, 22, 55, 88, 60, 11, 80, 20, 50, 44, 77. 7
   b) What is hashing. Explain in detail about the technique used for collision resolution. 8

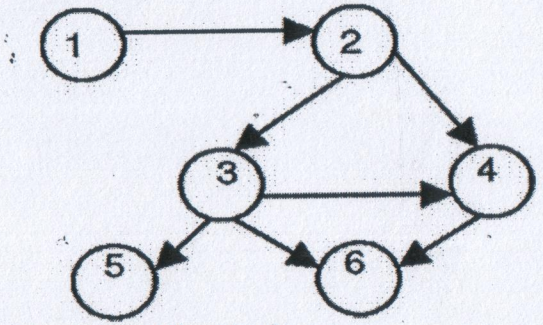
6. a) Define graph and diagraph? 8

   Let G be the graph represented by this adjacently list.

Vertex	Adjacent list
A	F
B	C
C	B
D	A,B
E	C,D,
F	E

   i. Draw G.
   ii. Is G a directed graph?
   iii. Is G weakly connected?
   iv. Give the adjacency matrix for G.

   b) Define graph, connected graph and spanning tree. Perform the topological sort from the following graph. 7



7. Write short notes on: **(Any two)** 2×5
   a) Game Tree.
   b) Recursion versus Iteration.
   c) Big O Notation.