Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2016

Subject Name: Introduction to Algorithms & Data Structures

Subject Code: 4CS04IDS1 Branch: B.Sc.IT

Semester: 4 Date: 07/05/2016 Time: 02:30 To 05:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) What is Data Structure?
b) Define: Vertex, Edge
c) Define domain and co domain with respect to set.
d) Write names of any two linear data structure.
e) Define: loop.
f) What is tree?
g) Give full names of DFS and BFS
h) If a graph contains N vertices then its MST contain _____ edges
i) The term "push" and "pop" is related to the
a. array b. lists c. stacks d. all of above
j) The Worst case occur in linear search algorithm when
a. Item is somewhere in the middle of the array
b. Item is not in the array at all
c. Item is the last element in the array
d. Item is the last element in the array or is not there at all
k) Which of the following data structure is non-linear data structure?
a. Trees b. Graphs c. Arrays d. a) and b) both
l) The situation when in a stack TOP OF STACK= -1 is
a. underflow b. overflow c. housefull d. saturated
m) Each node in a linked list has two pairs of..... and.....
a Link field and information field
b Link field and avail field
c Avail field and information field
d Address field and link field
n) Other name for directed graph is .....
a. Direct graph b. Digraph c. Dir-graph d. None of Above

Attempt any four from Q-2 to Q-8

Q-2 **Attempt all questions**

a. Write a note on efficiency of algorithm? **(5)**

b. Write a note on Red Black Tree? **(5)**

c. Define: Degree of a vertex in a graph with example **(4)**

Q-3 **Attempt all questions**

a. Write an algorithm and function code for insert first node in singly linked list **(5)**

b. What are the available tools for writing algorithm? **(5)**

c. State differences between stack and Queue? **(4)**

Q-4 **Attempt all questions**

a. Write an algorithm for Enqueue, Dequeue operation on Linear Queue **(5)**

b. Define the terms: root, leaf node, path, siblings. **(5)**

c. Explain Floor and ceil function with Example **(4)**

Q-5 **Attempt all questions**

a. Explain any one Graph representation method with example. **(5)**

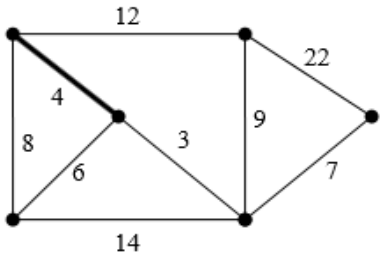
b. Write a note on asymptotic notations. **(5)**

c. Explain logarithm and exponential function. **(4)**

Q-6 **Attempt all questions**

a. Explain Krushkal's algorithm with Example **(7)**

b. Construct MST using Prims algorithm for following Graph with algorithm. **(7)**



Q-7 **Attempt all questions**

a. Explain topological sort in graph? **(5)**

b. Explain DFS with example. **(5)**

c. State differences between Array and Linked List. **(4)**

Q-8 **Attempt all questions**

a. What is recursion? Write a recursive algorithm for Quick Sort. **(7)**

b. What is Binary Tree? Explain Binary Tree traversal with example **(7)**