Enrollment No: $\qquad$ Exam Seat No: $\qquad$

## C.U.SHAH UNIVERSITY

## Summer Examination-2022

Subject Name : Introduction to Algorithms \& Data Structure
Subject Code : 4CS04BDS1
Branch: B.C.A.
Semester: 4
Date: 04/05/2022
Time: 11:00 To 02:00
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:
a) What is algorithm?
b) Which symbol is used for input/output operation while drawing flowchart?
c) What is equivalent set?
d) $\lfloor 3.9\rfloor=$ $\qquad$ .
e) Which two complexities are used to measure efficiency of an algorithm?
f) What is the limitation of binary search?
g) Queue follows $\qquad$ data structure.
h) Which data structure is used to convert infix notation to postfix notation?
i) What is the difference between singly linked list and circular linked list?
j) What is perfect hashing?
k) What is sibling?
l) DFS stands for $\qquad$ .
m) MST stands for $\qquad$ .
n) The root of Red black tree is of $\qquad$ color.

Attempt any four questions from Q-2 to Q-8
Q-2 Attempt all questions
a) Explain sequence, selection and repetition in detail.
b) Explain surjective function, injective function, bijective function.
c) What is recursion? Explain factorial finding mechanism using recursion.

Q-3 Attempt all questions
a) Explain characteristics of algorithm.
b) Explain types of linked list with its node structure.
c) Explain modular arithmetic in detail.

Q-4 Attempt all questions
a) Explain types of DEQUEUE.
b) Explain types of binary tree.

c) Explain topological sort.

Q-5

## Attempt all questions

a) Explain push, pop, peek operation in stack with algorithm.
b) Explain adjacency list and adjacency matrix representation of graph.
c) Write In degree and Out degree of each vertices.


Attempt all questions
a) Explain binary search algorithm in detail.
b) Explain big oh notation, omega notation \& theta notation.
a) Construct binary search tree of : $50,15,62,5,20,58,91,3,8,37,60,24$

Write down in order traversal, pre order traversal, post order traversal.
b) Write any three BFS traversal and any three DFS traversal


Attempt all questions
a) Find MST using Krushkal's algorithm.


b) Find MST using Prim's algorithm.


