C.U.SHAH UNIVERSITY
Winter Examination-2018

Subject Name : Introduction to Algorithms & Data Structure

Subject Code : 4CS04BDS1/4CS04IDS1   **Branch: B.C.A./B.Sc.I.T.**

Semester : 4   **Date : 23/10/2018**   **Time : 10:30 To 01:30**   **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.
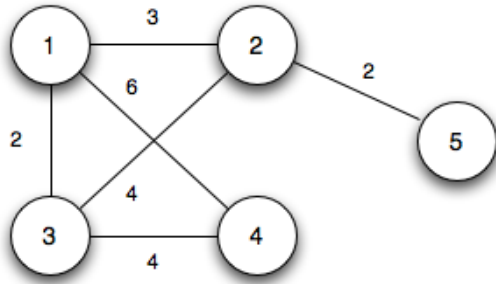(4) Assume suitable data if needed.

Q-1   Attempt the following questions: (14)

a) An algorithm is a _____ set of precise instructions for performing computation
  A. Finite   C. Infinite
  B. Constant   D. None of the above

b) Two main measures for the efficiency of an algorithm are :
  A. Processor and memory   C. Complexity and capacity
  B. Time and space   D. Data and space

c) BST stands for ____
  A. Binary Search Tree   C. Beta Search Tree
  B. Balanced Search Tree   D. None of the above

d) In _____ search each element is compared with search element till not found
  A. Binary   C. Merge
  B. Sequential   D. None of the above

e) DFS stands for ___
  A. Depth First Sort   C. Depth First Search
  B. Defined Following Search   D. Defined First Search

f) Queue data structure works on
  A. LIFO   C. FILO
  B. FIFO   D. None of the above

g) Space complexity of an algorithm is the maximum amount of _____ required by it during execution.
  A. Time   C. Memory Space
  B. Operations   D. None of the above

h) The amount of time the computer needs to run to completion is known as_____.
  A. Space Complexity   C. Recursive function
  B. Time Complexity   D. None of the above

i) Travelling salesman problem is an example of
  A. Dynamic Algorithm   C. Recursive Approach
  B. Greedy Algorithm   D. Divide and Conquer

j) Which of the following is an example of dynamic programming approach?

A. Fibonacci Series   C. Dijkstra Shortest Path
B. Tower of Hanoi   D. All of the above

k) Which of the following case does not exist in complexity theory
- A. Best Case   C. Average Case
- B. Worst Case   D. Null Case

l) An algorithm may have _____ 'inputs' quantities.
- A. One or more   C. Two or more
- B. Zero or more   D. None of the above

m) The number of edges from the root to the node is called _____ of the tree.
- A. Height   C. Length
- B. Depth   D. None of the above

n) Which indicates pre-order traversal?
- A. Left sub-tree, Right sub-tree and root
- B. Right sub-tree, Left sub-tree and root
- C. Root, Left sub-tree, Right sub-tree
- D. Right sub-tree, root, Left sub-tree

Attempt any four questions from Q-2 to Q-8

Q-2	**Attempt all questions**	**(14)**
	a) Explain characteristics of algorithm.	**(5)**
	b) What is spanning tree ? Explain with its properties.	**(5)**
	c) Write Properties of Red black tree.	**(4)**
Q-3	**Attempt all questions**	**(14)**
	a) Explain binary search with its process.	**(5)**
	b) Explain Control mechanism in algorithm	**(5)**
	c) Explain types of linked list with diagram.	**(4)**
Q-4	**Attempt all questions**	**(14)**
	a) What is hash table ? Explain hash function.	**(5)**
	b) Explain divide and conquer approach with example.	**(5)**
	c) Explain strassen's matrix multiplication with example.	**(4)**
Q-5	**Attempt all questions**	**(14)**
	a) Write an algorithm for PUSH, POP and PEEK operation on Stack	**(5)**
	b) What is DEQueue ? Explain its types.	**(5)**
	c) What is recursion ? Write an algorithm for finding factorial using recursion.	**(4)**
Q-6	**Attempt all questions**	**(14)**
	a) Explain types of functions with diagram	**(7)**
	b) Explain graph representation methods with example	**(7)**
Q-7	**Attempt all questions**	**(14)**
	a) Explain asymptotic notation.	**(7)**
	b) Explain Differences between DFS and BFS.	**(7)**
Q-8	**Attempt all questions**	**(14)**
	a) Find MST using Krushkal's algorithm	**(7)**

b) Write in order, pre order and post order traversal for the following tree. **(7)**