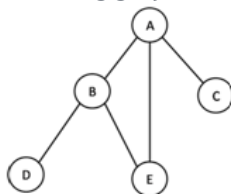


Question - 1

SCORE: 1 points

Ques

Which of the following is not the DFS traversal of the following graph?



- A, C, E, B, D
- A, B, D, E, C
- A, B, E, C, D
- A, E, B, D, C

Question - 2

SCORE: 1 points

Ques

Consider a weighted undirected graph with positive edge weights and let (u, v) be an edge in the graph. It is known that the shortest path from source vertex s to u has weight 53 and shortest path from s to v has weight 65. Which statement is always true?

- Weight $(u, v) < 12$
- Weight $(u, v) = 12$
- Weight $(u, v) \geq 12$
- Weight $(u, v) > 12$

Question - 3

SCORE: 1 points

Ques

Which one of the following permutations can be obtained in the output in the same order using stack assuming that the input is the sequence 1,2,3,4,5 in that order?

- 3,4,5,1,2
- 3,4,5,2,1
- 1,5,2,3,4

- 5,4,3,1,2

Question - 4

SCORE: 1 points

Ques

The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum number of nodes in a binary tree of height 5 are:

- 63 and 6, respectively
- 64 and 5, respectively
- 32 and 6, respectively
- 31 and 5, respectively

Question - 5

SCORE: 1 points

Ques

Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function $x \bmod 10$, which of the following statements are true?

- I. 9679, 1989, 4199 hash to the same value.
- II. 1471, 6171 hash to the same value.
- III. All elements hash to the same value.
- IV. Each element hashes to a different value.

- I only
- II only
- I and II only
- III or IV

Question - 6

SCORE: 1 points

Ques

DFS is generalization of _____ traversal

- Preorder
- Level order
- Inorder
- Postorder

Question - 7

SCORE: 1 points

Ques

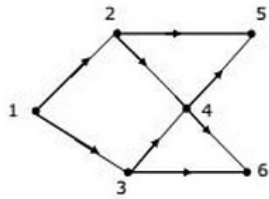
Given an undirected graph $G = (V, E)$, the size of all adjacency lists will be

- $|V+E|$
- $|E|$
- $2|E|$
- $2|V|$

Question - 8
Ques

SCORE: 1 points

Consider a graph with vertices $V = \{1, 2, 3, 4, 5, 6\}$, shown below. Which of the following is NOT a topological ordering?

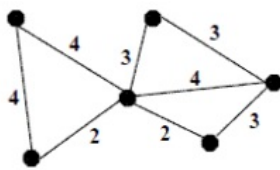


- 1 2 3 4 5 6
- 1 3 2 4 5 6
- 1 3 2 4 6 5
- 3 2 4 1 6 5

Question - 9
Ques

SCORE: 1 points

What is the weight of the Minimum Spanning Tree of the following graph, according to the Prim's algorithm:



- 10
- 13
- 14
- 15

Question - 10
Ques

SCORE: 1 points

Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural

numbers. What is the in-order traversal sequence of the resultant tree?

- 7 5 1 0 3 2 4 6 8 9
- 0 2 4 3 1 6 5 9 8 7
- 0 1 2 3 4 5 6 7 8 9
- 9 8 6 4 2 3 0 1 5 7

Question - 1

SCORE: 1 points

Ques

If every node in undirected graph G of n nodes, has degree zero, how many connected components are there in the graph:

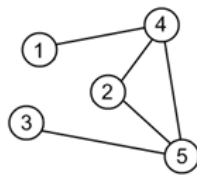
- 0
- 1
- $n-1$
- n

Question - 2

SCORE: 1 points

Ques

Which of the following is not the BFS traversal of the following graph:



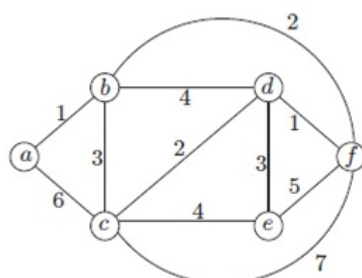
- 1, 4, 2, 5, 3
- 4, 5, 3, 2, 1
- 3, 5, 4, 2, 1
- 4, 2, 5, 1, 3

Question - 3

SCORE: 1 points

Ques

Consider the following graph:



Which one of the following cannot be the sequence of edges added, in that order, to a minimum spanning tree using Kruskal's algorithm?

- (a-b), (d-f), (b-f), (d-c), (d-e)
- (a-b), (d-f), (d-c), (b-f), (d-e)
- (d-f), (a-b), (d-c), (b-f), (d-e)
- (d-f), (a-b), (b-f), (d-e), (d-c)

Question - 4

SCORE: 1 points

Ques

A hash function f defined as $f(\text{key}) = \text{key} \bmod 7$, with linear probing, is used to insert the keys 37, 38, 72, 48, 98, 11, 56 into a table indexed from 0 to 6. What will be the location of key 11?

- 3
- 4
- 5
- 6

Question - 5

SCORE: 1 points

Ques

What are the appropriate data structures for following algorithms?

- 1) Breadth First Search
- 2) Depth First Search
- 3) Prim's Minimum Spanning Tree
- 4) Kruskal' Minimum Spanning Tree

- 1) Stack 2) Queue 3) Priority Queue 4) Disjoint Set
- 1) Queue 2) Stack 3) Priority Queue 4) Disjoint Set
- 1) Stack 2) Queue 3) Disjoint Set 4) Priority Queue
- 1) Priority Queue 2) Queue 3) Stack 4) Disjoint Set

Question - 6

SCORE: 1 points

Ques

Let G be a graph with n vertices and m edges. What is the tightest upper bound on the running time on Depth First Search of G ? Assume that the graph is represented using adjacency matrix

- $O(n)$
- $O(m+n)$

- $O(n^2)$
- $O(mn)$

Question - 7

SCORE: 1 points

Ques

A priority queue is implemented as a max-heap.

Initially, it has five elements. The level-order traversal of the heap is given below:

10, 8, 5, 3, 2

Two new elements `1` and `7` are inserted in the heap in that order. The level-order traversal of the heap after the insertion of the elements is:

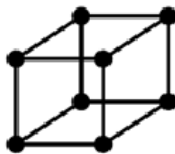
- 10, 8, 7, 5, 3, 2, 1
- 10, 8, 7, 2, 3, 1, 5
- 10, 8, 7, 1, 2, 3, 5
- 10, 8, 7, 3, 2, 1, 5

Question - 8

SCORE: 1 points

Ques

The following graph is:



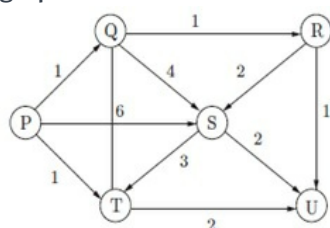
- Complete
- Bipartite
- None of the above
- Both of the above

Question - 9

SCORE: 1 points

Ques

Suppose we run Dijkstra's single-source shortest-path algorithm on the following edge-weighted directed graph with vertex P as the source:



In what order do the nodes get included into the set of vertices for which the shortest path distances are finalized?

- P, Q, R, S, T, U
- P, Q, R, U, S, T
- P, Q, R, U, T, S
- P, Q, T, R, U, S

Question - 10

SCORE: 1 points

Ques

Level of a node is distance from root to that node. For example, level of root is 1 and levels of left and right children of root is 2. The maximum number of nodes on level i of a binary tree is

In the following answers, the operator '^' indicates power.

- $2^{(i-1)}$
- 2^i
- $2^{(i+1)}$
- $2^{[(i+1)/2]}$