(16

Total No. of Questions : 8] SEAT No. :

[Total No. of Pages : 4

PC-4419

[6352]-155

S.E. (Computer Science & Engineering) (Data Science)

DATA Structures and Algorithms

(2019 Pattern) (Semester - III) (210642)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *Solve questions Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q. 7or Q.8.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data if necessary.*

Q1) a) Identify the expression and convert it into the remaining two forms :

AB + C * DE – FG + + $ Note $ = Exponent operator [6]

b) What is Queue? Explain insertion and deletion operations in Queue with a suitable diagram. [6]

c) Compare stacks and queues. [6]

OR

Q2) a) eg. Explain the concept of the linear and circular queue with an example [6] S

b) Construct a function PUSH and POP in 'C' for a stack using an array. [6] S

c) Give the postfix and prefix expression for (a+b*c)/(x+y/z). [6] C

Q3) a) Explain a binary tree. Name and explain with suitable example the following terms : [6]

i) Root node

ii) Left sub tree and right sub tree

iii) Depth of tree

P.T.O.

b) From the given traversal construct the binary tree. [6]

Inorder : D B F E A G C L J H K

Postorder : D F E B G L J K H C A

c) Construct the binary search tree (BST) from the following elements. [5]

10, 60, 40, 28, 14, 50, 6.

OR

Q4) a) Write a recursive 'C' function for inorder and preorder traversal of Binary Search Tree. [6]

b) Explain with suitable example how binary tree can be represented using : [6]

i) Array

ii) Linked List

c) Define the following terms with respect to Trees : [5]

i) Root

ii) Subtree

iii) Level of node

iv) Depth of Tree

v) Siblings

Q5) a) Represent the following graph using the adjacency matrix and adjacency list [6]

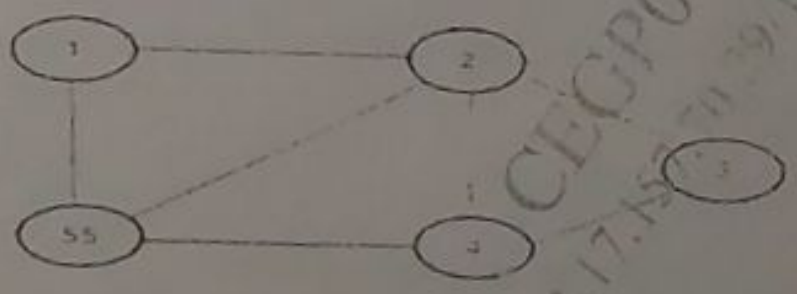
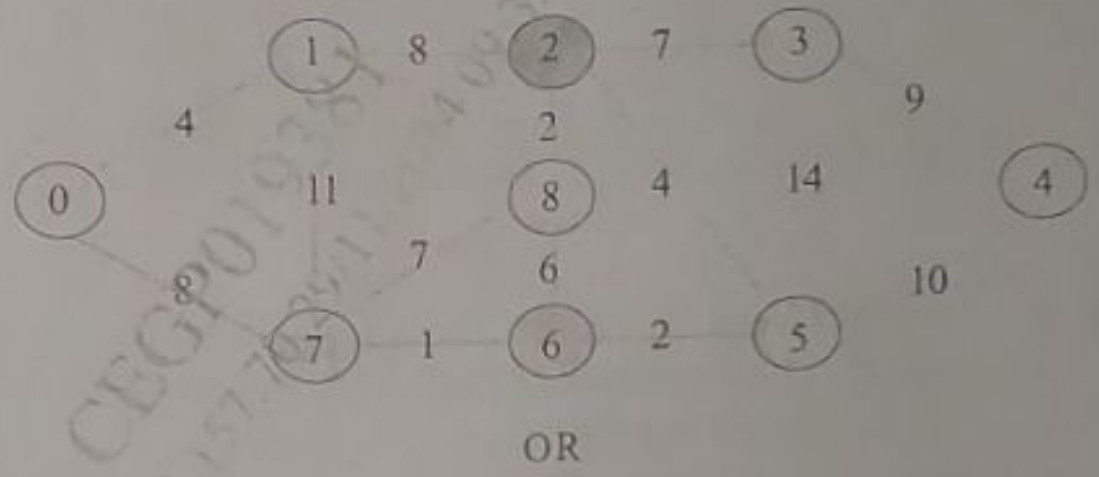


Fig. 1

11

b) Explain with suitable example, DFS and BFS traversal of a graph. [6]

c) Find out Minimum Spanning Tree of the following graph (figure 3) using Kruskal's algorithm. [6]



OR

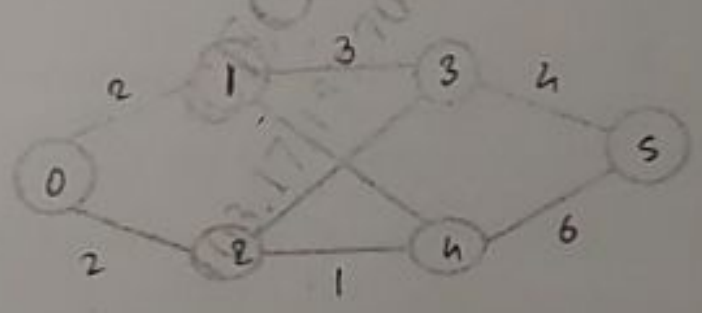
Q6) a) Define with an examples : [6]

i) Undirected Graph

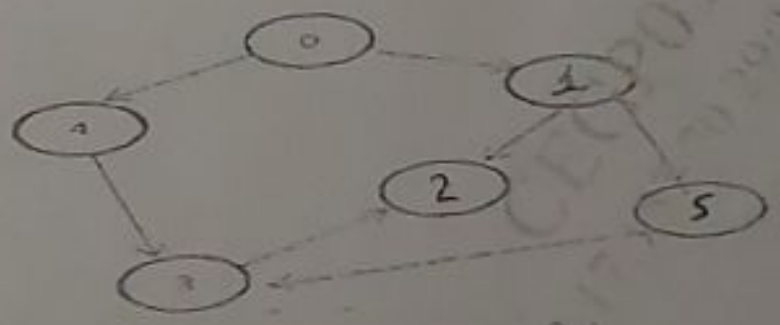
ii) Directed Graph

iii) Weighted Graph

b) Find minimum spanning tree for the following graph using Prim's algorithm. [6]



c) Find the indegree and outdegree of the following graph. [6]



(2)

Q7) a) What is a collision in Hashing? What are different Collision Resolution Strategies? Explain any one with example. [6]

b) Show the result of inserting the following keys into a hash table of size 7 using linear probing and the hash function

h(k) = k%7:19, 27, 36, 10, 64. [6]

c) What is a file? List different modes of file. Explain any four functions related to File handling? Explain concept of inverted files. [5]

OR

Q8) a) Insert the keys 49, 63, 56, 52, 48 into a hash table of size 11 using quadratic probing and h(k)=k% 11. Show the resulting hash table. Assume i^2 is the probing sequence. [6]

b) Define sequential file organization. Give it's advantages and disadvantages. [6]

c) Explain indexed sequential file organization. Compare it with a direct access file. [5]