Total No. of Questions : 8]

SEAT No. :

P-9700

[Total No. of Pages : 4

[6179]-229A
S.E. (E & TC/Electronics)
DATA STRUCTURES
(2019 Pattern) (Semester - III) (204184)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Write a 'C' function to Push and POP elements from a stack of characters using an array. **[6]**

b) What are the disadvantages of the linear queue? Suggest a suitable method to overcome them. **[6]**

c) Convert the given infix expression to a postfix expression using stack : (a^b)*c–d/d **[5]**

Note : ^=Exponent operator.

OR

Q2) a) Identify the expression and convert them into the remaining two forms : **[6]**

i) AB + C * DE – FG + + $

ii) – A / B * C $ DE

Note $ = Exponent operator

b) Write a 'C' function to insert and delete element from queue using an array. **[6]**

c) Define Queue. What are conditions for 'Queue empty' and 'Queue full' when queue is implemented using Array? Explain. **[5]**

P.T.O.

Q3) a Explain traversal operations in a singly linked list. **[6]**

b) A doubly linked list with numbers to be created. Write node structure and a 'C' function to create a double linked list. **[6]**

c) Draw and explain the circular linked list. State the limitations of a singly linked list. **[6]**

OR

Q4) a) Write limitations of arrays over linked list? Represent the following polynomial using a singly linked list. **[6]**

$23x^9 + 18x^7 + 41x^6 + 16x^4 + 3$

b) What is a singly linked list? Write C function for inserting a node at a given location into a singly linked list. **[6]**

c) Write a'C' function for Inserting a number at the front of the circular linked list. **[6]**

Q5) a) Write are cursive 'C' function for inorder and preorder traversal of Binary Search Tree. **[6]**

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

i) Array

ii) Linked List

[6]

c) Write an algorithm to insert an element in a binary search tree implemented using linked representation. **[5]**

OR

Q6) a) Construct the Binary Search Tree (BST) from the following data : **[6]**

5, 2, 8, 4, 1, 9, 7

Also show preorder, postorder and inorder traversal for the same.

b) Explain basic concept of AVL tree. Also explain four rotations in AVL tree. **[6]**

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

i) Root

ii) Subtree

iii) Level of node

iv) Depth of Tree

v) Siblings

Q7) a) Represent the following graph using the adjacency matrix and adjacency list. **[6]**

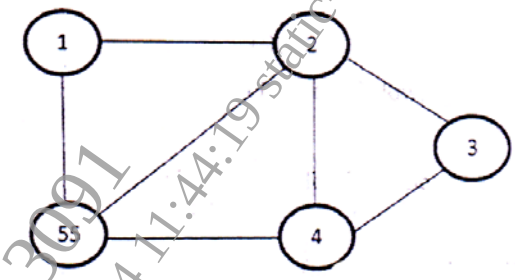

Fig. 1

b) Define indegree and outdegree of a vertex in graph. Find the indegree and outdegree of following graph. **[6]**

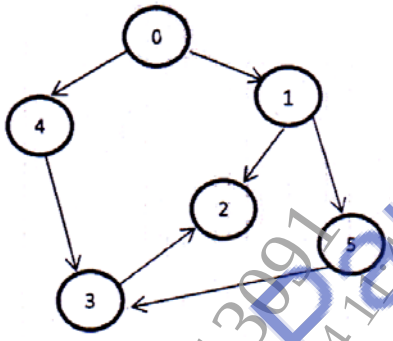

Fig. 2

c) Define with an examples : **[6]**

i) Undirected Graph.

ii) Directed Graph.

iii) Weighted Graph

OR

Q8) a) Find out Minimum spanning Tree of the following graph (figure 3) using Kruskal's algorithm. **[6]**

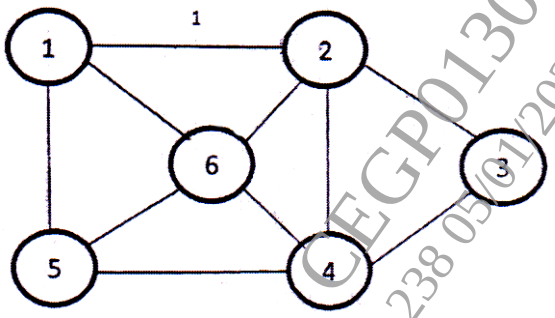

Fig. 3

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

c) Find the shortest path from node ‘a’ to all nodes in the graph shown in fig. 4 using Dijkstra’s algorithm. **[6]**

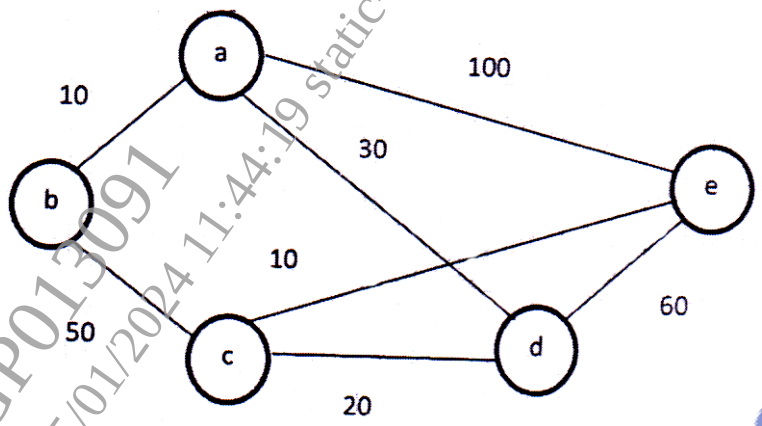

Fig. 4