Total No. of Questions : 12]

SEAT No. :

PA-4318

[Total No. of Pages : 3

[5929] - 1051

F.Y. M.C.A. (Engineering)

DATA STRUCTURES AND ALGORITHMS

(2020 Pattern) (Semester - I) (310902)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Assume suitable data if necessary.*

Q1) a) Explain Divide and Conquer algorithm strategy with suitable example. [6]

b) What is a sparse matrix? How it is represented in triplet format? [6]

OR

Q2) a) What are two dimensional arrays? Explain row major and column major representation of array storage. [6]

b) Discuss about algorithm complexity in terms of space and time. [6]

Q3) a) Explain Linked List as Abstract Data Type with diagram. [6]

b) Explain insert operations in doubly linked list with diagram? [6]

OR

Q4) a) Explain Linked List ADT with diagram. [6]

b) How circular list are advantageous than singly linked list? Explain working of circular linked list with diagram? [6]

P.T.O.

Q5) a) How stacks are represented using sequential organization? Which one is better? Explain with examples. **[6]**

b) How stacks are useful to implement using recursion process? Explain with application. **[5]**

OR

Q6) a) Write short note on : **[6]**

i) Queue.

ii) Circular Queue.

iii) Dequeue.

b) What is priority queue? Explain its array implementation? **[5]**

Q7) a) Write a C/C++ function to insert and search a node in Binary Search Tree. **[8]**

b) Write a short note on AVL tree. **[4]**

OR

Q8) a) Explain application of tree as decision tree with example. **[6]**

b) Define following terms : **[6]**

i) Binary Tree.

ii) Degree of a node.

iii) Height of a node.

Q9) a) Explain following terms : **[6]**

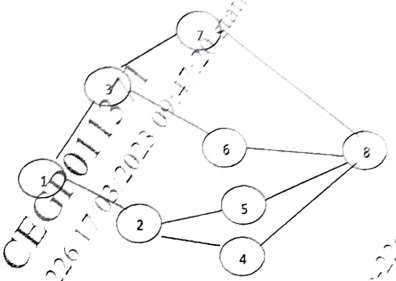
i) Connected component.

ii) Adjacency matrix.

b) Explain Dijkstra's shortest path algorithm with an example? **[6]**

OR

Q10) a) For the following graph, give the result of DFS and BFS traversals. Starting vertex is 7. **[4]**



b) Explain Kruskal Algorithms with suitable example. **[8]**

Q11) a) Write a pseudo C code for Quick sort algorithm. **[6]**

b) Write a C/C++ non recursive function for binary search. **[5]**

OR

Q12) a) Show the stepwise execution of the Bubble sort algorithm and selection sort for the following list. 17,24,49,7,8,67,23. **[6]**

b) Explain sentinel search with suitable example. **[5]**

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