

Total No. of Questions : 10]

PE-5705

SEAT No. :

[Total No. of Pages : 3

[6582]-201

S.E. (Artificial Intelligence and Data Science/Computer Science
and Engineering)

PCC-201-AID : DATA STRUCTURES
(2024 Pattern) (Semester - III)

[Max. Marks : 70

Time : 2½ Hours]

Instructions to the candidates :

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8 and Q9 or Q10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of electronic pocket calculator is allowed.
- 5) Assume suitable data, if necessary.

- Q1) a) What is meant by time and space complexity? Explain the asymptotic notations used for time complexity? [5]
- b) What is Sequential Search explain with Example? [5]
- c) Explain Bubble sort using the following Example : [4]
- 18, 13, 12, 22, 15, 24, 10, 16, 19, 14, 30.

OR

- Q2) a) Explain binary search with appropriate example. Comment on their data organization, time complexity and space complexity. [5]
- b) Explain quick sort algorithm with suitable example. What is advantages of quick sort algorithm. [5]
- c) What is hashing? Explain the properties of good hash function. [4]
- Q3) a) Write a pseudo code to insert new node in to singly link list. [7]
- b) Explain the representation of polynomial using GLL. [7]

OR

- Q4) a) What is Link List? Explain its types with diagram. [7]
- b) Write and explain node structure of Generalized linked list for representing multiple variable polynomial. Represent given polynomial graphically using Generalized Linked List: $5x^7 + 7xy^6 + 11x^2$. [7]

P.T.O.

Q5) a) Write rules to convert given infix expression to postfix expression using stack. Convert expression $(A * B - (C + D * E) ^ (F * G / H))$ stepwise using above rules. [6]

b) What is queue? How they are represented in memory? [4]

c) Explain the concept circular queue. Give the advantages of circular queue over linear queue. [4]

OR

Q6) a) What is infix, prefix and postfix expression? Give example of each. Explain evaluation of postfix expression with suitable example expression? [6]

b) Draw and explain Priority Queue? State any real-life application. [4]

c) Convert following expression into postfix.

$$(A + B) - (C/D - E) + (F + G/K)$$

Q7) a) Write pseudocode for BFS traversal of binary search tree. [7]

b) Explain Optimal Binary Search Tree (OBST) with Example. [7]

Q8) a) Explain in details AVL tree, Heap Tree. [7]

b) Describe binary search tree deletion with example. [7]

Q9) a) Elaborate following terminologies: [5]

i) Graph

ii) Adjacency List

iii) Adjacency Matrix

b) Explain Kruskal Algorithms with suitable example. [5]

c) Write Prim's algorithm to find minimum spanning tree. [4]

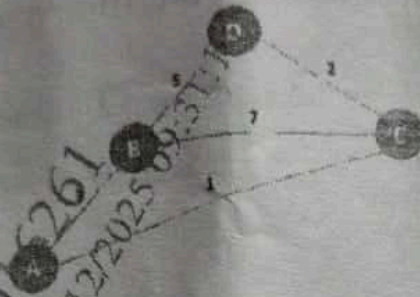
OR

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Q10)a) Apply Kruskal's algorithm to find the MST of the graph shown below.[5]



b) Give difference between Prim's and Kruskal's algorithm. [5]

c) Write the applications of: [4]

- i) BFS
- ii) DFS

