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Total No. of Pages : 02

Total No. of Questions : 09

MCA (Sem.–1)
ADVANCED DATA STRUCTURES

Subject Code : PGCA-1952

M.Code : 79037

Date of Examination : 09-01-2026

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION - B & C have **FOUR** questions each.
3. Attempt any **FIVE** questions from SECTION B & C carrying **TEN** marks each.
4. Select at least **TWO** questions from SECTION - B & C.

SECTION - A

I. Write short notes on :

- a) Show single rotation in AVL tree.
- b) What is the use of heaps?
- c) What is the time complexity of the algorithm for finding all pairs shortest path problem?
- d) How the Prim's algorithm is better in finding the Minimal spanning tree in comparison to the Kruskal's method?
- e) List the properties of Red Black trees.
- f) What are the ways to represent a graph via data structures?
- g) What is Re – Hash strategy?
- h) Why hashing is efficient way of searching?
- i) What is string marching?
- j) What is the meaning of single source shortest paths?

SECTION - B

2. Solve the recurrence using master method :

$$T(n) = 9T(n/3) + n$$

3. Explain in detail quick sorting method. Provide a complete analysis of quick sort.
4. Start with an empty Red - Black tree and insert the following keys in the given order :

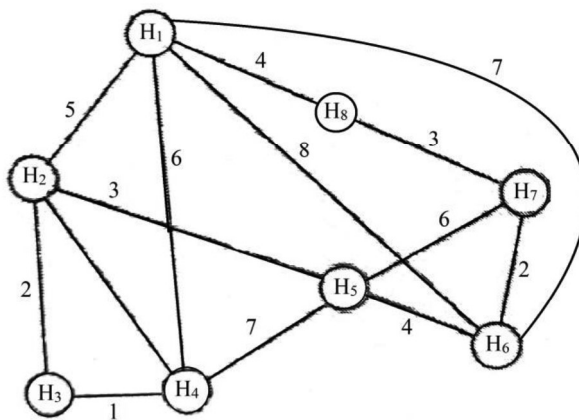
40, 50, 70, 30, 42, 15, 20, 25, 27, 26, 60, 55

Draw figures depicting the tree immediately after each insertion and following the rebalancing.

5. a) Explain the concept and usage of hash functions.
b) Explain the concept of open addressing in detail.

SECTION - C

6. Explain the KMP algorithm in detail with an illustrative example.
7. Write an algorithm to solve APSP problem.
8. Explain Boyce – Moore algorithm with example.
9. A newspaper agent daily drops the newspaper to the area assigned in such a manner that he has to cover all houses in respective area with minimum travel cost. Compute the minimum travel cost. The area assigned to the agent where he has to distribute newspaper is shown below :



NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.