

Roll No.

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 : 18-06-2025

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 atleast TWO questions from SECTION - B & C.**

SECTION-A

1. Answer the following :

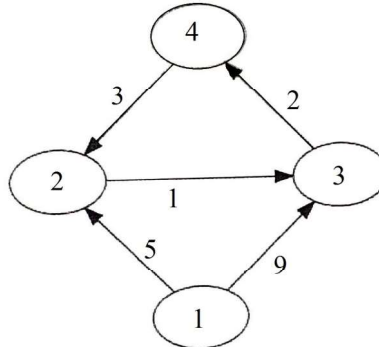
- Why is probabilistic analysis important?
- What is the worst case time complexity of quick sort?
- What is hashing?
- What are the properties of a good hash function?
- What is the worst case time complexity of bucket sort algorithm?
- List the properties of AVL tree.
- What do you mean by minimum spanning tree?
- What is maximum flow? Explain.
- How do you compute string length?
- What is string concatenation?

SECTION-B

2. a. The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function $h(k) = k \bmod 10$ and linear probing. What is the resultant hash table?
b. What is perfect hashing? Explain.
3. a) Show the red-black trees that result after successively inserting the keys 4,3,11,12,18,9 into an initially empty red-black tree.
b) Explain the importance of disjoint sets data structure.
4. What is a heap? Differentiate between min-heap and max-heap? How are they created? Explain with the help of examples.
5. What is amortized analysis? What are the different types of amortized analysis? Explain in detail.

SECTION-C

6. Calculate all pairs shortest path using Floyd Warshall algorithm for the following problems.



7. What is the basic principle of Rabin-Karp algorithm? Explain in detail with the help of an example.
8. Write an algorithm for Boyer-Moore algorithm. Also perform detailed analysis of this algorithm.
9. What is prefix function in Knuth-Morris-Pratt algorithm? Explain in detail. Also explain the time complexity of Knuth Morris Pratt algorithm.

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.