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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 : 21-12-2023

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) Write short notes on :

- a. What do you mean by amortized analysis?
- b. What is the worst case time complexity of merge sort?
- c. What are the characteristics of a good hash function?
- d. What is the worst case time complexity of counting sort algorithm?
- e. What are the four rotations of AVL tree?
- f. What is minimum spanning tree?
- g. What is maximum flow?
- h. What is string copy?
- i. How to concatenate two strings? Explain.
- j. What is the time complexity of Rabin Karp algorithm?

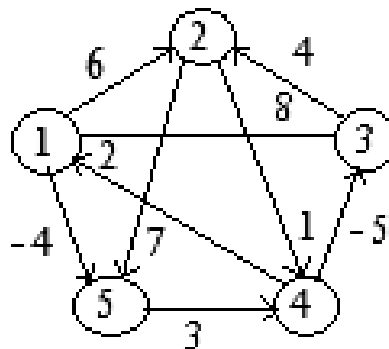
SECTION-B

2) **Answer the following :**

- a. Consider a hash table with 10 slots and the collisions are resolved by linear probing. The following keys are inserted in the order: 15, 2, 1, 5, 20, 31, 12, 21, 17 and 34. The hash function is $h(k)=k \bmod 10$. 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 41,38,31,12,19,8 into an initially empty red-black tree.
- b. Explain disjoint-set data structures using an example.
- 4) What is the difference between counting sort and bucket sort? Explain with the help of an example.
- 5) What are the methods of amortized analysis? Explain in detail.

SECTION-C

- 6) How graphs are represented in memory? Explain in detail.
- 7) Apply all pairs shortest algorithm for constructing the shortest path for the following graph.



- 8) What is the good suffix rule in Boyer-Moore algorithm? Explain in detail with the help of an example.
- 9) What is prefix function in Knuth-Morris-Pratt algorithm? Explain in detail.

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.