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 : 15-06-2024

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

l. Write short notes on :

(i) How is the time complexity measured?

(ii) What is a recurrence relation?

(iii) What are hash Tables?

(iv) What is a Hash Function?

(v) What are disjoint sets?

(vi) What is Heap Property? Explain.

(vii) What is the importance of red black trees?

(viii) What are the applications of Minimum Spanning Trees?

(ix) Enlist various string operations.

(x) What is Maximum flow problem?

SECTION-B

2. What are data structures? What is Abstract data type? What are the operations that may be performed on a typical data structure?

3. "*Queues can be implemented using two stacks*"-Support this statement with suitable programming example.

4. Let A = <7,2,4,17,1,11,6,8,15,10,20>

   (i) Draw binomial heap whose keys are elements of A.

   (ii) Insert a new element with key 5 into the heap.

   (iii) To a binomial heap obtained this way, apply the operation of extracting the node with minimum key two times. After each change in the structure of the heap draw its current diagram.

5. In a B-tree after inserting D, G, M, R and W into a B-tree with minimum degree 3 and 2 to 5 values per node perform the following insertions one-by-one:

   J, B, H, S, U, X, A, T.

SECTION-C

6. What is a minimum spanning tree? What are its applications? Explain the Kruskal and Prim's algorithms for finding the minimum spanning tree? Compare the growth of the tree in the two cases.

7. Modify Dijkastra's algorithm to solve all-pairs-shortest-path problem.

8. Compare the adjacency list and matrix representation of graph.

9. Discuss any string matching algorithm with illustrative example.

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.