Reg No.:_____ Name:_____

0520MCA105122005

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

MCA (Two Year) Degree S1 (R, S) Examination December 2024

Course Code: 20MCA105

Course Name: ADVANCED DATA STRUCTURES

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1	Discuss how disjoint sets can be implemented.	(3)
2	What is amortised analysis of algorithms and how is it different from asymptotic analysis?	(3)
3	What are the different applications of Suffix trees?	(3)
4	With an example, explain splaying operation in a Splay tree.	(3)
5	What are Binomial trees?	(3)
6	Discuss different operations that can be performed on mergeable heaps and their advantages over binary heaps?	(3)
7	What are the different methods in which graphs can be represented?	(3)
8	Given a graph, discuss the method to find articulation points in it.	(3)
9	Discuss the use of a Merkle tree.	(3)
10	List the advantages of Blockchain technology.	(3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11	What is the advantage of using Amortised analysis? Explain aggregate method using the example of incrementing a binary counter.	(6)

OR

12	Explain Hashing technique. Discuss collision resolution techniques used in Hashing	(6)

Module II

13 Discuss the properties of Red-Black Tree. Insert 10,85,15,70,20,60 and 30 into a Red-Black tree. (6)

OR

14 Explain insertion and deletion operation on B-Trees with an example. (6)

Module III

15 With an example explain how Decrease-Key operation can be performed in a Fibonacci heap. (6)

OR

16 What are binomial heaps? Discuss union operation in binomial heap. Illustrate different cases with examples. (6)

Module IV

17 What is a minimum cost spanning tree? Explain the construction of minimum cost spanning tree using Kruskal's algorithm. (6)

OR

18 What are the applications of Topological sorting? Write the algorithm of Topological sorting and illustrate the method with an example. (6)

Module V

19 Discuss Blockchain Architecture in detail. (6)

OR

20 What is a smart contract? Explain the life cycle of a smart contract. (6)

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