

**Course Code: 20MCA105****Course Name: ADVANCED DATA STRUCTURES**

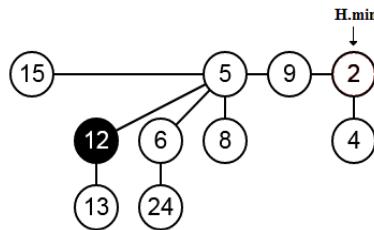
Max. Marks: 60

Duration: 3 Hours

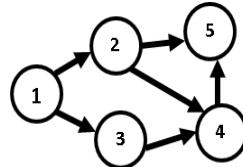
**PART A***Answer all questions, each carries 3 marks.*

Marks

- |   |  |     |
|---|--|-----|
| 1 | Differentiate between Stack and Queue.                                 | (3) |
| 2 | What is Set data structure? How is a Set implemented using Bit String? | (3) |
| 3 | State the properties of a Red Black tree.                              | (3) |
| 4 | What is meant by Splay Tree?   | (3) |
| 5 | List out any three operations supported by a Mergeable Heap.           | (3) |
| 6 | Find the Potential of the Fibonacci Heap given below.                  | (3) |



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|---|---|-----|
| 7 | What is meant by Bi-Connected Components? Illustrate with an example. | (3) |
| 8 | Write any one of the Topological Ordering of the graph.               | (3) |



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|----|---|-----|
| 9  | Explain block chaining with an example. | (3) |
| 10 | What is Merkle tree? Give example.      | (3) |

**PART B***Answer any one question from each module. Each question carries 6 marks.***Module I**

- |    |   |     |
|----|---|-----|
| 11 | How do you perform Amortised Analysis using Accounting method? Illustrate with Incrementing Binary Counter example. | (6) |
|----|---|-----|

**OR**

- 12 What are the different collision resolution techniques in hashing? Explain any one of them. (6)

**Module II**

- 13 Explain different cases of inserting nodes into a Red-Black Tree with an illustration. (6)

**OR**

- 14 How a full node is splitted in B Tree Insertion procedure? Explain with a diagram. (6)

**Module III**

- 15 Explain how the Decrease-Key operation is performed on Binomial Heaps. What is the Amortised Cost of this operation? (6)

**OR**

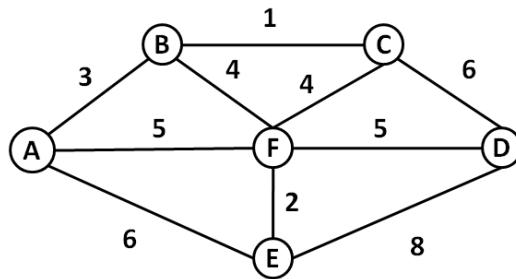
- 16 Describe how Extract-Min operation is performed in a Fibonacci Heap? Illustrate with an example. (6)

**Module IV**

- 17 Explain Depth First Search algorithm with a suitable example. (6)

**OR**

- 18 Apply Kruskal's algorithm to find a minimum spanning tree of the following graph. (6)



**Module V**

- 19 Explain Blockchain Architecture in detail. (6)

**OR**

- 20 Describe the data types in Blockchain. (6)

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