

**Code: 19B512T**

M.Tech. I Semester Regular & Supplementary Examinations July 2021

**Advanced Data Structures**  
( Computer Science and Engineering )

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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**UNIT-I**

1. Assuming the table size as the smallest prime number greater than the input size, hash the following keys: [62, 56, 45, 14, 78, 44, 36, 29, 39]. To handle collision, use (i) Double Hashing and (ii) Rehashing. Draw the hash table for each insertion. Which of the two methods has less number of total probes? 12M

**OR**

2. a) What is a hash function and how to choose a good hash function? 4M  
b) Describe the collision resolving techniques in hashing. 8M

**UNIT-II**

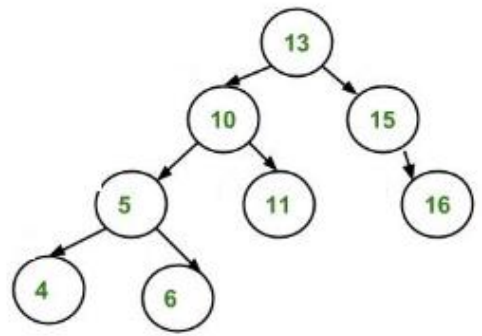
3. Describe Skip List? Explain how insert, delete and search operations are carried out in a skip list with an example? 12M

**OR**

4. a) Distinguish between skip list and linked list? 6M  
b) Justify the importance of randomized data structures and algorithms? 6M

**UNIT-III**

5. Consider the following AVL Tree and perform the operations as given below.



- i) insert 7 ii) Insert 14 iii) delete 11 iv) delete 15  
Explain the steps involved in AVL tree after necessary rotations with neat diagrams to perform the above operations. 12M

**OR**

6. a) Define Red-Black tree. List all Red-Black tree properties 4M  
b) Show the tree that results from inserting the values 2, 1, 4, 5, 9, 3, 6, 7 into an initially empty red-black tree. Show the tree after each insertion. 8M

**UNIT-IV**

7. Write the algorithm for Knuth-Morris-Pratt pattern matching and explain the procedure with an example. 12M

**OR**

8. For the sequences ABCBDAB and BDCABA, identify the longest common subsequence using dynamic programming technique. Write down the recursive formula used for solving the same. 12M

**UNIT-V**

9. a) Explain the concept of Priority Search tree with an example. 8M  
b) What are the applications of Computational Geometry? 4M

**OR**

10. Explain the following 12M  
i) Quad Trees  
ii) K-D Trees

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**Code: 19B51DT**

M.Tech. I Semester Regular & Supplementary Examinations July 2021

**Data Analytics**

( Computer Science and Engineering )

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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		Marks	CO	BL
<b>UNIT-I</b>				
1.	Interpret various exploratory data analysis methods in statistics.	12M	1	4
<b>OR</b>				
2.	a) Classify key roles for new big data eco system	8M	1	2
	b) Outline structured data, unstructured data and semi structured data	4M	1	2
<b>UNIT-II</b>				
3.	Analyze various applications of association rules	12M	2	4
<b>OR</b>				
4.	a) Compare and contrast clustering and classification	4M	2	2
	b) Analyze k-means algorithm and its terminating conditions	8M	2	4
<b>UNIT-III</b>				
5.	Interpret Naïve Bayes Algorithm	12M	3	4
<b>OR</b>				
6.	Analyze linear, multiple linear regression and logistic regression. Give examples of various regressions.	12M	3	4
<b>UNIT-IV</b>				
7.	Interpret text analysis steps Collecting Raw Text and Representation of text.	12M	4	4
<b>OR</b>				
8.	Interpret ARIMA model	12M	4	4
<b>UNIT-V</b>				
9.	Interpret Hadoop ecosystem in data analyst	12M	5	4
<b>OR</b>				
10.	Analyze SQL essential in database text essential	12M	5	4

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<b>R-19</b>
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**Code: 19B511T**

M.Tech. I Semester Regular & Supplementary Examinations July 2021

**Mathematical Foundations of Computer Science**

( Computer Science and Engineering )

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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Marks CO BL

**UNIT-I**

- |   |    |   |   |
|---|----|---|---|
| 1. a) Define tautology and describe truth table for P (Q R).  | 6M | 1 | 2 |
| b) Show that R is valid conclusion from the given set of premises P, P <sup>®</sup> Q, Q <sup>®</sup> R | 6M | 1 | 3 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 2. a) Show that RVS is valid conclusion from the premises: C D, (C D) ~H, ~H (A ~B), (A ~B) R S | 6M | 1 | 2 |
| b) Solve that S V R is a tautologically implied by (P v Q) ^ (P -> R) ^ (Q -> S)                | 6M | 1 | 2 |

**UNIT-II**

- |  |    |   |   |
|--|----|---|---|
| 3. a) Construct the Hasse diagram for the divisibility relation A= {3, 6, 12, 36, 72}. | 6M | 2 | 1 |
| b) Differentiate between recursive functions and composite functions                   | 6M | 2 | 2 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 4. a) Analyze compatibility and partial ordering relations with appropriate examples. | 6M | 2 | 1 |
| b) Discuss equivalence relation with two suitable examples.                           | 6M | 2 | 1 |

**UNIT-III**

- |  |    |   |   |
|--|----|---|---|
| 5. a) Solve the recurrence relation a <sub>n+2</sub> -2a <sub>n+1</sub> +a <sub>n</sub> =2 <sup>n</sup> , n>=0 a <sub>0</sub> =1, a <sub>1</sub> =2 using generating function? | 6M | 3 | 3 |
| b) Solve the recurrence relation an 9a <sub>n-1</sub> +26a <sub>n-2</sub> +24a <sub>n-3</sub> =0 n>=3, a <sub>0</sub> =0, a <sub>1</sub> =1, a <sub>2</sub> =10.               | 6M | 3 | 3 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 6. a) Solve the recurrence relation a <sub>n</sub> -7a <sub>n-1</sub> +10a <sub>n-2</sub> =0 n>=2 ,a <sub>0</sub> =10, a <sub>1</sub> =41.              | 6M | 3 | 3 |
| b) Solve the recurrence relation an 6a <sub>n-1</sub> +8a <sub>n-2</sub> =9 , n>=2 a <sub>0</sub> =10, a <sub>1</sub> =25 by using generating function? | 6M | 3 | 3 |

**UNIT-IV**

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|---|----|---|---|
| 7. a) Describe Kruskal's Algorithm for minimum spanning tree.     | 6M | 4 | 3 |
| b) Analyze Depth First Search Algorithm with appropriate example. | 6M | 4 | 4 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 8. a) Discuss about Properties and applications of trees.   | 6M | 3 | 3 |
| b) Differentiate between Spanning trees and Counting Trees. | 6M | 4 | 5 |

**UNIT-V**

- |  |    |   |   |
|--|----|---|---|
| 9. a) Design a Moore Machine to determine the residue mod 4 for each binary string treated as integer. | 6M | 5 | 4 |
| b) Discuss the relationship between Grammar and Language.  | 6M | 5 | 4 |

**OR**

- |  |    |   |   |
|--|----|---|---|
| 10. a) Discuss the significance of Turing Machine with appropriate example.                        | 6M | 5 | 5 |
| b) Differentiate between Finite-State Machine with output and Finite State Machine with no output. | 6M | 5 | 4 |

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**R-19**

**Code: 19B51AT**

M.Tech. I Semester Regular & Supplementary Examinations July 2021

## **Machine Learning**

( Computer Science and Engineering )

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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### **UNIT-I**

1. a) Write some Real-World applications of Machine Learning. 6M
- b) Explain the types of machine learning algorithms. 6M

**OR**

2. a) Explain Logistic regression in detail. 6M
- b) Distinguish between Parametric and non-Parametric Models. 6M

### **UNIT-II**

3. a) Specify and explain the fundamental rules of probability theory. 6M
- b) Write a short notes on overfitting. 6M

**OR**

4. Explain structured regression models with illustrations. 12M

### **UNIT-III**

5. Explain Apriori algorithm with an example. 12M

**OR**

6. a) Give a brief notes on combinatorial algorithms. 6M
- b) Explain K-Means Gaussian mixture as soft K-means clustering. 6M

### **UNIT-IV**

7. Explain Bayesian interface for linear models with laplace priors regularization. 12M

**OR**

8. Explain ARD for logistic regression sparse coding. 12M

### **UNIT-V**

9. Define deep networks. Explain any three applications of deep networks in detail. 12M

**OR**

10. Explain deep neural networks with suitable examples. 12M

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<b>R-19</b>
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**Code: 19BE11T**

M.Tech. I Semester Regular & Supplementary Examinations July 2021

**Research Methodology and IPR**

( Common to All Branches )

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 12 = 60 Marks )

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<b>UNIT-I</b>
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1. Explain any two multivariate techniques used in data analysis?

**OR**

2. Elucidate the various errors in selecting the research problem.

<b>UNIT-II</b>
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3. Elucidate the various sources of collecting review of literature. Also explain how to write a good review article.

**OR**

4. Elucidate the format of research proposal.

<b>UNIT-III</b>
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5. Write a short note on Patent, Design, Trade and Copyright.

**OR**

6. Explain the international scenario on Patent.

<b>UNIT-IV</b>
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7. Elucidate the Patent rights.

**OR**

8. Explain Licensing and Transfer Technology in Patent.

<b>UNIT-V</b>
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9. Elucidate the patent information and databases.

**OR**

10. Elucidate the new developments in IPR

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