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<b>R-20</b>
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**Code: 20AC33T**

II B.Tech. I Semester Supplementary Examinations June 2024

**Discrete Mathematics**

(Common CSE, AI&DS, AI&ML, CSE(AI) and CSE(DS) )

Max. Marks: 70

Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

(Compulsory question)

- |   |    |    |
|---|----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M )                                       | CO | BL |
| a) Write the converse and contrapositive statement of the statement “If there is rain, then I buy an umbrella”. | 1  | L1 |
| b) Find the generating function for $f_n = 3^n, n \geq 0$ in closed form.                                       | 2  | L1 |
| c) Give an example of a monoid which is not a group. Justify your answer.                                       | 3  | L1 |
| d) How many vertices are needed to construct a graph with 7 edges, in which each vertex of degree 2?            | 4  | L1 |
| e) Write the properties of tree.  | 5  | L1 |

**PART-B**

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

Marks CO BL

**UNIT-I**

- |   |    |     |    |
|---|----|-----|----|
| 2. a) Define Tautology and contraction. Verify whether the formula $((p \rightarrow r) \wedge (q \rightarrow r)) \rightarrow ((p \vee q) \rightarrow r)$ is tautology or not. | 6M | CO1 | L3 |
| b) Use the indirect method to show that $R \rightarrow \neg Q, R \vee S, S \rightarrow \neg Q, P \rightarrow Q \Rightarrow \neg P$ .  | 6M | CO1 | L3 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 3. a) Obtain principle disjunctive normal form of the formula $(\neg p \rightarrow r) \wedge (q \leftrightarrow p)$ . | 6M | CO1 | L3 |
| b) Explain automatic theorem proving with an example.   | 6M | CO1 | L4 |

**UNIT-II**

- |   |    |     |    |
|---|----|-----|----|
| 4. a) Define recurrence relation. Find the first four terms of $a_k = 2a_{k-1} + k$ for all integers $k \geq 2, a_1 = 1$ .                          | 6M | CO2 | L3 |
| b) Solve the recurrence relation by using the characteristic roots method $a_n + 4a_{n-1} + 4a_{n-2} = 8$ for $n \geq 2$ given $a_0 = 1, a_1 = 2$ . | 6M | CO2 | L3 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 5. a) Solve the recurrence relation $a_n - a_{n-1} = 3n + 2, a_0 = 1, n \geq 1$ by substitution method  | 6M | CO2 | L3 |
| b) Use the generating method to solve the recurrence relation $a_n - 6a_{n-1} + 8a_{n-2} = 3^n, n \geq 1$ where $a_0 = 3, \text{ and } a_1 = 7$ . | 6M | CO2 | L3 |

**UNIT-III**

- |  |    |     |    |
|--|----|-----|----|
| 6. a) Draw the Hasse diagram for the poset $(P(A), \subseteq)$ , where $A = \{a, b, c\}$ . | 6M | CO3 | L3 |
|--|----|-----|----|

- b) Determine whether the following relation is reflexive, irreflexive, symmetric, asymmetric, antisymmetric or transitive on the set  $A = \{1, 2, 3, 4\}$ ,

$$R = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 3), (3, 4), (4, 3), (4, 4)\}.$$

6M CO L3

OR

7. a) Let  $f$  and  $g$  be functions from  $\mathbb{R}$  to  $\mathbb{R}$  defined by  $f(x) = ax + b$  and  $g(x) = 1 - x + x^2$ , if  $(g \circ f)(x) = 9x^2 - 9x + 3$ , determine  $a, b$  values.

6M CO3 L3

- b) Let  $G$  be the set of all non-zero real numbers and let  $a * b = \frac{ab}{4}$ , Show that  $(G, *)$  is an abelian group.

6M CO3 L2

#### UNIT-IV

8. a) Define the following with examples: (i) Degree of a vertex (ii) Complete Graph (iii) Regular graph.

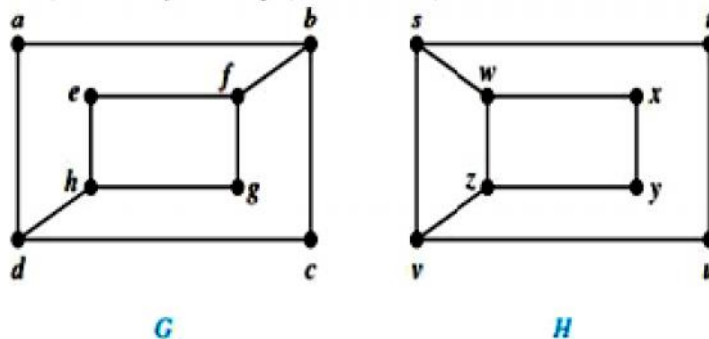
6M CO4 L2

- b) Define (i) Adjacency matrix (ii) Incidence matrix of simple graph with example.

6M CO4 L2

OR

9. a) State the necessary condition for two graphs to be isomorphic. Verify the following two graphs are isomorphic or not.



6M CO4 L3

- b) Define (i) Euler's path (ii) Euler circuit (iii) Hamiltonian path.

6M CO4 L1

#### UNIT-V

10. a) Write an algorithm to obtain a minimum spanning tree and illustrate the algorithm with an example.

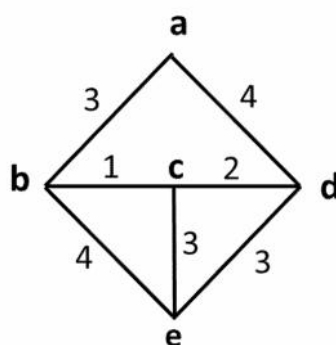
6M CO5 L3

- b) Define (i) Rooted tree (ii) Binary tree (iii) Spanning tree.

6M CO5 L1

OR

11. a) Find the weight of the minimal spanning tree of the following graph by using Kruskal's algorithm.



6M CO5 L4

- b) Draw all different spanning trees of complete bipartite graph  $K_{2,2}$

6M CO5 L3

\*\*\* End \*\*\*

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**Code: 20AC35T**

II B.Tech. I Semester Supplementary Examinations June 2024

**Management Science**

(Common CSE, AI&DS, AI&ML, CSE(AI) and CSE(DS) )

Max. Marks: 70

Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

**(Compulsory question)**

- |  |     |    |
|--|-----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M )        | CO  | BL |
| a) Discuss any two reasons to view management as significant in an organization. | CO1 | L1 |
| b) Write a brief note on any one important feature of HRM.                       | CO2 | L5 |
| c) Recall Harris Basic EOQ formula and its elements.                             | CO3 | L1 |
| d) Name any three sources of financing to startup industries.                    | CO4 | L1 |
| e) Outline the importance of Marketing Matrix.                                   | CO5 | L1 |

**PART-B**

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

Marks CO BL

**UNIT-I**

- |   |    |     |    |
|---|----|-----|----|
| 2. a) Differentiate between Line and Flat Organization.               | 6M | CO1 | L1 |
| b) Explain changings skills of manager in global working environment. | 6M | CO1 | L2 |

**OR**

- |  |     |     |    |
|--|-----|-----|----|
| 3. Discuss Henry Fayol's contribution to Management. | 12M | CO1 | L1 |
|--|-----|-----|----|

**UNIT-II**

- |   |     |     |    |
|---|-----|-----|----|
| 4. Summarize following stages of recruitment process:<br>a) Selection Process<br>b) Induction Process | 12M | CO2 | L3 |
|---|-----|-----|----|

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 5. a) What are the reasons for importance of Performance Appraisal? | 6M | CO2 | L3 |
| b) Discuss importance of Job Analysis.                              | 6M | CO2 | L1 |

**UNIT-III**

- |   |    |     |    |
|---|----|-----|----|
| 6. a) Differentiate between PERT and CPM.                   | 6M | CO3 | L1 |
| b) What are the objectives of Inventory Management Control? | 6M | CO3 | L1 |

OR

7. a) What inferences can be arrived from ABC analysis? 6M CO3 L3  
 b) Discuss any three factors that affects Plant Location. 6M CO3 L1

UNIT-IV
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8. Explain methods of Investment Analysis with simple example/s. 12M CO4 L4

OR

9. a) What are the different sources of financing? 6M CO4 L1  
 b) Discuss following two concepts in brief:  
 i) Net Present Value  
 ii) Profitability Index 6M CO4 L1

UNIT-V
--------

10. a) Explain following types of Market Segmentation:  
 i) Demographic  
 ii) Geographic 6M CO5 L2  
 b) Describe Marketing Mix with simple example 6M CO5 L3

OR

11. a) What do you understand from Market Segmentation? 6M CO5 L1  
 b) Discuss core concepts that are important in marketing 6M CO5 L1

\*\*\* End \*\*\*

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Code: 20A532T

II B.Tech. I Semester Supplementary Examinations June 2024

**Object Oriented Programming using Java**

(Common CSE, AI&DS, AI&ML, CSE(AI) and CSE(DS) )

Max. Marks: 70

Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

**(Compulsory question)**

1. Answer *all* the following short answer questions ( 5 X 2 = 10M )

a) List at least two benefits of constructor overloading

b) List at least two uses of abstract class

c) Define exception handling with an example

d) Define synchronization in the context JAVA programming

e) Discuss Java Lambda expressions

CO BL

1 L2

2 L1

3 L1

4 L2

5 L2

**PART-B**

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

Marks CO BL

**UNIT-I**

2. Discuss and elaborate the importance of three object oriented programming principles with a suitable program.

12M 1 L2

**OR**

3. Describe the working mechanism for a constructor to accept two objects as parameters and return an object, supported by a program.

12M 1 L3

**UNIT-II**

4. Show the concept of runtime polymorphism using method overriding in context of multilevel inheritance with a sample program.

12M 2 L3

**OR**

5. Examine the necessity and applications of "super" keyword with a sample program.

12M 2 L3

**UNIT-III**

6. Explain the working mechanism of interfaces with a sample code by highlighting the constants and methods.

12M 2 L2

**OR**

7. Discuss the concept of multiple catch statements with an example.

12M 2 L2

**UNIT-IV**

8. Explain how inter-thread communication works in Java programming, with a sample program.

12M 3 L2

**OR**

9. Explain the working mechanism of generic super class and generic subclass with a sample program.

12M 3 L2

**UNIT-V**

10. Illustrate how to pass Lambda expression as an argument to a method with a sample program.

12M 4 L3

**OR**

11. Explain the working mechanism of Map interface in JAVA. Write a programme for HashMap and TreeMap for adding and removing the elements.

12M 4 L2

\*\*\* End \*\*\*

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**Code: 20A533T**

II B.Tech. I Semester Supplementary Examinations June 2024

**Computer System Architecture**

(Common CSE, AI&DS, AI&ML, CSE(AI) and CSE(DS) )

Max. Marks: 70

Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

**(Compulsory question)**

- |   |     |    |
|---|-----|----|
| 1. Answer <b>all</b> the following short answer questions ( 5 X 2 = 10M ) | CO  | BL |
| a) Convert (27.35) <sub>8</sub> to the base of 10.                        | CO1 | L3 |
| b) Explain computer architecture in detail                                | CO2 | L2 |
| c) Explain the functions of an address bus and data bus                   | CO1 | L2 |
| d) Draw block diagram of combinational and sequential circuit             | CO2 | L4 |
| e) Write the instruction formats.   | CO2 | L3 |

**PART-B**

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

Marks CO BL

**UNIT-I**

- |  |    |     |    |
|--|----|-----|----|
| 2. a) What do you mean by complement of a number? Explain 1's and 2's complement method. | 6M | CO1 | L2 |
| b) Obtain the 1's and 2's complement of the following eight binary numbers               |    |     |    |
| i) 10101110      ii) 10000001      iii) 10000000   |    |     |    |
| iv) 00000001     v) 00000000   | 6M | CO1 | L3 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 3. a) Explain the functional architecture of the computer system. | 6M | CO1 | L2 |
| b) Discuss about fixed point and floating point representations   | 6M | CO1 | L3 |

**UNIT-II**

- |  |    |     |    |
|--|----|-----|----|
| 4. a) Simplify the following Boolean function using four variable K-map. Also draw logic diagram of original and simplified circuit: $F(w,x,y,z) = (2,3,4,5,6,7,11,14,15)$ | 6M | CO1 | L2 |
| b) List the different types of logic gates? Draw the logic circuits and write the truth tables for each logic gate.  | 6M | CO1 | L3 |

**OR**

5. a) Draw and explain the full adder using 8 to 1 multiplexer. 6M CO2 L2  
 b) Explain how a program is executed in reality. Do make sure that your explanation details about PC, MAR, MBR, IR, etc registers. 6M CO2 L2

**UNIT-III**

6. a) Write and explain algorithm for floating point addition. 6M CO1 L2  
 b) Explain the three different types of instruction formats used in basic computer 6M CO1 L1

**OR**

7. a) What is an addressing mode? List various addressing modes and write brief notes on each. 6M CO1 L1  
 b) For the pattern  $X = (A+B)*(C+D)$ , explain three-, two-, one- and zero-address instructions by giving the syntax. 6M CO1 L1

**UNIT-IV**

8. a) What are the three types of CPU organizations and explain with an example? 6M CO1 L2  
 b) Illustrate multiple bus organization with neat diagram 6M CO3 L2

**OR**

9. a) Write short notes on Hardwired Control and Micro-programmed Control 6M CO2 L4  
 b) Draw and explain the concept of memory hierarchy. 6M CO1 L2

**UNIT-V**

10. What is DMA? Explain DMA transfer in a computer system 12M CO2 L4

**OR**

11. a) What are handshaking signals? Explain the handshake control of data transfer during input and output operation. 6M CO2 L4  
 b) Explain the functions of typical input-output interface. 6M CO1 L2

\*\* End \*\*

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**Code: 20A531T**

II B.Tech. I Semester Supplementary Examinations June 2024

**Database Management Systems**

(Common CSE, AI&DS, AI&ML, CSE(AI) and CSE(DS) )

Max. Marks: 70

Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

**PART-A**

(Compulsory question)

1. Answer **all** the following short answer questions ( 5 X 2 = 10M )
- |   | CO  | BL |
|---|-----|----|
| a) Explain significance of Data Dictionary in DBMS? | CO1 | L2 |
| b) Define a View                                    | CO2 | L1 |
| c) Give Syntax of SQL                               | CO3 | L1 |
| d) Explain Disadvantages of Normal Forms            | CO4 | L2 |
| e) What are TCL commands in DBMS                    | CO5 | L2 |

**PART-B**

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

- |   | Marks | CO  | BL |
|---|-------|-----|----|
| <b>UNIT-I</b>   |       |     |    |
| 2. a) Compare and Contrast Delete and Drop  | 4M    | CO1 | L2 |
| b) Analyze the Architecture of DBMS with diagram  | 8M    | CO1 | L4 |
| <b>OR</b>   |       |     |    |
| 3. a) Who are the different types of database end users?<br>Discuss the main activities of each | 6M    | CO1 | L1 |
| b) Compare and Contrast File System and DMBS?   | 6M    | CO1 | L2 |
| <b>UNIT-II</b>  |       |     |    |
| 4. a) Explain Domain Constrains with examples   | 6M    | CO2 | L3 |
| b) Explain any 3 Key Constraints with examples  | 6M    | CO2 | L3 |
| <b>OR</b>   |       |     |    |
| 5. a) Explain Various types of attributes in E-R Model with symbols and example                 | 6M    | CO2 | L3 |
| b) Explain Weak entity with example   | 6M    | CO2 | L3 |



<b>UNIT-III</b>
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6. Consider the following relations  
 Sailors(sid, sname, rating, age)  
 Boats(bid, bname, color)  
 Reserves(sid, bid, day)
- Write the statements in relational Algebra, Relational calculus, Domain Relational calculus and SQL for the following.
- Find the names of sailors who have reserved a Red boat.
  - Find the names of sailors who have reserved at least one boat.
  - Find the names of sailors who have reserved Red and Green boat.
  - Find the names of sailors who have reserved Red or a White boat.
  - List all sailors names
  - List all red color bid

12M CO3 L4

**OR**

- Compare and Contrast Views and Table
  - Analyze Set Operators with examples

6M CO3 L2

6M CO3 L3

<b>UNIT-IV</b>
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- Explain 1NF and 2NF with examples
  - Explain Multivalued dependency and 4NF with example

6M CO4 L3

6M CO4 L3

**OR**

- Explain Lossless Join Decomposition with examples
  - Explain Armstrong's Axioms in Functional Dependency in DBMS

6M CO4 L3

6M CO4 L2

<b>UNIT-V</b>
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- What are properties of transaction
  - Explain Serializability with example

6M CO5 L2

6M CO5 L3

**OR**

- Why concurrency control is needed demonstrate with example
  - Explain about lock based concurrency control.

6M CO5 L3

6M CO5 L3

\*\*\* End \*\*\*