Code No: **R22A0504**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular/Supplementary Examinations, April 2025

Database Management Systems

(CSE-AIML, CSE-DS & B.Tech-AIML)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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		PART-A (10 Marks) **(Write all answers of this part at one place)**	**BCLL**	**CO(s)**	**Marks**
1	A	What four main types of actions involve databases?	**L1**	**CO-I**	**[1M]**
	B	What is entity and entity set?	**L1**	**CO-I**	**[1M]**
	C	What are the different operators in relational algebra	**L2**	**CO-II**	**[1M]**
	D	What is the purpose of group by clause in the SELECT statement in SQL?	**L1**	**CO-II**	**[1M]**
	E	Give an example of a relation schema R and a set of dependencies such that R is in BCNF but is not in 4NF.	**L2**	**CO-III**	**[1M]**
	F	Is there any reason to design a database schema that is in 2NF, but is in no higher-order normal form?	**L1**	**CO-III**	**[1M]**
	G	Define the violations caused by each of the following: dirty read, nonrepeatable read, and phantoms.	**L2**	**CO-IV**	**[1M]**
	H	How does the two-phase locking protocol guarantee serializability?	**L1**	**CO-IV**	**[1M]**
	I	What are states of transactions?	**L1**	**CO-V**	**[1M]**
	J	Define check point?	**L2**	**CO-V**	**[1M]**
		PART-B (50 Marks) **SECTION-I**			
2	A	Discuss the capabilities that should be provided by a DBMS.	**L2**	**CO-I**	**[5M]**
	B	Discuss the main categories of data models.	**L2**	**CO-I**	**[5M]**
		OR			
3	A	Suppose the advisor relationship set were one-to-one. What extra constraints are required on the relation advisor to ensure that the one-to-one cardinality constraint is enforced? Explain with example.	**L2**	**CO-I**	**[5M]**
	B	Differentiate relation schema and relational instance? Define the terms arity and degree of s relation? What are domain constraints?	**L2**	**CO-I**	**[5M]**
		SECTION-II			
4	A	Describe different types of Joins in SQL.	**L3**	**CO-II**	**[5M]**
	B	Explain TRC and DRC queries with suitable examples.	**L3**	**CO-II**	**[5M]**

OR

5	A	Explain the select, project, Cartesian product and join operation in relational algebra with an example.	**L2**	**CO-II**	**[5M]**
	B	Outer join expressions can be computed in SQL without using the SQL outer join operation. To illustrate this fact, show how to rewrite each of the following SQL queries without using the outer join expression. a. select* from student natural left outer join takes b. select* from student natural full outer join takes	**L3**	**CO-II**	**[5M]**

SECTION-III

6	A	Explain why 4NF is a normal form more desirable than BCNF.	**L2**	**CO-III**	**[5M]**
	B	Explain about different types of functional dependences with examples.	**L3**	**CO-III**	**[5M]**

OR

7	A	Illustrate the multi-value dependency and the fourth normal form-4NF with an example.	**L2**	**CO-III**	**[5M]**
	B	Given a relation R(A, B, C, D) and Functional Dependency set FD = { AB → CD, B → C }, determine whether the given R is in 2NF? If not convert it into 2 NF.	**L3**	**CO-III**	**[5M]**

SECTION-IV

8	A	Draw a state diagram and discuss the different states that transactions through during execution.	**L2**	**CO-IV**	**[5M]**
	B	Explain ACID properties of a transaction in detail.	**L2**	**CO-IV**	**[5M]**

OR

9	A	Explain basic 2PL protocol with an example.	**L2**	**CO-IV**	**[5M]**
	B	Discuss two multiversion techniques for concurrency control. What is a certify lock? What are the advantages and disadvantages of using certify locks?	**L2**	**CO-IV**	**[5M]**

SECTION-V

10	A	Explain the purpose of the checkpoint mechanism. How often should checkpoints be performed? How does the frequency of checkpoints affect: • The time it takes to recover from a system crash?	**L2**	**CO-V**	**[5M]**
	B	Explain multiple granularity protocol.	**L2**	**CO-V**	**[5M]**

OR

11	A	Write about lock based recovery techniques.	**L2**	**CO-V**	**[5M]**
	B	What are the before image (BFIM) and after image (AFIM) of a data item? What is the difference between in-place updating and shadowing, with respect to their handling of BFIM and AFIM?	**L2**	**CO-V**	**[5M]**

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