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CBCS SCHEME

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BCS403

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Database Management Systems

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define Database. Explain the characteristics of database.	06	L2	CO1
	b.	Discuss three schema architecture with a diagram and explain the importance of mappings between the schema levels.	08	L2	CO1
	c.	Discuss the types of end users with suitable examples.	06	L2	CO1
		OR			
Q.2	a.	Illustrate the component modulus of DBMS and their interaction with a neat diagram.	06	L2	CO1
	b.	List and explain different types of attributes with example.	04	L2	CO1
	c.	Draw an ER-diagram for keeping track of information about 'Employee' database, taking into accounts at least five entities.	10	L2	CO1
		Module – 2			
Q.3	a.	Define the following terms: i) Primary key ii) Super key iii) Candidate key iv) Foreign key	04	L1	CO2
	b.	Discuss the various constraints violations during insert, delete and update operations with examples for each.	08	L3	CO2
	c.	Explain binary relational algebra operations with suitable examples.	08	L2	CO2
		OR			
Q.4	a.	Summarize the E-R to Relational Mapping algorithm with examples for each step.	07	L3	CO2
	b.	Discuss the various types of JOIN operation with an examples.	05	L2	CO2
	c.	Consider the following system: SAILORS(Sid, Sname, rating, age) BOATS(Bid, Bname, Bcolor) RESERVES(Sid, Bid, day) Obtain the relational algebra queries for the following : i) Find the name of sailors who reserved green boat. ii) Find the color of the boat reserve by "Naresh" iii) Find the name of the sailor who has reserved boat no. 1. iv) Find the Sid of sailors with age over 20 who have not reserved a boat.	08	L3	CO2

		Module – 3			
Q.5	**a.**	Explain informal design guidelines for relational schema design.	**04**	**L2**	**CO3**
	b.	Define Normalization. Explain with examples 1NF, 2NF, 3NF.	**08**	**L3**	**CO3**
	c.	Discuss the types of update anomalies in SQL with an example.	**08**	**L3**	**CO3**
		OR			
Q.6	**a.**	Explain with suitable example how constraints are specified in SQL during table creation.	**10**	**L3**	**CO3**
	b.	Consider the following schema: Employee (SSN, F_name, M_name, L_name, Address, Salary, D_no) Department (Dname, Dno, MgrSSN, Mgr_S_Date) i) Retrieve the name and address of all employees who work for the 'Research' Department. ii) Retrieve all employees whose address is in Houton, Texas. iii) Retrieve all employees in department 5 whose salary is between $30,000 and $40,000. iv) Update all employees in the 'Research' department a raise in salary of 10%. v) Delete employee having SSN = 123456789;	**10**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Discuss the importance of concurrency control and give an example for the same.	**06**	**L2**	**CO4**
	b.	Explain the states in transaction processing with a neat diagram.	**08**	**L2**	**CO4**
	c.	Discuss the ACID properties of database transaction.	**06**	**L2**	**CO4**
		OR			
Q.8	**a.**	What is the difference between 'where' and 'having' clause? Give an example.	**04**	**L2**	**CO4**
	b.	Write a note on the following with an example : i) Assertion ii) Triggers	**06**	**L2**	**CO4**
	c.	Create cursor for employee table and extract the values from the table. Declare the variable open the cursor and extract the values from the cursor. Close the cursor for the given relation Employee(E_id, E_Name, Age, Salary).	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	Discuss the two phase locking protocol used for concurrency control.	**08**	**L2**	**CO5**
	b.	Explain Multiversion concurrency control techniques in detail.	**08**	**L2**	**CO5**
	c.	Write a note on intension locking used to achieve granularity.	**04**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the characteristic of NOSQL systems.	**08**	**L2**	**CO5**
	b.	What are the basic operations of CRUD in MongoDB?	**06**	**L2**	**CO5**
	c.	Write a note on Neo4j Interfaces and Distributed System Characteristics.	**06**	**L2**	**CO5**

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