EPCET LIBRARY BANGALORE-49

EAST POINT COLLEGE OF ENGINEERING & TECHNOLOGY
An Autonomous Institution Affiliated to Visvesvaraya Technological University (VTU) Belagavi

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24AD42/24CI42/24CS42/24IC42/24IS42

Fourth Semester B.E. Degree Examination, May 2026
DATABASE MANAGEMENT SYSTEM

TIME:3 hrs. Max.Marks:100

Note: 1. Answer **any FIVE** full questions, choosing **ONE** question from **each MODULE.**
2. M: Marks, L: Bloom's level,C: Course outcomes.
3. Assume missing data suitably

		Module-1	M	L	C
Q.1	**a**	Describe three schema architecture. Why do we need mapping between schema levels	**05**	**L2**	**CO1**
	b	Define the following terms: (i) Database (ii) Schema (iii) Entity (iv) Program data independence (v) Degree of a relationship	**05**	**L1**	**CO1**
	c	Illustrate with a diagram the different components of a DBMS and describe how they interact with each other.	**10**	**L2**	**CO1**
		OR			
Q.2	**a**	Discuss the advantages of DBMS over traditional file systems	**06**	**L2**	**CO1**
	b	Draw an ER diagram for HOSPITAL Management system with the following PATIENTS(Pssn, Lastname, Firstname, PhoneNo, Sex, DOB, Address) DOCTORS(Dssn, Lastname, Firstname, PhoneNo, Sex, DOB, Address) BEDS(RoomNo, BedNo, Type, Status, Price) ACCOUNTS(DateIn, DateOut, Amount) Show all the types of Entities and Attributes. Assume your own Relationships, Participation constraints and Cardinality ratios with explanation	**10**	**L3**	**CO1**
	c	Explain Specialization and Generalization in ER modeling with suitable examples.	**04**	**L2**	**CO1**
		Module–2			
Q.3	**a**	Discuss the select and project operations in relational algebra with appropriate examples.	**04**	**L2**	**CO2**
	b	Explain the each step for ER to relational mapping algorithm with suitable example.	**10**	**L2**	**CO2**
	c	Explain the characteristics of relations.	**06**	**L2**	**CO2**
		OR			
Q.4	**a**	Describe the operations in relational algebra that are based on set theory. Explain their usage and conditions with examples.	**06**	**L2**	**CO2**
	b	Describe Entity Integrity and Referential Integrity with examples	**04**	**L2**	**CO2**

	c	Consider the following COMPANY database EMP(Name,SSN,Salary,SuperSSN,Gender,Dno) DEPT(DNum,Dname,MgrSSN,Dno) DEPT_LOC(Dnum,Dlocation) DEPENDENT(ESSN,Dep_name,Sex) WORKS_ON(ESSN,Pno,Hours) PROJECT(Pname,Pnumber,Plocation,Dnum) Write the relational algebra queries for the following (i)Retrieve the name, address, salary of employees who work for the Research department. (ii) Find the names of employees who work on all projects controlled by department number4. iii) Retrieve the SSN of all employees who either in department no :4 or directly supervise an employee who work in department number :4 (iv) Retrieve each department number, the number of employees in the department and their average salary. (v) Retrieve the names of employees who have no dependents	10	L3	CO2
		Module–3			
Q.5	a	Write the syntax for CREATE,ALTER,DROP and TRUNCATE commands in SQL with suitable examples	06	L2	CO3
	b	Explain different types of SQL constraints with suitable examples	10	L2	CO3
	c	Describe triggers in DBMS with syntax and example	04	L2	CO3
		OR			
Q.6	a	What is SQL? List its different types of languages.	05	L1	CO3
	b	Discuss the role of GROUP BY and HAVING clauses in SQL and explain how they are used with examples.	05	L2	CO3
	c	Consider the following relation schemas: Works(Pname, Cname, Salary) Lives(Pname, Street, City) located_in(Cname, City) Manager(Pname, Mgrname) Write SQL queries for the following: i) List the names of all persons who live in the city Bangalore. ii) Retrieve the names of all persons working for "Infosys" whose salary is greater than Rs. 50,000. iii) Find the names of all persons who live and work in the same city. iv) List the names of the people who work for Tech M along with the cities they live in. v) Find the average salary of employees working for Infosys.	10	L3	CO3
		Module–4			
Q.7	a	Discuss insertion,deletion and modification anomalies with an example.	06	L2	CO4
	b	Determine if the following schedule is serializable and explain your reasoning: i) T1: R(X)W(X) T2 : R(X)W(X) T1 : COMMIT T2 : COMMIT ii) T1: W(X)R(Y) T2 : R(X)W(Y) T1: COMMIT T2 : COMMIT	04	L2	CO4
	c	Discuss the types of problems that may encounter with transactions that run concurrently.	10	L2	CO4

		OR			
Q.8	**a**	With a neat diagram, explain transition diagram of a transaction.	**05**	**L2**	**CO4**
	b	Discuss the concept of two-phase locking and explain how it helps in achieving serializability	**05**	**L2**	**CO4**
	c	Explain the concept of 1NF, 2NF, 3NF and BCNF with example.	**10**	**L2**	**CO4**
		Module–5			
Q.9	**a**	Describe CRUD operations in MongoDB with examples	**10**	**L2**	**CO5**
	b	Discuss schema initialization in MongoDB.	**05**	**L2**	**CO5**
	c	Explain projection and aggregation in MongoDB with examples	**05**	**L2**	**CO5**
		OR			
Q.10	**a**	Define documents and collections in MongoDB	**04**	**L2**	**CO5**
	b	Explain how data is read from and written to MongoDB.	**08**	**L2**	**CO5**
	c	Explain the mechanisms available in MongoDB to retrieve only required data instead of full documents.	**08**	**L2**	**CO5**

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