EPCET LIBRARY BANGALORE-49

CBCS SCHEME

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BCS403

Fourth Semester B.E./B.Tech. Degree Examination, June/July 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 DBMS. Explain the main characteristics of the database approach.	5	L2	CO1
	b.	With a neat diagram, explain Three –Schema architecture. Justify the need of mappings among schema levels.	8	L2	CO1
	c.	Write short notes on : i) DB languages ii) DB Interfaces.	7	L1	CO1
		OR			
Q.2	a.	Differentiate between traditional file system Vs database systems.	5	L2	CO1
	b.	With a neat diagram, discuss various DB system environment components.	8	L2	CO1
	c.	Draw an ER diagram, for ONLINE SHOPPING database with atleast five entities. Specify primary key and participation constraints.	7	L3	CO2
		Module – 2			
Q.3	a.	Explain briefly domain, key, integrity and referential integrity constraints with necessary examples.	10	L2	CO1
	b.	Consider following relations and construct Relational Algebra queries for the following : SAILOR (Sid, Sname, Rating, Age) BOAT (Bid, Bname, Color) RESERVE (Sid, Bid, Day) i) Retrieve the color of boats reserved by "Deepak" ii) Retrieve the sailor names who have reserved 'Red' or 'Green' boats iii) Retrieve the SID of sailors with age over 25 who have not reserve a boat iv) Retrieve the total count of boats reserved by each sailor	10	L3	CO2
		OR			
Q.4	a.	Explain ER-to-Relational mapping algorithm with example	10	L2	CO1
	b.	Consider the following relations and construct Relations Algebra Queries. STUDENT(Sid, Sname, Major, GPA) FACULTY (Fid, Fname, Dept, Designation, Salary) COURSE (Cid, Cname, Fid) ENROLL (Cid, Sid, Grade) i) Retrieve the name of facilities who are receiving salary more than 34567.00 ii) List the name of all faculty members who teaches the course "BCS 403". iii) List all the departments having an average salary of above 45678.00 iv) List the names of students enrolled for the course "Mastering SGC".	10	L3	CO2

		Module – 3			
Q.5	**a.**	Define Functional dependency. Explain 1NF and 2NF with examples.	**10**	**L2**	**CO4**
	b.	Explain occurrences of types of anomalies while performing SQL operations.	**10**	**L2**	**CO3**
		OR			
Q.6	**a.**	What is multivalued dependency? Explain fourth normal form at examples.	**10**	**L2**	**CO4**
	b.	Describe the six clauses in the syntax of a SQL relational query. Show what type of constructs can be specified in each of the six clauses.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Consider following relation, construct SQL queries. EMPLOYEE (Fname, Lname, SSN, Address, Phone, Dno) DEPARTMENT (Dname, Dnumber, Mgr, SSn) PROJECT (Pname, Pnumber, Plocations) DEPENDENT (Name, Age, Relationship, Essn) WORKS ON (Pnum, EmpSSN, Hours) i) Make a list of all project number for projects that involve an employee whose last name is "Shetty: as a worker or as a manager of the department that controls the project ii) Retrieve name and address of all employees who work for the "Research" Department iii) Retrieve the name of each employees who works on all the project controlled by department number 555 iv) Find total number of employees, maximum salary, minimum salary, and average salary among employees who works for the "HR" department.	**10**	**L3**	**CO3**
	b.	Define Transaction processing. Explain ACID properties of transactions.	**10**	**L2**	**CO3**
		OR			
Q.8	**a.**	Consider following relations, construct SQL queries SALESMAN (Salesman_id, Name, City, Commission) CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id) ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id) i) Count the customer with grades above "GOA"s average ii) Find the name and numbers of all salesman who have more than one customer iii) List all salesman and indicate those who have and don't have customer in their cities (USING-UNION) iv) Demonstrate delete operation by removing salesman with ID 1008.	**10**	**L3**	**CO3**
	b.	Define Serializability, Elaborate characterizing schedules based on seralizability.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Elaborate 2PL techniques for concurrency control.	**10**	**L2**	**CO4**
	b.	Explain optimistic concurrency control techniques.	**10**	**L2**	**CO4**
		OR			
Q.10	**a.**	Explain Column-Family store database with a neat diagram.	**10**	**L2**	**CO4,5**
	b.	Explain in detail CAP Theorem.	**10**	**L2**	**CO4,5**