U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

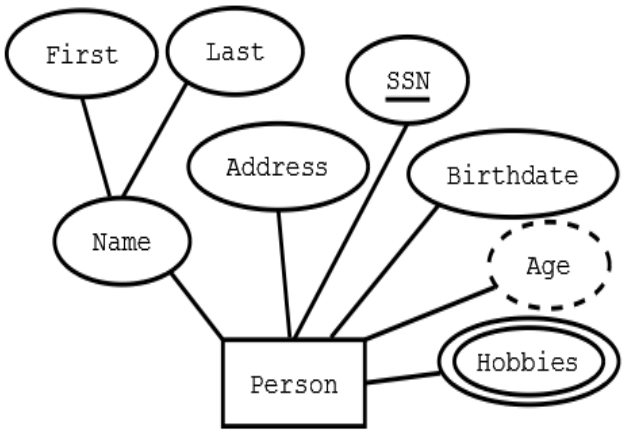
Autonomous Institute Affiliated to VTU

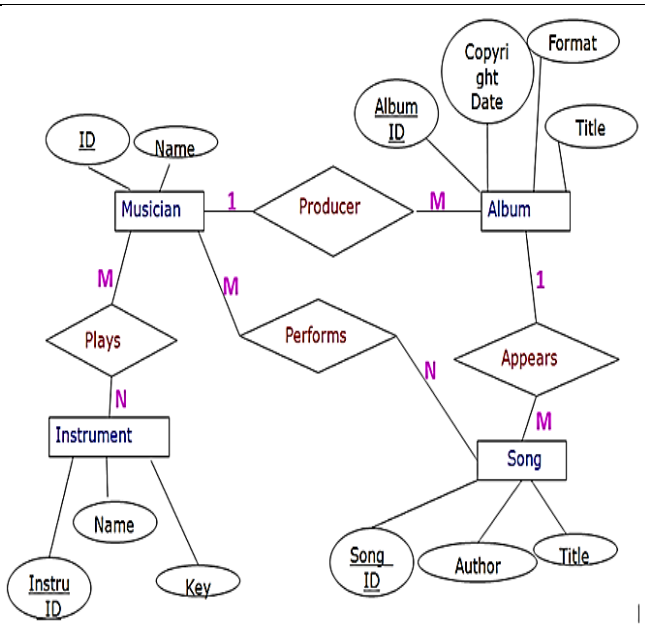
June 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 23IS4PCDBM/ 22IS4PCDBM/ 19IS4PCDBM **Max Marks: 100**
Course: Database Management System

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Identify and classify the different types of attributes in the given ER diagram. 	CO1		5
	b)	Provide the significance of data independence and types of data independence with examples.	CO1		7
	c)	Design a E R diagram for Company database choosing at least 4 entities and for each entity 4 attributes. Also, mention cardinality ratio.	CO1	PO1	8
		OR			
2	a)	Define with example for the following i) Strong entity ii) Types of Attributes	CO1		4
	b)	Transform the given ER diagram into relational tables and provide a justification for each table structure.	CO2	PO1	10

						
		c)	Interpret the advantages of DBMS over Traditional file system.	*CO1*		**6**
			UNIT - II			
	3	a)	Along with an example describe the types of Relational model constraints.	*CO2*	*PO1*	**10**
		b)	Formulate the SQL queries for the given database application: STUDENT (StudentID, Name, Department, Age) COURSE (CourseID, Title, Credits) ENROLLMENT (StudentID, CourseID, Grade) Write an SQL query i) Display the names of all students who are enrolled in the course titled 'Database Systems'. ii)Find the names of students who have enrolled in more than one course. iii)Find the names of students who are not enrolled in any course. iv)List the names of students and their grades in all courses they are enrolled in, sorted by student name and then course title.	*CO3*	*PO2*	**10**
			OR			
	4	a)	Interpret the following with syntax and examples. i) Subquery ii) Correlated Subquery	*CO2*	*PO!*	**6**
		b)	Consider the following database **Emp** (SSN, fname, Lname, Bdate, address, gender, salary, superSSN, Dnumber) Dept (Dnumber, Dname, MgrSSN, mgrstartdate) Dept_loc (Dnumber, Location) Project (Pnumber, Pname, Plocation, Dnumber) Works on (ESSN, Pnumber, hours) Dependent (ESSN, dependent name, gender, bdate, relationship). **Write SQL Queries for the following:**	*CO2*	*PO2*	**8**

			i) Retrieve the salary of every employee and all distinct salary values ii) Retrieve the name of managers who have at least one dependent. iii) Retrieve name and address of all employees who work for 'Research' dept iv) Retrieve names of all employees who do not have supervisors			
		c)	i). Write SQL statement to list name of the students whose names start with letter 'A' or 'D' but end with letter 'h''. ii). Write SQL statement to list name of the students whose names are having the substring 'in'?	***CO21***	***PO1***	**6**
			UNIT - III			
	5	a)	Apply i) Equi Join ii) Outer Join iii) Left Outer Join iv) Right Outer Join for the following relations. TABLE T1 A | Q | R 10 | a | 5 15 | b | 8 25 | a | 6 TABLE T2 A | B | C 10 | b | 6 25 | c | 3 10 | b | 5	***CO2***	***PO1***	**8**
		b)	Describe Mango DB CRUD operations with example	***CO2***	***PO1***	**8**
		c)	Differentiate between MYSQL and NOSQL.	***CO1***		**4**
			OR			
	6	a)	Illustrate with an example the different Categories of NOSQL Systems.	***CO2***	***PO1***	**8**
		b)	Given the following schema: Emp (fname, Lname, SSN, Bdate, address, gender, salary, super SSN, Dno) Dept (Dname, Dnumber, MgrSSN, mgrstartdate) Dept_loc (Dnumber, Dloc) Project (Pname, Pnumber, Ploc, Dnum) Works on (ESSN, Pno, hours) Dependent (ESSN, dependent name, gender, bdate, relationship) **Give the relation algebra Queries for the following**: i) Retrieve the name of the manager of each department. ii) Retrieve the names of employees who work on all the project controlled by department 5. iii) Retrieve the name of employee who have no dependents. iv) Retrieve number of Male and Female employee working in the Company	***CO3***	***PO2***	**8**
		c)	State the CAP theorem in NOSQL and explain.	***CO2***	***PO12***	**4**
			UNIT - IV			
	7	a)	Illustrate the four Informal Design guidelines with suitable example.	***CO1***		**8**

		b)	For the given relation R (A, B, C, D, E, F) the given FDs are F: {C→F, E→A, EC→D, A→B} Find out the i) Candidate Key ii) Prime Attribute iii) Non-prime attribute	CO4		6
		c)	Interpret Armstrong's Axioms and their significance in normalization, using examples to demonstrate inferred functional dependencies	CO2	PO1	6
			OR			
	8	a)	Given a set of attributes **S = {A, B, C, D}** and the following **functional dependencies**: • A → B • B → C • C → A **Determine all candidate keys** for the relation.	CO3	PO2	4
		b)	Consider the universal relation R= {A, B, C, D, E, F, G, H, I, J} and the set of functional Dependencies {AB→C, A→DE, B→F, F→GH, D→IJ} Find the key for R? Decompose R into 2NF and then 3NF relations	CO3	PO2	10
		c)	Show the different classification of Functional Dependencies with an example for each.	CO4		6
			UNIT - V			
	9	a)	Discuss the ACID Properties of a database transaction.	CO1		6
		b)	Illustrate the state transaction diagram in detail.	CO2	PO1	6
		c)	Describe the Two-phase locking techniques in concurrency control	CO2	PO1	8
			OR			
	10	a)	Discuss the problems that occur when concurrent execution is uncontrolled along with examples	CO1		10
		b)	Consider the following **four schedules** S1, S2, S3 and S4. Draw the **serializability (precedence) graphs** for all four schedules and find whether each **schedule is conflict serializable or not**. **S1:** r1(X); r2(X); w1(X); r3(X); w2(X) **S2:** r2(X); r1(X); w2(X); r3(X); w1(X) **S3:** r3(X); r2(X); r1(X); w2(X); w1(X) **S4:** r2(X); w2(X); r3(X); r1(X); w1(X)	CO3	PO2	10

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