U.S.N.										

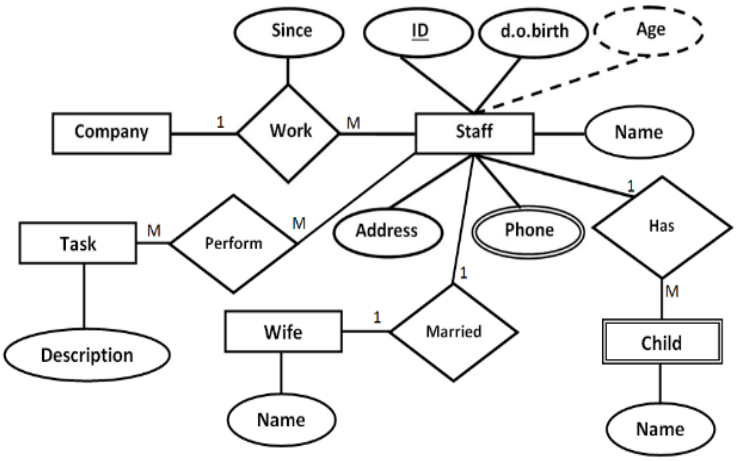
B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 22IS4PCDBM **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.

				CO	PO	Marks
			UNIT - I			
1	a)		Make use of Three Schema Architecture to emphasize how Data Independence is achieved in DBMS.	CO1		**10**
	b)		List the characteristics of DBMS and explain in detail.	CO1		**05**
	c)		Design a schema diagram for a Payroll Database Application with atleast four schemas and identify the metadata for the same.	CO2	PO1	**05**
			UNIT - II			
2	a)		Analyze an ER Diagram for Order Database considering the Orders, Customers and Salesman as entities having suitable attributes and relations.	CO2	PO2	**10**
	b)		Identify the number of tables required to convert the ER diagram to a Relational Database. Justify your answer by mentioning the rules for conversion. 	CO2	PO2	**10**

			UNIT - III			
	3	a)	Provide the various database modification or update operations with appropriate syntax of Relational DataBase Management System. Also specify types of constraints that may be violated by each of these operations.	CO2	PO2	**10**
		b)	Consider the following schema for Order Database and Apply the concepts of SQL to solve queries **SALESMAN** (S_id, Name, City) **CUSTOMER** (C_id, C_Name, City, Grade, S_id) **ORDERS** (Ord_No, Ord_Amt, O_Date, C_id, S_id) a) Count the customers with grades above Bangalore's average. b) Find the name and numbers of all salesmen who had more than one customer. c) List all salesmen and indicate those who have and don't have customers in their cities d) Find the salesman who has the customer with the highest amount order. e) Create the above tables with appropriate constraints	CO3	PO4	**10**
			UNIT - IV			
	4	a)	Design the relational algebra expression for the following queries using given schema: **SAILORS** (Sid, Sname, rating, age) **BOATS** (bid, bname, color) **RESERVES** (Sid, bid, day) 1. Find the names of sailors who have reserved green boat. 2. Find the names of sailors who have reserved all boats. 3. Find the names of sailors who have reserved boat with B_id= 103. 4. Find the colors of boats reserved by Ram. 5. Find the names of the sailors who have reserved a red or green boat.	CO3	PO4	**10**
		b)	Design the following Join operations and emphasize their working by choosing a suitable relational database. a) Equi Join b) Natural Join	CO3	PO4	**05**
		c)	Design the use of following functions using SQL statements. a) Count b) Max c) Avg d) Sum e) Having	CO3	PO4	**05**
			OR			
	5	a)	Identify the need for normalization in DBMS and infer with example First, Second and Third Normal Forms.	CO2	PO2	**10**
		b)	Given a relation R(X,Y,Z,W,P) and Functional Dependency set FD = {X->Y, Y->P and Z->W}, Determine whether the given R is in 3NF. If not convert it into 3NF.	CO2	PO2	**10**

			UNIT - V			
	6	a)	Check whether the given schedule is Conflict Serialzable or not. S: R1(A), R2(A), R1(B), R2(B), R3(B), W1(A), W2(B)	CO2	PO2	**05**
		b)	Analyze how the following concepts of concurrency control in DBMS hinders to develop the reliable database systems. a. Dirty Read b. Lost Update c. Non repeatable read d. Incorrect Summary Problem	CO2	PO2	**10**
		c)	Design and discuss the CAP theorem.	CO1		**05**
			OR			
	7	a)	Infer how the 2-phase locking protocol can be utilized for achieving concurrency control in in DBMS.	CO1		**08**
		b)	Analyze the different states of transaction execution with a state transition diagram.	CO2	PO2	**05**
		c)	Identify the locking scheme which uses the three operations read_lock(X), write_lock(X) and unlock(X) and explain the same.	CO2	PO2	**07**

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