U.S.N.										

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

Autonomous Institute Affiliated to VTU

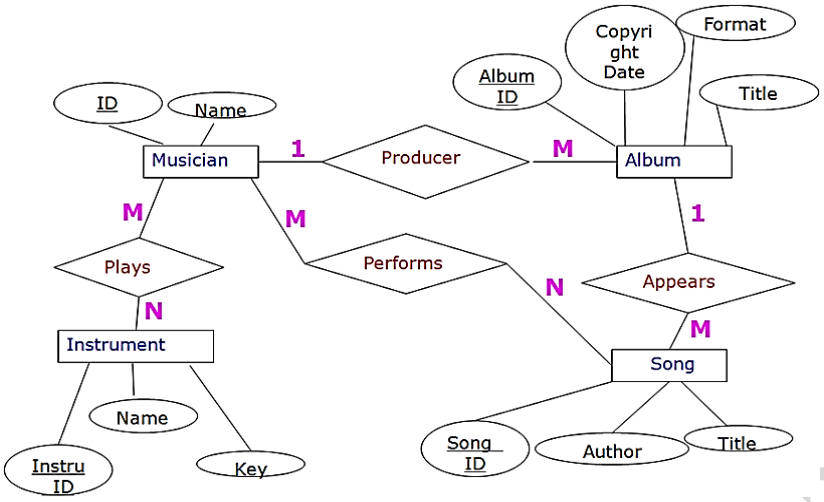
April 2024 Semester End Main Examinations

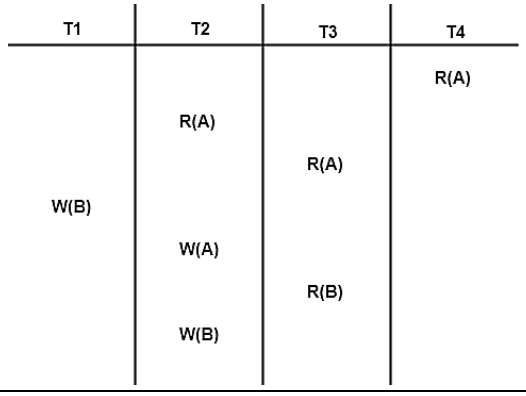
Programme: B.E. **Semester: III**
Branch: Computer Science & Engineering **Duration: 3 hrs.**
Course Code: 22CS3PCDBM **Max Marks: 100**
Course: Database Management System

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

		UNIT - I	CO	PO	Marks
1	a)	List And explain the main characteristics of Database approach.	CO1	PO1	**05**
	b)	Consider the following tables Works (Pname, Cname, Salary) Lives (Pname, Street, City) Locatedin (Cname, City) Manager (Pname, Mgrname) Where Pname = Person name, Cname = Company name, Mgrname = Manager name Write the SQL for the following: (i) List the names of the people who work for company Wipro along with the cities they live in. (ii) Find the people who work for the company "Infosys" with salary more than Rs. 50000/-. List the names of the people, along with the streets and city addresses. (iii) Find the names of the persons who live and work in the same city. (iv) Find the names of the person who do not work for "Infosys". (v) Find the persons whose salaries are more than that of all of the 'Oracle' employee.	CO2	PO2	**10**
	c)	Consider the below table Loan_Records Borrower Bank_Manager Loan_Amount Ramesh Sunderajan 10000.00 Suresh Ramgopal 5000.00 Mahesh Sunderajan 7000.00 Predict the output of the following query SELECT Count(*) FROM ((SELECT Borrower, Bank_Manager FROM Loan_Records) AS S NATURAL JOIN (SELECT Bank_Manager, Loan_Amount FROM Loan_Records) AS T);	CO2	PO2	**05**

			OR			
	2	a)	Explain Three- Schema Architecture with a neat Diagram.	*CO1*	*PO1*	**05**
		b)	Consider the following tables: EmployeeDetails(EmpId,FullName,ManagerId,DateOfJoining, City) EmployeeSalary(EmpId, Project,Salary) **i)** Fetch all the employees who are not working on any project. ii) Fetch employee names having a salary greater than or equal to 5000 and less than or equal to 10000. iii) Fetch all employee records from the EmployeeDetails table who have a salary record in the EmployeeSalary table. iv) Fetch the project-wise count of employees sorted by project's count in descending order. v) Write a query to find employees who earn more than their managers	*CO2*	*PO2*	**10**
		c)	**A relational schema for a train reservation database is given below.** **Passenger (pid, pname, age)** **Reservation (pid, class, tid)** Table: Passenger pid pname age 0 Sachin 65 1 Rahul 66 2 Sourav 67 3 Anil 69 Table : Reservation pid class tid 0 AC 8200 1 AC 8201 2 SC 8201 5 AC 8203 1 SC 8204 3 AC 8202 Predict the output of the following query SELECT pid FROM Reservation , WHERE class 'AC' AND EXISTS (SELECT * FROM Passenger WHERE age > 65 AND Passenger. pid = Reservation.pid)	*CO2*	*PO2*	**05**
			UNIT – II			
	3	a)	Differentiate between Nested subquery and correlated subquery with an example.	*CO1*	*PO1*	**06**
		b)	A bank has many branches, and a large number of customers. A customer can open many different kinds of accounts with the bank. The bank keeps track of the customer with his SSN, name, address, and phone number. Age is a factor to check whether he is a major. There are different types of loans, each identified by a loan number. Customer can take out more than one type of loan, and all branches can give loans. Loans have a duration and interest rate. The account holder can enquire about the balance in his account. Draw an ER Diagram for the bank. Make suitable assumptions and use them in showing maximum and minimum cardinality ratios.	*CO3*	*PO3*	**08**

		c)	Convert the following ER diagram to schema diagram 	*CO2*	*PO2*	**06**
			OR			
	4	a)	Write the ER diagram notations used for the following: i) Attribute ii) Composite Attribute iii) Multivalued Attribute iv) Derived Attribute v) Key Attribute vi) Entity	*CO1*	*PO1*	**06**
		b)	Consider the following schema Employee(fname,minit,lname,SSN,bdate,address,salary,superSSN,Dno) Department(dname,dnumber,mgrssn,mgrstartdate) Department_loc(dnumber,dlocation) Project (pname,pnumber,plocation,dnum) Works_on(ESSN, pno,hours) Dependant(ESSN,dep_name,bdate,relationship) Write relational algebra expression for the following: i)Find the fname and lname of employees in department 4 that earn > 50000 ii) Find fname and lname of all employees that do not have any dependents iii) Find project name for all projects worked on by John Smith iv) Find fname and lname of all employees working in the "Research" department that earn more than $50,000.	*CO2*	*PO2*	**08**
		c)	Find the quotient for the following : A/B1 , A/B2, and A/B3; where A , B1, B2 and B3 are: A = SNo PNo S_1 P_1 S_1 P_2 S_1 P_3 S_1 P_4 S_2 P_1 S_2 P_2 S_3 P_2 S_4 P_2 S_4 P_4 B_1 = PNo: P_2 B_2 = PNo: P_2, P_4 B_3 = PNo: P_1, P_2, P_4	*CO2*	*PO2*	**06**

			UNIT-III			
	5	a)	Explain forth normal form and fifth normal form with an example for each.	*CO1*	*PO1*	**06**
		b)	What is the key of R? Decompose R into 2NF and 3NF relations R(A,B,C,D,E,F,G,H,I,J) {A,B} -> {C} {B,D} -> {E,F} {A,D} -> {G,H} {A} -> {I} {H} -> {J}	*CO2*	*PO2*	**08**
		c)	Consider a relation R(A,B,C,D,E,F) F: E->A, E->D, A->C, A->D, AE->F, AG->K. Find the closure of E	*CO2*	*PO2*	**06**
			UNIT - IV			
	6	a)	List and explain the different types of NoSQL databases with an example for each.	*CO1*	*PO1*	**06**
		b)	Consider a table "Students " with the following columns: StudRollNo / _id, StudName ,Grade, Hobbies, DOJ Write the equivalent SQL and MongoDB queries for the following: 1. To display only the students name from all the documents of the Students collection. 2. To display only the student name, grade as well as the identifier from the document of the Student collection where the _id column is 1. 3. To find those documents where the grade is not set to VIII. 4. To find those documents from the Students collection where the hobbies is set to 'chess' and the student name is set to 'Akshay'. 5. To find documents from the Students collection where the student name ends in 's'.	*CO2*	*PO2*	**08**
		c)	Differentiate between SQL and NoSQL.	*CO1*	*PO1*	**06**
			UNIT - V			
	7	a)	List and explain the desired properties of transaction.	*CO1*	*PO1*	**06**
		b)	Consider following schedule. Determine whether each schedule is Strict, Cascadeless, Recoverable or non-recoverable. Provide justification to your answer. 1. R1(X), W1(X), R1(Y), W1(Y), C1, R2(X), W2(X), C2 2. R1(X), W1(X), R1(Y), W1(Y), R2(X), W2(X), C2, C1 3. R1(X), R2(X), W1(X), R1(Y), W1(Y), C1, W2(X), C2 4. R1(X), R2(X), W2(X), W1(X), C2, R1(Y), W1(Y), C1	*CO2*	*PO2*	**08**
		c)	Check whether the given schedule S is conflict serializable or not by constructing precedence graph. If yes, then determine all the possible serialized schedules 	*CO2*	*PO2*	**06**

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