U.S.N.										

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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E. **Semester: III**
Branch: CSE(DS),/CSE(ICB) /AI & DS **Duration: 3 hrs.**
Course Code: 23DC3PCDBM **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.

SUPPLEMENTARY EXAMS 2024

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)	With a neat diagram explain the 3-schema architecture of database approach.	*CO1*	*PO1*	**07**
	b)	As a part of project work, the students of 3rd semester design the database for their application. Illustrate any four types of constraints that they can specify when tables are created in SQL with syntax, assuming suitable schema.	*CO1*	*PO1*	**04**
	c)	EMPLOYEE (SSN, Name, Address, Gender, Salary, SuperSSN, DNo) DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate, DLoc) PROJECT (PNo, PName, PLocation, DNo) WORKS_ON (SSN, PNo, Hours) For the above given schema, write the SQL query for : 1. Find the resulting salaries if every employee working on the 'IoT' project is given a 15 percent raise 2. Retrieve the average salary for each department whose name starts with CSE 3. Retrieve the department with the highest average salary 4. Retrieve the departments where the number of employees exceeds the average number of employees across all departments 5. Retrieve the employee(s) who have been with the company the longest 6. Retrieve the employees who have a manager and display their manager's name	*CO3*	*PO3*	**09**
		UNIT - II			
2	a)	Explain the following terms: a) Schema b) Cardinality Ratio c) Weak Entity d) Domain of an Attribute	*CO1*	*PO1*	**08**

		b)	Illustrate with a real-world example, the importance of entity and referential integrity constraints to maintain data consistency and reliability of relational databases.	*CO2*	*PO2*	**06**
		c)	Design an ER-diagram for the Bank-database considering the following requirements: a. Each bank has multiple branches with registered customers. b. Customers maintain account at different branches c. Each branch offers loans to its customers Is there a weak entity type. If so, give its name, partial key and identifying relationship. Represent the cardinality ratio on each participation of entities in relationship	*CO3*	*PO3*	**06**
			OR			
	3	a)	Explain the different types of attributes with their ER notation and an example	*CO1*	*PO1*	**06**
		b)	Elucidate the relational model characteristics that must be considered during database design.	*CO2*	*PO2*	**08**
		c)	Develop a set of guidelines for effectively applying the ER to Relational Mapping Algorithm in database design projects.	*CO3*	*PO3*	**06**
			UNIT - III			
	4	a)	Illustrate with appropriate syntax and an example for each relational operations in detail. i) PROJECT ii) JOIN iii) INTERSECTION iv) MINUS v) EQIJOIN	*CO1*	*PO1*	**10**
		b)	i) Find the candidate keys present in given relation R (A, B, C, D) and Functional dependency {AB→CD, D→B, C→A} and justify your answer. ii) For the relation R(A B C D), find closure of A+ , given {A→B, BC→D, D→A} and justify your answer.	*CO2*	*PO2*	**10**
			OR			
	5	a)	Explain Functional dependencies with a suitable example. List and explain the inference rules of functional dependency.	*CO1*	*PO1*	**10**
		b)	Define Normalization. Explain multivalve dependency and fourth and fifth normal form, with an example	*CO1*	*PO1*	**10**
			UNIT - IV			
	6	a)	Draw a state transition diagram and illustrate the states for transaction execution.	*CO1*	*PO1*	**06**
		b)	Explain Two Phase Locking Protocol for concurrency control. What are its disadvantages?	*CO1*	*PO1*	**08**
		c)	Determine if the below given two bank transaction sequence lead to deadlocked situation and justify using wait for graph technique.	*CO2*	*PO2*	**06**

SUPPLEMENTARY EXAMS 2024

			<table><tr><th>T1</th><th>T2</th></tr><tr><td>lock-X(A)</td><td>lock-X(A)</td></tr><tr><td>read(A)</td><td>lock-X(B)</td></tr><tr><td>A=A-5000</td><td>lock-X(C)</td></tr><tr><td>write(A)</td><td>….</td></tr><tr><td>lock-X(B)</td><td>read(A)</td></tr><tr><td>read(B)</td><td>A=A+(A*0.25)</td></tr><tr><td>B=B+5000</td><td>write(A)</td></tr><tr><td>write(B)</td><td>….</td></tr><tr><td>commit</td><td>commit</td></tr></table>			
		UNIT - V			
7	a)	Demonstrate the different RAID techniques and RAID Levels that an organization can leverage to meet their storage solutions.	*CO1*	*PO1*	**10**
	b)	Define indexing. Explain primary and secondary indexing of records.	*CO1*	*PO1*	**10**

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