13/5/2024 (E)

SOMAIYA VIDYAVIHAR UNIVERSITY

Maximum Marks: 100	Semester: January 2024 – April 2024 Examination: ESE Examination		Duration:3 Hrs.
Programme code: 1 Programme:B.Tech Computer Engineering		Class: SY	Semester:IV (SVU 2020)
Name of the Constituent College: K. J. Somaiya College of Engineering		Name of the department: Computer	
Course Code: 116U01C403	Name of the Course: Relational Database Management System		
Instructions: 1)Draw neat diagrams 2) All questions are compulsory 3) Assume suitable data wherever necessary			

Que. No.	Question	Max. Marks
Q1	Solve any **Four**	20
i)	Discuss the advantages of using a Database management system over a file system	5
ii)	With respect to an ER diagram, what does the participation constraint specify? What are the two types of participation constraints?	5
iii)	Explain the basic steps of query processing with a suitable diagram.	5
iv)	State the four informal guidelines used as measures to determine the quality of relation schema design	5
v)	Draw a state diagram and discuss the typical states that a transaction goes through during execution.	5
vi)	Discuss Data Control commands in SQL with example	5

Que. No.	Question	Max. Marks
Q2 A	Solve the following	10
i)	Can identifying relationship of a weak entity be of degree greater than two? Give example to illustrate your answer	5
ii)	Discuss entity integrity and referential integrity constraints with an example	5
	OR	
Q2 A	What is a view? How do views help in database management? Can you give an example of when they're useful?	10
Q 2 B	Solve any **One**	10
i)	Explain the process of mapping an Entity-Relationship (ER) model to the Relational model. Illustrate with an example.	10
ii)	What are the different types of joins in relational algebra? Provide examples for any 4	10

Que. No.	Question	Max. Marks
Q3	Solve any **Two**	20
i)	Consider the following database schema: member(membno, name) book(isbn, title, authors, publisher) borrowed(membno, isbn, date)	10

	Write SQL queries a) Update the author of Database system book to "Korth" b) Find the average number of books borrowed per member c) Find the member number and name of each member who has borrowed every book published by "McGraw-Hill"	
ii)	Discuss any 5 algorithms used for implementing SELECT relational algebra operation and circumstances under which each algorithm can be used	10
iii)	Consider the three transactions T1, T2, and T3, and the schedules S1 and S2 given below. Draw the serializability (precedence) graphs for S1 and S2, and state whether each schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedule(s). T1: r1 (X); r1 (Z); w1 (X); T2: r2 (Z); r2 (Y); w2 (Z); w2 (Y); T3: r3 (X); r3 (Y); w3 (Y); S1: r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); w3 (Y);r2 (Y); w2 (Z); w2 (Y); S2: r1 (X); r2 (Z); r3 (X); r1 (Z); r2 (Y); r3 (Y); w1 (X);w2 (Z); w3 (Y); w2 (Y);	10

Que. No.	Question	Max. Marks
Q4	Solve any **Two**	**20**
i)	Consider the relation schema R = (A, B, C, D, E) and set of functional dependencies. A →BC CD →E B→ D E→ A List the candidate keys for R? Decompose R into 2NF and 3NF relation	10
ii)	Discuss the ACID properties of transactions and their significance in ensuring data consistency and reliability.	10
iii)	Discuss the Two-Phase Locking (2PL) protocol for concurrency control in database systems. How does it ensure serializability?	10

Que. No.	Question	Max. Marks
Q5	(Write notes / Short question type) on any **four**	**20**
i)	Database Administrator	5
ii)	User-defined and Predicate defined subclasses	5
iii)	Triggers in SQL	5
iv)	Boyce-Codd Normal Form	5
v)	Shadow paging recovery technique	5
vi)	Deadlock handling- wait for graph	5