SOMAIYA VIDYAVIHAR UNIVERSITY

23/05/2022(E)

Semester: January 2022 – May 2022 **Maximum Marks:**100 **Examination: ESE Examination** **Duration:**3 hrs		
Programme code: 01 **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:** COMP	
Course Code: 116U01C403	**Name of the Course:** Relational Database Management System	
Instructions: **1) All Questions are Compulsory.** **2) Draw neat diagrams.** **3) Assume suitable data if necessary.**		

Question No.		Max. Marks
Q 1	**Attempt any two.** i) List and explain the various users of database and their roles. ii) Describe different applications of database. iii) State and explain concerns while using an enterprise database.	10 M
Q 2 (a)	A university registrar's office maintains data about the following entities: (a) courses including course_number, title, credits, syllabus, and prerequisites (b) course_offerings including year, semester, section_number, instructor(s), timings, and classroom_no (c) students including student_id, name, and program (d) instructors including identification_number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. i. Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints. ii. Show relational mapping for the ER diagram. **OR** Draw EER model and show relational mapping for Insurance Management System. Assume required data.	10 M
Q 2 (b)	Consider following schema; Branch (branch_name, branch_city, assets) customer (customer_name, customer_street, customer_city) loan (loan_number, branch name, amount) borrower (customer_name, loan_number) account (account_number, branch name, balance) depositor (customer_name, account_number) Write SQL for the following; i) Find all customers who have a loan at the bank but do not have an account. ii) Find all customers that have both an account and a loan. iii) Write PL/SQL function to add records in the Branch table. iv) Apply not null constraint to amount attribute by altering structure of table loan.	10 M

<table>
<tr><td>Q 3 (a)</td><td>Attempt any two.
i) Explain Domain Constraint and Referential Integrity constraint with On Delete Cascade with suitable example
ii) Describe security mechanism in SQL.
iii) Explain the working of REVOKE and TRUNCATE command with example.</td><td>10 M</td></tr>
<tr><td>Q 3 (b)</td><td>Consider the following relational database schema consisting of the four relation schemas:
passenger (pid, pname, pgender, pcity)
agency (aid, aname, acity)
flight (fid, fdate, time, src, dest)
booking (pid, aid, fid, fdate)
Answer the following questions using relational algebra queries;
i) Find only the flight numbers for passenger with pid 123 for flights to Chennai before 06/11/2020.
ii) Find the passenger names for those who do not have any bookings in any flights.
iii) Get the details of flights that are scheduled on both dates 01/12/2020 and 02/12/2020 at 16:00 hours.
iv) Find the details of all male passengers who are associated with agency.</td><td>10 M</td></tr>
<tr><td>Q 4 (a)</td><td>Draw Extendable Hashing structure to store following records. Consider maximum bucket size = 2.
<table><tr><th>Town</th><th>f(Town)</th></tr><tr><td>Brighton</td><td>0010</td></tr><tr><td>Clearview</td><td>1101</td></tr><tr><td>Downtown</td><td>1010</td></tr><tr><td>Mianus</td><td>1000</td></tr><tr><td>Perryridge</td><td>1111</td></tr><tr><td>Redwood</td><td>1011</td></tr><tr><td>Round Hill</td><td>0101</td></tr></table>OR
Let relation R (ABCDEFG) and FDs {AB → C, AC → B, AD → E B → D, BC → A, E → G}. Consider the decomposition for the given schema D = {ABC, ACDE, ADG}. Find it is lossy or lossless decomposition assuming same set of functional dependency holds.</td><td>10 M</td></tr>
<tr><td>Q 4 (b)</td><td>Show the equivalence between given set of functional dependencies with proper steps.
A relation R (A , C , D , E , H) is having two functional dependencies sets F and G as shown-
Set F- AC → D, E → AD, E → H
Set G- A → CD, E → AH</td><td>10 M</td></tr>
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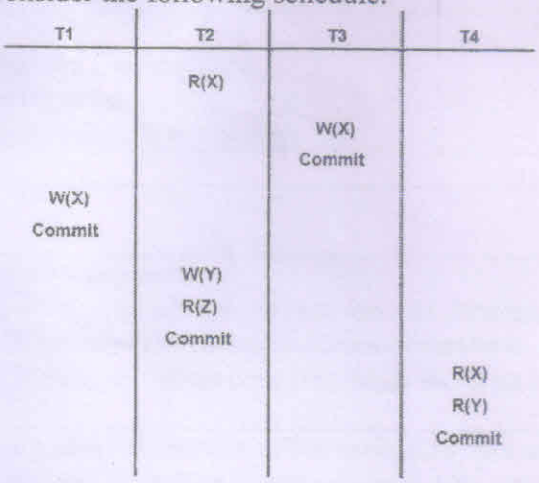
Q 5 (a)	Consider a file of 8192 records. Each record is 16 bytes long and its key field is of size 6 bytes. The file is ordered on a key field, and the file organization is unspanned. The file is stored in a file system with block size 512 bytes, and the size of a block pointer is 10 bytes. If the primary index is built on the key field of the file, and a multivalued index scheme is used to store the primary index, then find the number of first level and second level blocks in the multilevel index.	10 M
Q 5 (b)	Explain **any two** from the following with suitable diagram. i) State diagram of Transaction. ii) Shadow paging iii) Deadlock handling- wait for graph.	10 M
Q 6 (a)	Consider the following schedule.  Determine the given schedule is conflict serializable, recoverable or cascadeless. Provide stepwise solution.	5 M
Q 6 (b)	Describe the significance of Thomas write rule in concurrency control process. **OR** Explain the recovery process using log based recovery.	5 M