

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
Minor - II (Odd Semester) - 2017-18

Entry No: 16B C S 029 Total number of pages: [1]
Total number of questions: 05

B. Tech. || Sem IV & VI
Database Management System
Subject Code: CSL 3081

Time allowed: 01 Hour

Max Marks: 20

Important Instructions:

- a) Attempt all questions.

Q. 1 Differentiate between a DBMS & traditional file system. [3]

Q. 2 List down different symbols used in ER diagrams along with their purpose. [4]

Q. 3 Give the syntax for Create table and Insert command used in SQL. [2]

Q. 4 Consider the given below schema:

branch (branch_name, branch_city, assets)
account (account_number, branch_name, balance)
depositor (customer_name, account_no)
customer (customer_name, customer_street, customer_city)
loan (loan_number, branch_name, amount)
borrower (customer_name, loan_number)

Give the relational algebra expressions for the following:

a.) Find the name of the branches located in Jammu city. [1]

b.) Find the name of the customers having an account at SMVDU branch. [1]

c.) Give all the details of the customers whose loan balance is more than 10000. [1]

d.) Find the name of the customers who are having a deposit account at the branch located in some city other than their residing city. [2]

e.) Give the account numbers, which are held jointly by more than 3 customers. [2]

f.) Give the name of customers, who held an account at every branch. [2]

Q. Let r and s be two relations with the following schema [2]

R (P, Q, R1, R2, R3)

S (P, Q, S1, S2)

Which 3 of the following queries will give same result?

1) $\Pi_P(r \bowtie s)$ ✓

2) $\Pi_P(r) \bowtie \Pi_P(s)$ ✗

3) $\Pi_P(\Pi_{P,Q}(r) \cap \Pi_{P,Q}(s))$ ✗

4) $\Pi_P(\Pi_{P,Q}(r) - (\Pi_{P,Q}(r) - \Pi_{P,Q}(s)))$

Entry No. _____

Total number of pages: 2 |
Total number of questions: 05

B. Tech. || Sem IV & VI
Database Management System
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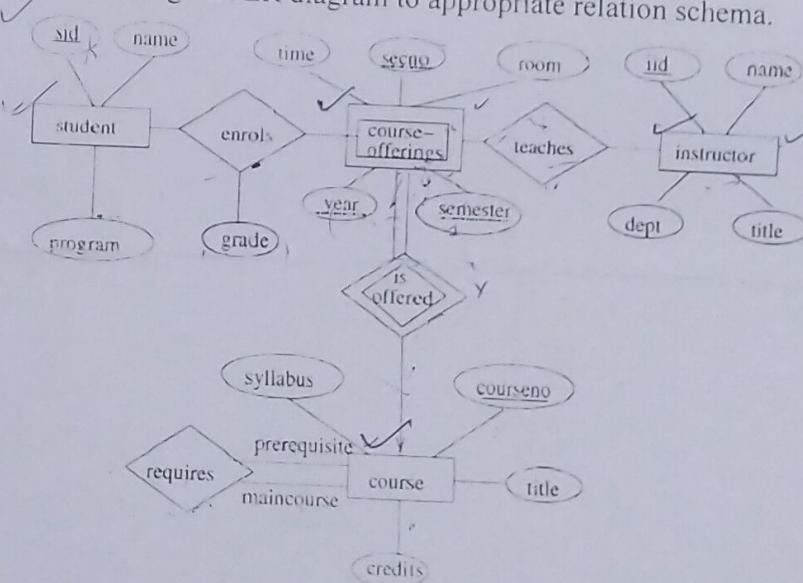
Time allowed: 01 Hour

Max Marks: 20

Important Instructions:

- a) Attempt all questions.

Q. 1. Convert the given ER diagram to appropriate relation schema. [3]



E-R diagram for a university.

Q 2 Write a short note on normalization. [3]

Q. 3 Relational schema R has eight attributes ABCDEFGH with the set of FDs given below. CH \rightarrow G, A \rightarrow BC, B \rightarrow CFH, E \rightarrow A, F \rightarrow EG [6]

- Find all the candidate keys for the relation.
- Find the highest normal form satisfied by the given relation.
- Normalize the given relation to the highest normal form with desirable properties of decomposition.

Q. 4 Consider two sets of functional dependencies $F_1 = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$ and $F_2 = \{A \rightarrow CD, E \rightarrow AH\}$. Are they equivalent? Justify your answer. [2]

Q. 5 Consider the given below schema:

branch (branch_name, branch_city, assets)
account (account_number, branch_name, balance)
depositor (customer_name, account_number)
customer (customer_name, customer_street, customer_city)
loan (loan_number, branch_name, amount)
borrower (customer_name, loan_number)

Give the SQL queries for the following:

- a.) Find the name of the branches located in Jammu city in the order of [1]
asset values from highest to lowest.
- b.) Find the name of the customers having an account at SMVDU branch
with balance more than 10000. [1]
- c.) Find the name of the customers who are having a deposit account at [2]
the branch located in some city other than their residing city.
- d.) Give the name of customers, who held an account at every branch. [2]

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Computer Science & Engineering
B. Tech. (CSE) Major Examination (Even/Summer) 2017-18

Entry No:

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 29

Total Number of Pages: [03]

Date: 05.05.2018

Total Number of

Questions: [07]

Course Title: Database Management System

Course Code: CSL 3081

Time Allowed: 3.0 Hours

Max Marks: [50]

Instructions / NOTE

- i. Attempt All Questions.
- ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- iii. Assume any missing data to suit the case / derivation / answer.
- iv. Use of IS Code (IS 456: 2000) is permissible in examination.

Section - A

- Q1. (a) What do you mean by the cardinality of a relation. [01]
 (b) Differentiate between a candidate key and super key. [01]
 (c) Suppose relation R(A,B) currently has tuples {(1,2), (1,3), (3,4)} and relation S(B,C) currently has {(2,5), (4,6), (7,8)}. Then the number of tuples in the result of the SQL query:
SELECT * FROM R NATURAL OUTER JOIN S; [01]
 (d) The database system must take special actions to ensure that transactions operate properly without interference from concurrently executing database statements. This property is referred to as [01]
A) Atomicity B) Durability C) Isolation D) All the mentioned [01]
 (e) Which of the following is a procedure for acquiring the necessary locks for a transaction where all necessary locks are acquired before any are released? [01]
A) Record controller B) Exclusive lock
C) Authorization rule D) Two phase lock
 (f) The deadlock state can be changed back to stable state by using the statement. [01]
A) Commit B) Rollback C) Savepoint D) Deadlock

- Q2 (a) Explain various lock types used in a Multiple Granularity concurrency control scheme along with the compatibility matrix. [04]
 (b) List the ACID properties. Explain the usefulness of each. [04]

Section - B

- Q3. (a) Explain the time-stamp protocol along with the Thomas write rule. [04]
 (b) Consider the universal relation $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the set of FDs $F = \{AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ\}$. What is the key for R? Also mention the highest NF satisfied by the relation R and then make the schema best possible by normalizing it. [04]
- Q4. (A) Consider three transactions T1, T2, T3 and two schedules S1 & S2 given below: [03]
- 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)

Check whether the above schedules are serializable or not. If serializable, write down equivalent serial order.

- B) Consider schedules S3, S4, and S5 below. Determine whether each schedule is cascadeless, recoverable, or nonrecoverable.

S3: r1(X); r2(Z); r1(Z); r3(X); r3(Y); w1(X); c1; w3(Y); c3; r2(Y); w2(Z); w2(Y); c2;

S4: r1(X); r2(Z); r1(Z); r3(X); r3(Y); w1(X); w3(Y); r2(Y); w2(Z); w2(Y); c1; c2; c3;

S5: r1(X); r2(Z); r3(X); r1(Z); r2(Y); r3(Y); w1(X); c1; w2(Z); w3(Y); w2(Y); c3; c2;

- Q5. Consider the following relational schema

employee(empno, name, office, age)

books(isbn, title, authors, publisher)

loan(empno, isbn, date)

[06]

Write the following queries in relational algebra.

- Find the names of employees who have borrowed a book published by PHI.
- Find the names of employees who have borrowed all books published by TMH.
- Find the names of employees who have borrowed more than five different books published by UOP.
- For each publisher, find the names of employees who have borrowed more than five books of that publisher.

- Q6. Consider the relational database given below.

Employee (Fname, Lname, Ssn, DOB, Address, Sex, Salary, Manager_ssn, Dept_no)

Department (Dept_name, Dept_no, Manager_ssn, Manager_start_date),

Dept_location (Dept_no, Dlocation)

[06]

Works_on (Emp_ssn, Proj_no, Hours worked)

Project (Pname, Pnumber, PLocation, Dept_no)

Dependent (Esn, Dependent_name, Sex, DOB, Relationship)

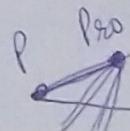
Write the SQL statements for the following:

- Display project numbers that involve an employee whose Last name is 'Singh', either as a worker or as a manager of the department that controls the project.
- Display names of managers who have at least one dependent.
- Display the name of those employees who have worked as a worker on all the projects controlled by the department no. 5.
- For each department that has more than five employees, display the department name and the number of employees whose salary is more than 10000.

- Q7. Consider the following information about a university database:

[10]

- Professors have an SSN, a name, an age, a rank, and a research specialty.
- Projects have a project number, a sponsor name (e.g., NSF), a starting date, an ending date, and a budget.
- Graduate students have an SSN, a name, an age, and a degree program (e.g., M.S. or Ph.D.).
- Each project is managed by one professor (known as the project's principal investigator).
- Each project is worked on by one or more professors (known as the project's co-investigators).
- Professors can manage and/or work on multiple projects.
- Each project is worked on by one or more graduate students (known as the project's research assistants).



- When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.
- ✓ Departments have a department number, a department name, and a main office.
- Departments have a professor (known as the chairman) who runs the department.
- Professors work in one or more departments, and for each department that they work in, a time percentage is associated with their job.
- Graduate students have one major department in which they are working on their degree.
- Each graduate student has another, more senior graduate student (known as a student advisor) who advises him or her on what courses to take.

Design and draw an ER diagram that captures the information about the university. Also write corresponding DDL commands to implement the resultant ER diagram along with suitable constraints in RDBMS.

Course Outcomes

After Successful Completion of this Course, students shall be able to;

- Define the terminology, features, classifications, and characteristics embodied in database systems.
- Convert any information model into a relational database schema and implement the same using SQL
- Formulate the data requirement in terms of Relational algebra operation
- Retrieve/update the data in database using query languages
- Apply the normalization theory to normalize the given Database schema
- Understand the requirement of ACID properties & their implantation

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Comp. Sc. & Engg.

B. Tech. (Comp. Sc. & Engg) Minor - I Examination (Even) 2018-19

Entry No:

1	7	B	C	S	0	4	5
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Total Number of Pages: [02]

Date: 4th February, 2019

Total Number of Questions: [04]

Course Title: Database Management Systems

Course Code: CSL 3081

Time Allowed: 1 hour 30 minutes

Max Marks: [20]

Instructions / NOTE

- Attempt All Questions.
- Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- Assume an appropriate data / information, wherever necessary / missing.

Q1. a.) What is data redundancy? What are the disadvantages of having [02] CO1 redundancy within a database?

b.) What do you mean by atomicity of transaction in DBMS. [02] CO1

Q2. a.) List down the various symbols used in ER diagrams along with [04] CO1 their purpose.

b.) What is a participation role? When it is necessary to use role [02] CO1 names in the description of relationship types?

Q3. Consider the relational database given below: [05] CO3

Employee (Fname, Lname, Ssn, DOB, Address, Sex, Salary, Manager_ssn, Dept_no)

Department (Dept_name, Dept_no, Manager_ssn, Manager_start_date);

Dept_location (Dept_no, Dlocation)

Works_on (Emp_ssn, Proj_no, Hours_worked)

Project (Pname, Pnumber, PLocation, Dept_no)

Dependent (Essn, Dependent_name, Sex, DOB, Relationship)

Give a relational-algebra expression for each of the following queries:

a) Display the Employee tuples with salary > 50000 belonging to department number 5.

b) List the name of projects under department no. 5.

c) Make a List of project numbers that involve an employee whose Last name is 'Singh'.

d) List the SSN of employees, whose Lname is same as of their managers.

e) List the name of employees who have at least one dependent.

Q4. Give the syntax & meaning for the following SQL commands/functions [05] CO2

with suitable examples:

- a) Alter
- b) Update
- c) INITCAP
- d) Sysdate
- e) Dual

Course Outcomes

- CO1: Define the terminology, features, classifications, and characteristics embodied in database systems.
- CO2. Convert any information model into a relational database schema and implement the same using SQL.
- CO3. Formulate the data requirement in terms of Relational algebra operation and query languages operations.
- CO4. Apply the normalization theory to normalize the given Database schema.
- CO5. Understand the requirement of ACID properties & their implementation.

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1-2	10	50
CO2	4	5	50
CO3	3	5	50

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Comp. Sc. & Engg.

B. Tech. (Comp. Sc. & Engg) Minor - II Examination (Even) 2018-19

Entry No:

1	7	B	C	S	0	4	5	
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Total Number of Pages: [02]

Date: 16th March, 2019

Total Number of Questions: [03]

Course Title: Database Management Systems

Course Code: CSL 3081

Time Allowed: 1 hour 30 minutes

Max Marks: [20]

Instructions / NOTE

- i. Attempt All Questions.
- ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- iii. Assume an appropriate data / information, wherever necessary / missing.

Q1. Consider the following relational schema

[04] CO3

employee (empno, name, office, age)

books (isbn, title, authors, publisher)

loan (empno, isbn, date)

Write the following queries in relational algebra.

- i) Find the names of employees who have borrowed a book published by publisher ABC.
- ii) Find the names of employees who have borrowed all books, published by publisher ABC.
- iii) Find the names of employees who have borrowed more than five books published by publisher ABC.
- iv) For each publisher, find the names of employees who have borrowed more than five books of that publisher.

Q2. a.) What do you mean by a View? Explain its use by giving some example. [02] CO3

b.) Write SQL statements for the following queries based on database schema given below: [06]

✓branch (branch_name, branch_city, assets)

✓account (account_number, branch_name, balance)

✓deposito (customer_name, account_no)

✓customer (customer_name, customer_street, customer_city)

loan (loan_number, branch_name, amount)

borrower (customer_name, loan_number)

- i) List the customer names and their loan numbers for all customers having a loan at some branch.
- ii) Find the names of all branches where the average account balance is more than 1000.
- iii) Find all customers who have an account at all branches located in Jaipur city.
- iv) Find all customers who have at most one account at the SAI branch.

- Q3. a) Consider a relation R (A, B, C, D, E, F, G, H, I, J, K) with following FDs. CO4
- $$AI \rightarrow BFG \quad I \rightarrow K \quad IC \rightarrow ADE \quad BIG \rightarrow CJ \quad K \rightarrow HA$$
- i) Find a canonical cover for this set of FDs. [03]
ii) Find a candidate key for this relation. [01]
- b) Consider two sets of functional dependencies $F1 = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$ and $F2 = \{A \rightarrow CD, E \rightarrow AH\}$. Are they equivalent? Give your answer with proper justification. [02]
- c) What do you mean by Functional Dependency, explain briefly? [02]

Course Outcomes

- CO1: Define the terminology, features, classifications, and characteristics embodied in database systems.
- CO2. Convert any information model into a relational database schema and implement the same using SQL.
- CO3. Formulate the data requirement in terms of Relational algebra operation and query languages operations.
- CO4. Apply the normalization theory to normalize the given Database schema.
- CO5. Understand the requirement of ACID properties & their implementation.

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO2	2	8	50
CO3	1	4	50
CO4	3	8	50

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Computer Science & Engineering

B. Tech. (CSE) Major Examination (Even) 2018-19

Entry No: **11BCS045**

Date: 06.05.2019

Total Number of Pages: [03]

Total Number of Questions: [08]

Course Title: Database Management System

Course Code: CSL 3081

Time Allowed: 3.0 Hours

Max Marks: [50]

Instructions / NOTE

- Attempt All Questions.
- Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- Assume an appropriate data / information, wherever necessary / missing.

Section - A			
Q1.	(a) A relational database developer refers to a record as A. a criteria B. a relation C. a tuple D. an attribute (b) A set of possible data values is called A. attribute B. degree C. tuple D. domain (c) SQL views can be used to hide: A. columns only. B. Rows only. C. both A & C D. None of the options is correct (d) You can add a row using SQL in a database with which of the following? A. ADD B. CREATE C. INSERT D. MAKE (e) Which of the following is not a property of transactions? A. Atomicity B. Concurrency C. Isolation D. Durability (f) What is a bitmap index?	[01] [01] [01] [01] [01] [01]	CO1 CO1 CO2 CO2 CO5 CO1
Q2.	(a) What do you mean by ACID properties? Explain. (b) Explain the concept of Time stamp based protocols to control the concurrency.	[04] [04]	CO5 CO5

Section - B

Q3.	(a) Explain the Data structure used in maintaining the locks by a lock manager for concurrency control. (b) Consider the following relation for published books: BOOK (Book_title, Author_name, Book_type, List_price, Author_affil, Publisher) With the following dependencies Book_title → Publisher, Book_type Book_type → List_price Author_name → Author_affil What normal form is the relation in? Apply normalization to convert the schema to highest possible normal form.	[04]	CO1 CO4
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	(c) Consider a database schema R(a,b,c), and a relation r on the schema R, write an SQL query to test whether the functional dependency $b \rightarrow c$ holds on relation r.	[02]	CO1
Q4.	Consider the following four schedules due to three transactions (indicated by the subscript) using read and write on a data item x, denoted by $r_i(x)$ and $w_i(x)$ respectively. Find out which of them are conflict serializable: A) $R_1(X); R_2(X); W_1(X); R_3(X); W_2(X)$ B) $R_2(X); R_1(X); W_2(X); R_3(X); W_1(X);$ C) $R_3(X); R_2(X); R_1(X); W_2(X); W_1(X);$ D) $R_2(X); W_2(X); R_3(X); R_1(X); W_1(X);$	[04]	CO5
Q5.	Consider the database schema given below: Supplier (Sno, Sname) Part (Pno, Pname) $\xrightarrow{\text{Pno: Part no}}$ Project (Jno, Jname) $\xrightarrow{\text{Jno: Project no}}$ Supply (Sno, Pno, Jno) $\xrightarrow{\text{Pno: Project no}}$ Give relation algebra expressions for the following: a) Retrieve the part number that are supplied to exactly two projects. b) Retrieve the part number that are supplied by each supplier. c) Retrieve the names of supplier who supply at least two different parts each to at least two different projects.	[06]	CO3
Q6.	Write SQL statements for the following queries based on database schema given below: branch (branch_name, branch_city, assets) account (account_number, branch_name, balance) depositor (customer_name, account_no) customer (customer_name, customer_street, customer_city) loan (loan_number, branch_name, amount) borrower (customer_name, loan_number) a) Find all loan numbers for loan held at the SMVDU branch with loan amounts greater than 10000. b) Find the names of all customers whose have an account at all branches located in KATRA city. c) Find the average balance for each customer who lives in Harrison and has at least three accounts. d) Delete all account tuples at every branch located in JAMMU city.	[06]	CO2
Q7.	Suppose you are given the following requirements for a simple database for the National Hockey League (NHL): <ul style="list-style-type: none"> • The NHL has many teams, • Each team has a name, a city, a coach, a captain, and a set of players, • Each player belongs to only one team, • Each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records, • A team captain is also a player, • A game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 1999) and a score (such as 4 to 2). Construct a clean and concise ER diagram for the required database.	[05]	CO2

8.	Explain the concept of log based recoverability in a DBMS allowing concurrent execution of transactions.	[05]	C05
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Course Outcomes

- CO1. Define the terminology, features, classifications, and characteristics embodied in database systems.
 CO2. Convert any information model into a relational database schema and implement the same using SQL.
 CO3. Formulate the data requirement in terms of Relational algebra operation and query languages operations.
 CO4. Apply the normalization theory to normalize the given Database schema
 CO5. Understand the requirement of ACID properties & their implementation

CO	Questions Mapping	Total Marks	Total Number of Regular Students (to be appeared in Exam)
CO1	1(a),1(b),1(c),1(f),3(a)	08	50
CO2	1(c),1(d),6,7	13	50
CO3	5	06	50
CO4	3(b),3(c)	06	50
CO5	1(e),2(a),2(b),4,8	17	50