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DATABASE MANAGEMENT SYSTEM

[As per Choice Based Credit System (CBCS) scheme]

(Effective from the academic year 2017 -2018)

SEMESTER – V

Subject Code **17CS53**

IA Marks **40**

Number of Lecture Hours/Week **04**

Exam Marks **60**

Module 2

1. Describe the characteristics of relations with suitable example for each. (8-Marks) (3a) (Dec.2017/Jan.2018)
2. What are the basic operations that can change the states of relations in the database? Explain how the basic operations deal with constraint violations. (8-Marks) (3b) (Dec.2017/Jan.2018)
3. Describe the steps of an algorithm for ER-to-relational mapping. (10-Marks) (4a) (Dec.2017/Jan.2018)
4. In SQL which command is used for table creation? Explain how constraints are specified in SQL during table creation with suitable example. (6-Marks) (4b) (Dec.2017/Jan.2018)
5. Explain the data types available for attribute specification in SQL. (4-Marks) (3a) (June/July 2018)
6. Explain briefly violations in entity integrity constraint, key and referential integrity constraints, with example. (6-Marks) (3b) (June/July 2018)
7. Consider the following RESORT database,

RESORT(resortno, resortno, suiteprice)

SUITE(suiteno, resortno, suiteprice)

RESERVATION(reservationno, resortno, visitorno, checkin, checkout, totalvisitor, suiteno)

VISITOR(visitormo, firstname, lastname, visitoraddr)

- i) Write the SQL to list full details of all the resorts on Los Angeles.
 - ii) Write the SQL to list full details of all the resorts having number of suites more than 30.
 - iii) Write the SQL to list visitors in ascending order by firstname. (6-Marks) (3c) (June/July 2018)
8. Explain how constraints are specified in SQL during table creation, with suitable example. (4-Marks) (4a) (June/July 2018)
9. Consider the following relations for a database that

keeps track of student enrolment in courses and the books adopted for each course:

STUDENT(SSn, Name, Major, bdate)

COURSE(Courseno, Cname, dept)

ENROLL(SSn, Courseno, Quarter, grade)

BOOK_ADOPTION(Courseno, Quarter, book_isbn)

TEXT(book_isbn, book_title, Publisher, Author)

Write the following queries in relational algebra on the database schema:

- i) List the number of courses taken by all students named John Smith in winter 2009 (i.e Quarter = WO9).
 - ii) Produce a list of text books (include courseno, book_isbn, book_title) for courses offered by the 'CS' department that have used more than two books.
 - iii) List any department that has all its adopted books published by 'Pearson' publishing. (6-Marks) (4b) (June/July 2018)
10. Give an example of mapping of generalization or specialization into relation schemas. (6-Marks) (4c) (June/July 2018)
11. Discuss the characteristics of relations. (6-Marks) (3a) (Dec.2018/Jan.2019)

12. Outline the steps to convert the basic ER Model to relational Database schema. (6-Marks) (3b) (Dec.2018/Jan.2019)
13. Define the following:
- Relation state
 - Relation schema
 - Arity
 - Domain. (4-Marks) (3c) (Dec.2018/Jan.2019)
14. Discuss the various types of set theory operations with example. (8-Marks) (4a) (Dec.2018/Jan.2019)
15. Consider the two tables, show the results of the following:

T ₁		
A	B	C
10	a	5
15	b	8
25	a	6

T ₂		
P	Q	R
10	b	6
25	c	3
10	b	5

i) $T_1 \bowtie_{T_1.B = T_2.Q} T_2$

ii) $T_1 \bowtie_{T_1.A = T_2.P} T_2$

iii) $T_1 \bowtie_{(T_1.A = T_2.P) \text{ AND } (T_1.C = T_2.R)} T_2$

iv) $T_1 - T_2$

(8-Marks) (4b) (Dec.2018/Jan.2019)

16. Define the following terms with an example of each:
- Superkey
 - Domain
 - Tuple
 - Nulls
 - A Relational database Schema
 - Entity integrity constraint. (12-Marks) (3a) (Dec.2017/Jan.2018 | 10-scheme)

17. Explain DIVISION operation. Find the quotient for the following: A/B_1 , A/B_2 and A/B_3 where A, B_1 , B_2 , B_3 are: (8-Marks) (Dec.2017/Jan.2018 | 10-scheme)

A

S_{NO}	P_{NO}
S₁	P ₁
S₁	P ₂
S₁	P ₃
S₁	P ₄
S₂	P ₁
S₃	P ₂
S₄	P ₂
S₄	P ₄

B_1

P_{NO}
P₂

B_2

P_{NO}
P₂
P₄

B_3

P_{NO}
P₁
P₂
P₄

18. Write SQL syntax with example for the following SQL statement:
- i. CREATE TABLE
 - ii. SELECT Statement
 - iii. UPDATE Command
 - iv. ALTER TABLE (8-Marks) (4a)
(Dec.2017/Jan.2018 | 10-scheme)

19. Consider the following schema and write the SQL queries:

STUDENT(Snum, Sname, Major, Level, Age)

CLASS(Cname, Meetsat, room, fid)

ENROLLED(Snum, Cname)

FACULTY(Fid, Fname, deptid)

- i. Find the names of all Juniors (level – JR) who are enrolled in a class ‘5A’, OR ‘5B’ .
 - ii. List all the students name where there are is greater than average the age of all students.
 - iii. Find the names of a faculty member who teaches to class ‘5A’ and ‘5B’
 - iv. List the names of all students beginning with ‘S’ and ending with letter ‘X’ (12-Marks) (4b) (Dec.2017/Jan.2018 | 10-scheme)
20. Briefly discuss the different types of update operations on relational database. Show an example of violation of the referential integrity in each of the update operation. (10-Marks) (3a) (June/July.2018 | 10-scheme)
21. Consider the following two tables R and S, show the results of the following operations?

- i) $R \bowtie_{R.X = S.A} S$
- ii) $R \bowtie_{R.Y = S.B} S$
- iii) $R \text{--} \bowtie_{R.X = S.A} S$
- iv) $R \bowtie_{(R.X = S.A \text{ AND } R.Z = S.C)} S$
- v) $R \cup S$

(Assume R and S are union compatible)

R		
X	Y	Z
7	a	3
14	b	5
21	a	6

S		
A	B	C
7	b	6
21	c	2
7	b	3

(10-Marks) (3b) (June/July.2018 | 10-scheme)

22. Describe the SIX clauses in the syntax of an SQL retrieval query and give examples for each. (10-Marks) (4a) (June/July.2018 | 10-scheme)

23. Consider the following schema for a company database.

EMPLOYEE (Name, Ssn, Address, Sex, Salary, Super_ssn, Dno)

DEPT_LOCATIONS(Dnumber, Dlocation)

DEPARTMENT(Dname, Dnumber, Mgr_ssn, Mgr_start_date)

PROJECT(Pname, Pnumber, Plocation, Dnum)

WORKS_ON(Essn, Pno, Hours)

DEPENDENT(Essn, Dependent, name, Sex, Bdate, Relationship)

Write the queries in SQL for the following:

- i. Retrieve the name of each employee who has a dependent with the same name and same sex as the employee.
- ii. List the names of manager who have at least one dependent.
- iii. For each employee retrieve the employee's name and name of his or her immediate supervisor

- iv. Show the resulting salaries if every employee working on the 'ProductX' project is given a 15 percent raise
- v. For each project on which more than two employees work, retrieve the project number, the project name and the number of employees who work on the project. (10-Marks) (4b) (June/July.2018 | 10-scheme)
- 24. List the five relational algebra operators along with their syntax and purpose. (10-Marks) (3a) (Dec.2016/Jan.2017 | 10-scheme)

25. Consider the following COMPANY database

EMP (Name, SSN, Salary, SuperSSN, Dno)

DEPT (Dnum, Dname, MgrSSN)

DEPT_LOC (Dnum, Dlocation)

Works_ON (ESSN, Pno, Hours)

Dependent (ESSN, Dep_name, Sex)

Write the relational algebra queries for the following:

- i. Retrieve the name of the employee who works in the same department as that of "Ravi".
- ii. Retrieve the number of dependents for an employee named "Ravi".
- iii. Retrieve the name of managers working in location "DELHI" who has no female dependents. (10-Marks) (3b) (Dec.2016/Jan.2017 | 10-scheme)
- 26. Explain with suitable example, how can you retrieve information from multiple tables. (8-Marks) (4a) (Dec.2016/Jan.2017 | 10-scheme)
- 27. Referring to the COMPANY database above, write SQL queries for the following:
 - i. Retrieve the name of employees whose salary is greater than all employees working in department 3.

- ii. For each department that has more than four employees, retrieve the department number and the number of its employees who have more than 4000 salary.
 - iii. Retrieve names of an employee who gets second highest salary. (12-Marks)(4b) (Dec.2016/Jan.2017 | 10-scheme)
28. Explain Explicit or Schema based constraint on relational model. (6-Marks) (3a) (June/July.2017 | 10-scheme)
29. Discuss any 4 relational algebra operations with examples. (8-Marks) (3b) (June/July.2017 | 10-scheme)
30. Consider the following schema:

Sailors (Sid, Sname, rating, age)

Boats (bid, bname, color)

Reserves (Sid, bid, day)

Write the queries in relational algebra,

- i. Find the names of sailors who have reserved boats no '103'
 - ii. Names of Sailors who have reserved red and green boat, (6-Marks) (3c) (June/July.2017 | 10-scheme)
31. Explain the different constraints that can be applied during table creation in SQL with example. (6-Marks) (4a) (June/July.2017 | 10-scheme)
32. Explain how group by clause works. What is the difference between where and having clause. (4-Marks) (4b) (June/July.2017 | 10-scheme)
33. Consider the following schema and write the SQL queries.

Emp (SSN, name, Addr, Sal, Sex, Dno)

Dep (Dno, Dname, Mgrssn)

DepLoCN (Dno, Plocn, Dno)

Proj (pno, Pname, Plocn, Dno)

Workson (SSN, Pno, Nohrs)

Dependent (SSN, Deptname, Depntsex, Depnt_Relationship)

- i. Retrieve the manager name with at least one dependent.
- ii. Retrieve the Pno, Pname, no of hrs works done on each project.
- iii. Retrieve the Pname which are controlled by 'Research' dept.
- iv. Retrieve employee name who works for dept no 10 and have a daughter.
- v. Retrieve the employee name who work on any project that Kumar works. (10-Marks) (4c) (June/July.2017 | 10-scheme)

**ANSWER SCRIP FOR THESE
QUESTIONS WILL BE UPLOADED ASAP**

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