



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Computer Science and Engineering

Semester End Examination; August - 2023

Database Management System

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Design an ER model for a given example from real world description.

CO2: Design relational models for a given application using schema definition and constraints.

CO3: Develop complex queries using SQL to retrieve the required information from database.

CO4: Apply suitable normal forms to normalize the given database.

CO5: Determine the roles of concurrency control in database design.

Note: I) PART-A is compulsory. Two marks for each question.

II) PART-B: Answer any Two sub questions (from a, b, c) for a Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
I : PART - A		10			
1 a.	List the implicit properties of database.	2	L1	CO1	PO1,2,3
b.	i) What is degree of a relationship type? ii) Give example for binary relationship.	2	L1,L2	CO2	PO1,3
c.	Demonstrate how key constraint and referential integrity constraints are violated with insert operation of relational algebra?	2	L2,L3	CO3	PO1,2,3
d.	Write the basic form of select statement and illustrate all the fields.	2	L1,L2	CO4	PO1,2,3
e.	List all the informal design guidelines of a database.	2	L1	CO5	PO1,2
II : PART - B		90			
UNIT - I		18			
2 a.	Explain the characteristics of database approach and show how it is different from traditional file systems?	9	L2	CO1	PO1,2,3
b.	List and explain advantages of using DBMS approach.	9	L1,L2	CO1	PO1,2,3
c.	Explain three-schema architecture with a neat diagram.	9	L2	CO1	PO1,2,3
UNIT - II		18			
3 a.	Explain high level conceptual data model for database design with a neat diagram.	9	L2	CO2	PO1,3
b.	Explain structural constraints of a relationship type with an example for each.	9	L2	CO2	PO1,3

Contd....2

- c. A university registrar’s office maintains data about the following entities:
 - (i) courses, including number, title, credits, syllabus, and prerequisites;
 - (ii) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom;
 - (iii) students, including student-id, name, and program; and
 - (iv) instructors, including identification number, name, department, and title.

9 L6 CO2 PO1,3

Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an ER diagram for the registrar’s office. Document all assumptions that you make about the mapping constraints.

UNIT - III

18

- 4 a. Discuss the following operations of Relational algebra with respect to constraint violation and how to deal with these violations: INSERT, DELETE and UPDATE.
- b. Discuss the following relational operations. Illustrate with an example for each: JOIN, DIFFERENCE, SELECT and UNION
- c. Give ER to Relational mapping algorithm. Discuss each step with an example.

9 L2 CO3 PO1,2,3

9 L2 CO3 PO1,2,3

9 L1,L2 CO3 PO1,2,3

UNIT - IV

18

- 5 a. Explain all the forms of insert, delete and update statements in SQL with an example for each.
- b. Consider the following COMPANY database:
 - EMP(Name, SSN, Salary, SuperSSN, Dno)
 - DEPT(DNum, Dname, MgrSSN, Dno)
 - DEPT_LOC(Dnum, Dlocation)
 - DEPENDENT(ESSN, Dep_name, Sex)
 - WORKS_ON(ESSN, Pno, Hours)
 - PROJECT(Pname, Pnumber, Plocation, Dnum)
 Write the SQL queries for the following:
 - (i) Retrieve the name of the employee who works with same department as Ravi
 - (ii) List female employees from Dno = 20 earning more than 50000
 - (iii) List “CSE” department details

9 L6 CO4 PO1,2,3

c. Illustrate the following in SQL with an example:

(i) Set operation

9 L2 CO4 PO1,2,3

(ii) Substring pattern matching and arithmetic operators

UNIT - V

18

6 a. Explain informal design guidelines used as measures to determine the quality of a relational schema design.

9 L2 CO5 PO1,2

b. Define normal form. Explain 1NF, 2NF and 3NF with suitable example for each.

9 L1,L2 CO5 PO1,2

c. What do you mean by multi-valued attribute? Explain 4NF with example.

9 L1,L2 CO5 PO1,2

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