**QUESTION BANK**

***Note: Question Bank is for reference purposes. Mid-semester and End Semester Exam Question papers will be drawn from the syllabus mentioned in the Course file.***

**Unit 1:**

**Introduction**

1. Define: Data, Database, DBMS, Data Redundancy.
2. Enlist advantages of Database Management Systems over traditional File System.
3. Explain DBMS architecture with a neat sketch.
4. Explain the different types of database users.
5. What are the responsibilities of a DBA?
6. Explain database system 3 level architecture with a clear diagram in detail.
7. Explain three levels of data abstraction in DBMS.
8. Explain Mapping Cardinalities.
9. State the advantages of Database management systems over file processing system.
10. What are the types of attributes used in ER diagrams?
11. Differentiate generalization and specialization.
12. What is the schema and instance explained with an example.
13. What is data independence? Explain the difference between physical and logical data independence with examples.

**Entity-Relationship model**

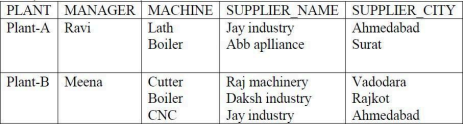
1. What is the Entity-Relationship model? Explain the steps to reduce the ER diagram to ER database schema.
2. What is mapping cardinalities? Explain it with real time examples.
3. Explain types of attribute with example
4. Explain Specialization features of ER diagrams with examples.
5. Explain Generalization features of E-R Diagrams.
6. Explain aggregation operation of the ER diagram.
7. Draw an ER diagram for the exam system of INDUS UNIVERSITY.
8. Construct an E-R diagram for a hospital with a set of patients and medical doctors. Associate with each patient a log of various tests and examinations conducted.
9. Construct an E-R diagram of the bank. It provides different kinds of bank accounts. And loans. It operates a number of branches.
10. Draw E – R Diagram for the School Management System.
11. Give symbols used in the E-R Diagram and Draw the E-R diagram of the Library Management System.
12. Draw an E-R diagram for suppliers who supply different parts. The parts are used in different projects. Explain the mapping cardinality used. Assume suitable attributes.
13. Construct an E-R Diagram for an insurance company with a set of customers, each of whom owns a number of cars, also each can have a number of recorded accidents associated with it.
14. What are the constraints in the E-R Diagram? Explain types of constraints with suitable examples.
15. Draw symbols for following in E-R diagram:
    1. Weak Entity set, Derived attribute, Multivalued
    2. Relationship Set, and Primary key attribute

**Unit 2:**

**Relational Model**

1. Explain candidate key, primary key and foreign key.
2. Explain following Term with suitable example 
   1. Primary Key
   2. Candidate Key
   3. Super Key
   4. On delete cascade
3. Explain following relational algebra operations:
   1. Natural join operation
   2. Selection and projection operation
4. List relational algebra operators and explain any two with examples.
5. What is Relational Algebra? Define Relational Algebra Operation cross product with example.
6. Explain selection and projection operation with examples.
7. What is a database schema? Explain the select, project, natural join, union and Cartesian product operations.
8. Consider the following schema and represent given statements in relation algebra form.
9. Branch(branch\_name,branch\_city)
10. Account(branch\_name, acc\_no, balance)
11. Depositor(Customer\_name, acc\_no)
    1. Find a list of customers who have an account at ‘abc’ branch.
    2. Find out all customers who have an account in ‘Ahmedabad’ city and the balance is greater than 10,000.
    3. Find a list of all branch names with their maximum balance.
12. Explain transformation of relational expression into equivalent relational expression.

**Relational Database design**

1. What are anomalies in database design? How can we solve it?
2. What problems can occur due to wrong database design? How can they be solved?
3. Explain the issues of database design.
4. Explain BCNF with examples.
5. Explain how to find closure of a set of attributes?
6. Define functional dependency. Explain trivial and non-trivial FD with examples.
7. Explain irreducible sets of Functional dependency with examples.
8. What is functional dependency? Explain its usage in database design.
9. What is Functional Dependency? Explain non-loss decomposition.
10. What is normalization? What is the need for normalization?
11. What is normalization? What is redundancy? Compare 1NF and 2NF with examples.
12. What is normalization? Explain 1NF, 2NF & 3NF.
13. Why should normalization be performed on a table and what are its benefits? Explain 3NF and BCNF.
14. Explain 1NF, 2NF, 3NF and BCNF.
15. Explain 2NF with examples.
16. Explain 3NF with examples.
17. What is the advantage of using 3NF? Explain with examples.
18. Explain BCNF with examples.
19. Why do we need normalization? Explain 4NF & 5NF.
20. What is non-loss(Lossless) decomposition in a database? How is it useful in databases?
21. Normalize (decompose) the following relation into lower to higher normal form. (From 1NF to 4NF). ****
22. What is a canonical cover? Consider the following set F of functional dependencies on schema R(A,B,C) and compute canonical cover for F.

{ A BC, B C, A B, AB C }

Consider a relation R with five attributes A, B, C, D, E having following dependencies: A B, BC E and ED A

a. List all Keys for R

b. In which normal form table is, justify your answer.

1. Given relation R with attributes A, B, C, D, E, F and set of FDs as A BC, E CF, B E and CD EF. Find out closure {A, B}+ of the set of attributes.
2. Consider table R(A, B, C, D, E) with FDs as A B, BC E and ED A. The table is in which normal form? Justify your answer.
3. Let R = (A, B, C, D, E, F) be a relation schema with the following dependencies-

C → F

E → A

EC → D

A → B

What is the Candidate key of the relation R?

**Unit 3:**

**Transaction Management**

1. What is a transaction? Explain the ACID properties.
2. What is a transaction? Explain its four important properties.
3. Why concurrency control is needed?
4. What is concurrency? What are the three problems due to concurrency? How the problems
5. can be avoided, explained for one of the three problems.
6. Consider schedule S with transaction T1 and T2. T1 transfers Rs. 150 from account A to C and T2 adds Rs. 50 into account A. Prepare concurrent schedule with two phase locking protocol.
7. Explain briefly the meaning of serializability of transactions.
8. Explain both the forms of serializability & relation between the two.
9. Explain conflict serializability with examples.
10. Explain view serializability with examples.
11. What is a deadlock? When it occurs and how to avoid it?
12. What is a deadlock? Explain Wait-For-Graph.
13. Explain the deadlock detection mechanism.
14. Explain various deadlock prevention methods.
15. Explain Two-Phase Locking protocol.
16. Explain Strict two phase locking with advantages & disadvantages. **16)** Define Locking. Explain two phase locking protocol.
17. Explain Locked based protocol.
18. Explain Two phase commit protocol.
19. What is System recovery? Explain a two phase commit protocol.
20. Explain immediate database modification log based recovery method. Also explain the role of check point in log base.
21. Explain log based recovery and mention all its types.
22. Explain system recovery procedure with check point record concept.

**Unit 4:**

**SQL Concepts**

1. Define: (1)Primary key (2)Foreign key (3)Unique Key (4)Not null (5)Commit (6)Candidate key (7)Rollback.
2. Define: (1)Weak entity (2)Data Dictionary (3)Substring( ) (4)Alter (5)Truncate (6)Drop.
3. What is ON DELETE CASCADE in SQL? Explain clearly with examples.
4. What is a join? Explain various types of joins with examples.
5. Explain natural join operation with an example.
6. Explain DDL, DML, DCL with examples.
7. Write with examples various built in string.
8. Explain any two string functions in SQL.
9. Explain any two aggregate functions of SQL.
10. What is View? Give the advantages of View.
11. Explain what is NULL?
12. We have following relations:

Supplier ( S#, sname, status, city)

Parts ( P#, pname, color, weight,city)

SP ( S#, P#, quantity)

Answer the following queries in SQL:

1. Find name of supplier for city = ‘Delhi’.
2. Find suppliers whose name start with ‘AB’
3. Find all suppliers whose status is 10, 20 or 30.
4. Find total number of city of all suppliers.
5. Find s# of supplier who supplies ‘red’ part.
6. Count number of supplier who supplies ‘red’ part.
7. Sort the supplier table by sname.
8. Delete records in supplier table whose status is 40.
9. Add one field in supplier table.
10. Find name of parts whose color is ‘red’
11. Find parts whose weight is less than 10 kg.
12. Find all parts whose weight is from 10 to 20 kg.
13. Find average weight of all parts.
14. Find S# of supplier who supply part ‘p2’
15. Find the name of the supplier who supplies maximum parts.
16. Sort the parts table by pname.
17. Delete records in the parts table whose color is ‘blue’.
18. Drop one field in the parts table.
19. Consider the following schema and write SQL for given statements.

Student ( rollno, name, branch )

Exam ( rollno, subject\_code, obtained\_marks , paper\_code )

Papers ( paper\_code, paper\_satter\_name, university )

1. Display name of student who got first class in subject ‘130703’. (ii) Display name of all student with their total mark.
2. Display list number of student in each university.
3. Display list of student who has not given any exam.
4. Write down the query for the following table where primary keys are underlined.

Person (ss#, name, address)

Car (license, year, model)

Accident (date, driver, damage-amount)

Owns (ss#, license)

Log (license, date, driver)

1. Find the total number of people whose cars were involved in accidents in 2009
2. Find the number of accidents in which the cars belonging to “S.Sudarshan”.
3. Add a new customer to the database.
4. Add a new accident recorded for the Santro belonging to “KORTH”.
5. Consider the employee data. Give an expression in SQL for the following query:

Employee (employee-name, street,city)

Works (employee-name, company-name,salary)

Company (company-name, city)

Manages (employee-name, manager-name)

1. Find the name of all employees who work for State Bank.
2. Find the names and cities of residence of all employees who work for State Bank. Find all employees in the database who do not work for State Bank.
3. Find all employees in the database who earn more than every employee of UCO Bank.
4. Consider the following schema and write SQL for given statements.

Student (Rollno, Name, Age, Sex, City)

Student\_marks (Rollno, Sub1, Sub2, Sub3, Total, Average)

Write query to–-

1. Calculate and store total and average marks from Sub1, Sub2 & Sub3.
2. Display name of students who got more than 60 marks in subject Sub1.
3. Display names of students with their total and average marks.
4. Display name of students who got equal marks in subject Sub2.
5. Implement the following relation using SQL query.

Student (stud\_no, stud\_name, sub1, sub2, totalmark, percentage)

1. Create the table, add 5 records and display the data.
2. Calculate total mark and percentage and also arrange the students in ascending order of total mark and also make a view of it.
3. Update the mark of sub1 of student\_no=111 with 50 and also Calculate total marks and percentage accordingly. (4 Marks) 18) Implement following relation using SQL query.
4. Employee (emp\_no, emp\_name, department, city, salary)
5. Find all the employee whose emp\_no is less than 100 and salary more than 25000 and department is “Account”
6. Count the no of employee and Sum the salary of all employee
7. Delete the employee having minimum salary.
8. We have following relations:

EMP(empno, ename, jobtitle, managerno, hiredate, sal, comm, deptno)

DEPT(deptno, dname, loc)

Answer the following queries in SQL.

1. The employees who are getting salary greater than 3000 for those persons belonging to the department 20
2. Employees who are not getting any commission
3. Find how many job titles are available in employee table.
4. Display total salary spent for each job category.
5. Display number of employees working in each department and their department name.
6. List ename whose manager is NULL.
7. List all employee names and their salaries, whose salary lies between 1500/- and 3500/- both inclusive.
8. We have following relations:

EMP(empno, ename, jobtitle, managerno, hiredate, sal, comm, deptno) DEPT(deptno, dname, loc)

1. Answer the following queries in SQL.
2. Find the Employees working in the department 10, 20, 30 only. (ii) Find Employees whose names start with letter A or letter a.
3. Find Employees along with their department name.
4. Find Employees whose manager is KING.
5. Find the Employees who are working in Smith's department
6. Find the Employees who get salary more than Allen’s salary.
7. Display employees who are getting maximum salary in each department
8. Write queries for the following tables.

T1 ( Empno, Ename , Salary, Designation),

T2 ( Empno, Deptno.)

1. Display all rows for salary greater than 5000.
2. Display the deptno for the ename=’syham’.
3. Add a new column deptname in table T2.
4. Change the designation of ename=’ram’ from ‘clerk’ to ‘senior clerk’. (v) Find the total salary of all the rows.
5. Display Empno, Ename, Deptno and Deptname.
6. Drop the table T1.
7. Consider following schema and write SQL for given statements.

Student ( RollNo, Name, Age, Sex, City )

Student\_marks ( RollNo, Sub1, Sub2, Sub3, Total, Average )

Write the query to

1. Display name and city of students whose total marks are greater than 225.
2. Display names of students who got more than 60 marks in each subject.
3. Display name of city from where more than 10 students come from.
4. Display a unique pair of male and female students.

**PL/SQL Concepts**

1. Explain the advantages of PL/SQL.
2. Explain the commit and rollback command.
3. Write a note on the cursor and its types.
4. Write short note on database triggers in PL/SQL.