# DBMS Question Bank

## Unit 1: Introduction

1) Explain the purpose of the database system. (4 Marks)
2) Explain the purpose and application of DBMS. (5 Marks)
3) List the benefits of database approach. (2 Marks)
4) Describe various disadvantages of file system compare to Data base management system. (7 Marks)
5) Discuss disadvantages of file processing systems and advantages of Database Management Systems. (7 Marks)
6) Explain different database users. (3 Marks)
7) What are the responsibilities of a DBA? ( 4 Marks),(4 Marks)
8) List the major functions performed by DBA. (2 Marks)
9) Explain functions of DBA to handle DBMS. (5 Marks)
10) Differentiate the following: DA and DBA. (4 Marks)
11) Define DBMS. Explain the various roles of DBA. (7 Marks)
12) Explain in detail the duties of DBA. (5 Marks)
13) Explain three level architecture of database system. (3 Marks)
14) Draw the three-level architecture of DBMS. (4 Marks)
15) Define Database. Explain the three level architecture of database system. (7 Marks)
16) What is data independence? Explain the difference between physical and logical data independence with example. (5 Marks)
17) Explain database system architecture with diagram in detail. (6 Marks)
18) Explain database system 3 tier architecture with clear diagram in detail. (6 Marks)

## Unit 2: Relational Model

1) Explain candidate key, primary key and foreign key. (3 Marks)
2) Explain following Term with suitable example (6 Marks)
a. Primary Key b. Candidate Key c. Super Key d. On delete cascade

3) Explain following relational algebra operations:
a. Natural join operation (2 Marks) b. Selection and projection operation (2 Marks)

4) List relational algebra operators and explain any two with example. (5 Marks)
5) What is Relational Algebra? Define Relational Algebra Operation cross product with example.(3 Marks)

6) Explain selection and projection operation with example.(5 Marks)

7) What is database schema? Explain the select, project, natural join, union and Cartesian product operations. (7 Marks)

8) Consider following schema and represent given statements in relation algebra form.
Branch(branch_name,branch_city)
Account(branch_name, acc_no, balance)
Depositor(Customer_name, acc_no)
(i) Find out list of customer who have account at „abc" branch.
(ii) Find out all customer who have account in „Ahmedabad" city and balance is greater than 10,000.
(iii) Find out list of all branch name with their maximum balance.

9) Explain transformation of relational expression into equivalent relational expression. (7 Marks)

## Unit 3: Entity-Relationship model

1) What is Entity-Relationship model? Explain the steps to reduce the ER diagram to ER database schema. (Winter 2012 – 7 Marks)
2) Explain Specialization and Generalization feature of ER diagram with example. (Dec. 2009 – 3 Marks), (May 2011 & Summer 2013 – 4 Marks)
3) Explain Generalization feature of E-R Diagram. (Dec. 2011 – 5 Marks)
4) Construct 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. (4 Marks)
5) Explain aggregation operation of ER diagram. (Dec. 2009 – 3 Marks, Dec. 2011 – 5 Marks)
6) Construct E-R diagram of the bank. It provides different kinds of bank accounts. And loans. It operates number of branches. (Dec. 2009 – 4 Marks)
7) Draw E-R diagram for Hospital management system and covert into set of table schema. (Mar. 2010 – 7 Marks)
8) Draw E – R Diagram for the School Management System. (Dec. 2010 – 7 Marks)
9) Draw E – R Diagram for Library Management System. (Dec'10 & Summer'13 – 7 Marks)
10) Give Symbol used in E-R Diagram and Draw the E-R diagram of Library Management System. (Dec. 2011 – 7 Marks)
11) Draw E-R diagram for supplier who supplies different parts. The parts are used in different projects. Explain the mapping cardinality used. Assume suitable attributes. (May 2011 – 5 Marks)
12) Give symbols used in E-R Diagram and Draw the E-R diagram of University exam System. (Dec. 2011 – 7 Marks)
13) Construct an E-R Diagram for an insurance company with a set of customers, each of whom owns number of cars, also each can have number of recorded accident associated with it. (5 Marks)

14) Obtain E-R diagram for the Admission procedure in a university. An advertisement is issued giving essential qualifications for the course, the last date for recipient of application, and the fee to be enclosed with the application. A clerk in the registrar's office checks the received applications to see if mark sheet and the fee are enclosed and sends valid application to the concerned academic department. The department checks the application in detail and decides the applicant to be admitted, those to be put in the waiting list, and those to be rejected. Appropriate letters are sent to the registrar's office which intimates the applicant.

15) Explain Mapping Cardinalities. (2 Marks)
16) With example explain various mapping cardinalities and total participation.
17) What is constraint in database? Explain types of constraints with suitable example.
18) Draw symbols for following in E-R diagram: Weak Entity set, Derived attribute (2 Marks)
19) Draw symbols for following in ER diagram: Relationship Set, and Primary key attribute. (2 Marks)
20) What does ER model mean? Specify all its notations.

Unit 4: Relational Database design
1) What are anomalies in database design? How can we solve it? (Dec. 2009 – 4 Marks)
2) What problems can occur due to wrong database design? How they can be solved?
3) Explain the issues of a database design. (Winter 2012 – 7 Marks)
4) Explain BCNF with example. (Dec.'09 & Summer 2013 – 3 Marks, Dec.'11 – 4 Marks)
5) Explain how to find closure of a set of attributes? (Dec. 2009 – 3 Marks)
6) Define functional dependency. Explain trivial and non-trivial FD with example.
7) Explain irreducible sets of Functional dependency with example.(May 2012 – 3 Marks)
8) What is functional dependency? Explain its usage in database design.
9) What is Functional Dependency? Explain non-loss decomposition. (May 2012 – 7 Marks)
10) What is normalization? What is the need for normalization? (Dec. 2009 – 4 Marks)
11) What is normalization? What is redundancy? Compare 1NF and 2NF with example. (7 Marks)
12) What is normalization? Explain 1NF, 2NF & 3NF. (May 2012 – 7 Marks)
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. (Dec. 2010 – 7 Marks)
15) Explain 2NF with example. (Summer 2013 – 3 Marks)
16) Explain 3NF with example
17) What is the advantage of using 3NF? Explain with example. (Dec. 2011 – 5 Marks)
18) Explain BCNF with example.
19) Why do we need normalization? Explain 4NF & 5NF. (May 2012 – 7 Marks)

20) What is non-loss decomposition in database? How it is useful in database?

22) What is canonical cover? Consider following set F of functional dependencies on schema R(A,B,C) and compute canonical cover for F.
(6 Marks) { A  BC,  B - C,  A  -  B,  AB  - C }

23) Consider a relation R with five attributes A, B, C, D, E having following dependencies:
A  B,  BC  E  and  ED  A  (7 Marks) .
a. List all Keys for R
b. In which normal form table is, justify your answer.

24) 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

25) 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

Unit 5: Query Processing & Query Optimization

1) Explain query optimization process. (4 Marks)
2) Explain method of query optimization.  (4 Marks)
3) Explain evaluation of expression process in query optimization. (4 Marks)
4) Explain various steps of Query evaluation. (7, 4 Marks)
5) Explain linear & binary search algorithm for selection operation. (7 Marks)
6) Explain the purpose of sorting with example with reference to query optimization.

7) Explain the measures of query cost, selection operation and join. (7 Marks)
8) Explain the measures of finding out the cost of a query in query processing. (5 Marks).

Unit 6: Transaction Management

1) What is a transaction? Explain the ACID properties.  (7 Marks)
2) What is a transaction? Explain its four important properties.  (4 Marks)
3) Explain ACID properties of transaction. (4 Marks),(4 Marks)
4) Explain ACID properties of Transaction with suitable example.(6 Marks)
5) List the ACID properties. Explain the usefulness of each. (5 Marks)
6) Why concurrency control is needed?  (3 Marks)
7) What is concurrency? What are the three problems due to concurrency? How the problems can be avoided, explain for one of the three problems.(7 Marks)
8) Consider schedule S with transaction T1 and T2. T1 transfer Rs. 150 from account A to C and T2 adds Rs. 50 into account A. Prepare concurrent schedule with two phase locking protocol.

9) Explain briefly the meaning of serializability of transactions.  (2 Marks)

10) Explain both the forms of serializability & relation between the two. (5 Marks)
11) Explain conflict serializability with example. (7 Marks)

12) Explain view serializability with example. (7 Marks)
13) What is deadlock? When it is occurs and how to avoid it? (7 Marks)
14) What is deadlock? Explain Wait-For-Graph.

15) Explain deadlock detection mechanism. (3 Marks)
16) Explain various deadlock prevention methods. (5 Marks)
17) Explain Two phase locking. ( 4 Marks)
18) Explain Two-Phase Locking protocol. (4 Marks)
19) Explain Strict two phase locking with advantages & disadvantages. (7 Marks)
20) Define Locking. Explain two phase locking protocol. (7 Marks)

21) Explain Locked based protocol. (7 Marks)
22) Explain Two Phase Locking protocol. What are its advantages and disadvantages?

23) Explain Two phase commit protocol.
24) What is System recovery? Explain two phase commit protocol

## Unit 7: Security

1) Explain shadow paging. (Dec. 2009 – 4 Marks)
2) Explain mandatory access control of database security. (Dec. 2009 – 3 Marks) 3) Define Discretionary access control. (Dec. 2010 – 2 Marks)
4) Explain the difference between Discretionary access control and mandatory access control. (May 2011 – 3 Marks)
5) Explain in detail Discretionary access control and mandatory access control.
6) Explain Data encryption. (5 Marks)
7) Write short note on data encryption. (4 Marks)
8) What is the difference between security and integrity?

9) What is security of data? Explain data encryption
10) What do you mean by security? What is the objective while designing a secure database?
11) What is authorization and authentication? Explain the access controls in a database. (7 Marks)

## Unit 8: 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)Dual
(5)Alter
(6)Truncate
(7)Drop.

3) What is ON DELETE CASCADE in SQL? Explain clearly with example.
4) What is a join? Explain various types of joins with example.
5) Explain natural join operation with example.
6) Explain DDL, DML, DCL with example. (5 Marks)
7) Write with example various built in string functions. (5 Marks)
8) Explain any two string functions in SQL.
9) Explain any two aggregate functions of SQL. (2 Marks)
10) What is View? Give the advantages of View. (2 Marks)
11) What is a view? What are its types? Write the syntax for creating a view.
12) Explain what is NULL?
13) We have following relations:
Supplier ( S#, sname, status, city)
Parts ( P#, pname, color, weight, city)
SP ( S#, P#, quantity)

(a) Answer the following queries in SQL:
(i) Find name of supplier for city = 'Delhi'.
(ii) Find suppliers whose name start with 'AB'
(iii) Find all suppliers whose status is 10, 20 or 30.
(iv) Find total number of city of all suppliers.
(v) Find s# of supplier who supplies 'red' part.
(vi) Count number of supplier who supplies 'red' part.
(vii) Sort the supplier table by sname.

(b) Answer the following queries in SQL:

(i) Delete records in supplier table whose status is 40. (1 Mark)
(ii) Add one field in supplier table. (1 Mark)
(iii) Explain commit command. ( 2 Marks)
(iv) Explain Cursor in PL/SQL.

(c) Answer the following queries in SQL

(i) Find name of parts whose color is 'red'
(ii) Find parts name whose weight less than 10 kg.
(iii) Find all parts whose weight from 10 to 20 kg.
(iv) Find average weight of all parts.
(v) Find S# of supplier who supply part 'p2'
(vi) Find name of supplier who supply maximum parts.
(vii) Sort the parts table by pname.

(d) Answer the following queries in SQL:
(i) Delete records in parts table whose color is 'blue'.
(ii) Drop one field in parts table.

14) Consider 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 )
(i) Display name of student who got first class in subject '130703'.
(ii) Display name of all student with their total mark.
(iii) Display list number of student in each university.
(iv) Display list of student who has not given any exam.

15) 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)

(i) Find the total number of people whose cars were involved in accidents in 2009.
(ii) Find the number of accidents in which the cars belonging to 'Sundaran'.
(iii)Add a new customer to the database.
(iv) Add a new accident recorded for the Santro belonging to 'NAVATHE'.

16) 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)

(i) Find the name of all employees who work for State Bank.
(ii) Find the names and cities of residence of all employees who work for State Bank.

(iii)Find all employee in the database who do not work for State Bank.
(iv) Find all employee in the database who earn more than every employee of UCO Bank.

17) Consider following schema and write SQL for given statements.(8 marks)
Student (Rollno, Name, Age, Sex, City)
Student_marks (Rollno, Sub1, Sub2, Sub3, Total, Average)
Write query to

(i) Calculate and store total and average marks from Sub1, Sub2 & Sub3.
(ii) Display name of students who got more than 60 marks in subject Sub1.
(iii)Display name of students with their total and average marks.
(iv) Display name of students who got equal marks in subject Sub2.

18) Implement following relation using SQL query.
(i) Student (stud_no, stud_name, sub1, sub2, totalmark, percentage)
Create the table, add 5 records and display the data.

(ii) Calculate total mark and percentage and also arrange the students on ascending order of total mark and also make a view of it.
(iii)Update the mark of sub1 of student_no=111 with 50 and also Calculate total marks and percentage accordingly.

19) Implement following relation using SQL query.

Employee (emp_no, emp_name, department, city, salary)
(i) Find all the employee whose emp_no is less than 100 and salary more than 25000 and department is “Account” .
(ii) Count the no of employee and Sum the salary of all employee
(iii)Delete the employee having minimum salary.