QUESTION BANK FOR DBMS:

UNIT 1: Introduction to DBMS

CO1: Understand basic concepts of Database

Short Questions

1. What is a DBMS? List its major advantages over File Processing Systems.
2. Define data independence. Differentiate between logical and physical data independence.
3. What is the role of a Database Administrator (DBA)?
4. Explain the ANSI/SPARC 3-tier architecture.
5. Define schema and instance.

Long Questions

1. Compare and contrast File Processing System with Database System.
2. Describe different types of database users.
3. Explain client-server architecture in DBMS with a diagram.

UNIT 2: SQL

CO2, CO6: Implement SQL concepts to build dynamic database applications

Short Questions

1. Differentiate between DDL and DML with examples.
2. Write a SQL query to fetch names of customers whose city is “Nagpur”.
3. What is the purpose of the LIKE operator? Give example.
4. List five aggregate functions in SQL.

Long Questions

1. Create a table for "Students" and insert five sample records. Write SQL queries to:
    - a) List students with age > 20
    - b) Display students sorted by name
    - c) Update city for student with ID 3
2. Write queries using BETWEEN, IN, and NOT IN.
3. Explain use of clauses: WHERE, GROUP BY, HAVING, ORDER BY.

UNIT 3: Data Models and E-R Model

CO1, CO3: Understand relational models and apply E-R modeling

Short Questions

1. Define entity, attribute, and relationship.
2. What is the difference between strong and weak entity?
3. Define specialization and generalization.

Long Questions

1. Draw an E-R diagram for a hospital management system.
2. Explain different types of attributes with examples.
3. Describe mapping cardinalities with types.

UNIT 4: Relational Model & Relational Algebra

CO3, CO4: Analyze relational structures and operations

Short Questions

1. Define: Primary key, Foreign key, Super key.
2. What are the different types of constraints in RDBMS?
3. Write a relational algebra expression for: "List employees in department 10".

Long Questions

1. Explain relational algebra operations: select, project, join, union, difference.
2. Discuss the significance of keys in relational schema.
3. Perform the following:
    - a) Create EMP and DEPT tables.
    - b) Write queries using natural join and outer join.

🧩 **UNIT 5: Relational Database Design and Normalization**

CO3: Design structured databases and apply normalization

Short Questions

1. Define Functional Dependency (FD). What is trivial FD?
2. What are Armstrong’s axioms?
3. Define normalization. List types of normal forms.

Long Questions

1. Explain the process of normalization with an example.
2. Decompose a relation violating 2NF into 3NF.
3. What are anomalies in database design? How does normalization help?

UNIT 6: Transactions, Concurrency & Recovery

CO5: Evaluate transaction management techniques

Short Questions

1. What is a transaction? Explain ACID properties.
2. Define serial and non-serial schedule.
3. What is shadow paging?

Long Questions

1. Explain conflict and view serializability with example.
2. Describe two-phase commit protocol.
3. Explain deadlock detection and prevention methods (Wait-Die, Wound-Wait).

UNIT 7: Query Processing & Optimization

CO4, CO6: Analyze and optimize query execution

Short Questions

1. What is a materialized view?
2. Define cost-based query optimization.
3. What are equivalence rules in query processing?

Long Questions

1. Explain different stages of query processing.
2. Compare linear search and binary search in file systems.
3. Write about pipelining and its advantages in DBMS.

UNIT 8: Database Security

CO6: Understand database security

Short Questions

1. Define: Authentication and Authorization.
2. What is SQL Injection?
3. Differentiate between DAC, MAC, and RBAC.

Long Questions

1. Describe techniques used for securing a database.
2. Explain encryption and decryption in database context.
3. What is intrusion detection? How is it used in DBMS?

PRACTICAL QUESTIONS:

SQL Practice

1. Write SQL queries for:
    - Display customers with balance > 1000.
    - Find average age of sailors.
    - Update salary of employees by 10%.
2. Use JOIN queries to:
    - List all employee names and their departments.
    - Find the customers who ordered Trousers.
    - Display sailor’s name and boat name using booking date.

PL/SQL Blocks

1. Write a PL/SQL block to find the largest of three numbers.
2. Write a PL/SQL block to generate Fibonacci series.
3. Write a PL/SQL program to calculate area of rectangle and triangle.

Aggregate & Pattern Queries

1. List total deposit from all accounts.
2. Count number of customers in each city.
3. Find products whose names start with 'A' and price > 500.