

Table 1. Generated Question List for Database Management Systems Based on User-Provided Syllabus and Input Parameters.

End User Inputs	Generated Questions List
<p>Subject: Database Management System</p> <p>UNIT I: Introduction to Databases: Introduction, An Example, Characteristics of the Database Approach, Actors on Scene, Workers behind the scene, Advantages of Using the DBMS Approach, A Brief History of Database Applications, When Not to Use a DBMS</p> <p>Overview of Database Languages and Architectures: Data Models, Schemas and Instances, Three Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server Architecture for DBMSs, Classification of Database Management Systems.</p> <p>UNIT II: Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model, Conceptual Design for Large Enterprises</p> <p>Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER to Relational, Introduction to Views, Destroying/Altering Tables and Views.</p> <p>UNIT III: Relational Algebra: Selection and Projection, Set Operations, Renaming, Joins, Division, More Examples of Algebra Queries. SQL: Queries, Constraints</p> <p>Triggers: The Form of a Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Databases, Designing Active Databases.</p> <p>UNIT IV: Introduction to Normalization Using Functional and Multivalued Dependencies: Informal Design Guidelines for Relation Schema, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.</p> <p>UNIT V:</p>	<p>Long answer Questions:</p> <ol style="list-style-type: none"> 1. Explain the concept of normalization in database management system. Discuss the different normal forms with examples. 2. Describe the various types of database models used in database management system. Compare and contrast the relational model with the hierarchical and network models. 3. Discuss the importance of indexing in database management system. Explain the different types of indexing techniques and their advantages and disadvantages. 4. Explain the concept of transaction management in database systems. Discuss the ACID properties and how they ensure the reliability of transactions. <p>Short answer type questions:</p> <ol style="list-style-type: none"> 1. What is a primary key in a database table? Provide an example. 2. Explain the difference between a foreign key and a unique key in a database. 3. What is a stored procedure in database management system? How does it differ from a function? <p>Fill in the blank questions:</p> <ol style="list-style-type: none"> 1. The process of organizing data into tables in a database is known as _____. 2. A database management system provides users with a _____ to interact with the database. <p>Multiple choice questions:</p> <ol style="list-style-type: none"> 1. The ACID properties in transaction management stand for: A) Atomicity, Consistency, Isolation, Durability B) Accuracy, Consistency, Integrity, Durability C) Atomicity, Consistency, Integrity, Dependency D) All of the above 2. What is the purpose of normalization in database management system? A) To reduce redundancy B) To improve data integrity C) To optimize query performance D) All of the above

Transaction Management and Concurrency Control: Transaction Concept, A Simple Transaction Model, Storage Structure, ACID Properties, Serializability, Transaction Isolation Levels, Concurrency Control, Lock-Based Protocols, Validation-Based Protocols.

Text Books:

- 1) Database Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke, Mc Graw-Hill
- 2) Database System Concepts, 6/e, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Mc Graw Hill
- 3) Database Systems, 6/e Ramez Elmasri, Shamkant B. Navathe, Pearson

Reference Books:

- 1) Database Systems, 9/e, Carlos Coronel, Steven Morris, Peter Rob, Cengage
- 2) Introduction to Database Systems, 8/e, C J Date, Pearson

Input Subject Name:

Database Management Systems

No. of Long Answers Questions: 4

No. of Short Answers Questions: 3

No. of Fill in the blank Questions: 2

No. of Multiple Questions: 2

Table 2. Generated answers for each question from the question list for Database Management Systems based on user-provided syllabus and input parameters.

Question	Answer
Long answer type Questions	
1. Explain the concept of normalization in database management system. Discuss the different normal forms with examples.	<p>1.ans) Normalization in database management is the process of organizing a database to reduce redundancy and dependency by dividing large tables into smaller ones and defining relationships between them. The goal is to ensure data integrity and minimize data anomalies. There are different normal forms to achieve this, each with specific rules and requirements:</p> <ol style="list-style-type: none"> 1. First Normal Form (1NF): Ensures that each column contains atomic values. For example, a table with a column for "Full Name" should be split into "First Name" and "Last Name" columns. 2. Second Normal Form (2NF): Requires that each non-key attribute is fully functionally dependent on the primary key. This means that all attributes must depend on the entire primary key, not just part of it. 3. Third Normal Form (3NF): Builds on 2NF by removing transitive dependencies. In this form, non-key attributes are dependent only on the primary key, not on other non-key attributes. <p>These normal forms help in structuring databases efficiently, reducing redundancy, and ensuring data integrity.</p> <p>(Remaining long answers continues similarly like above answer)</p>

Short answer questions

1. What is a primary key in a database table? Provide an example.
2. Explain the difference between a foreign key and a unique key in a database.
3. What is a stored procedure in database management system? How does it differ from a function?

1.ans) A primary key in a database table is a unique identifier for each record in the table. It ensures that each row in the table is uniquely identified. For example, in a table of students, the student ID could be the primary key as each student would have a unique ID number.

2.ans)

In a database, a foreign key and a unique key serve different purposes:

1. Foreign Key:

A foreign key is a field in a table that is used to establish a relationship with another table. It ensures referential integrity by enforcing a link between the data in two tables.

The foreign key in one table is a primary key in another table, creating a parent-child relationship between the tables.

It helps maintain data consistency and integrity by preventing actions that would destroy the relationship between tables.

2. Unique Key:

A unique key is a constraint that ensures that all values in a column are unique and not duplicated within the table.

Unlike a primary key, a unique key allows NULL values, but it enforces uniqueness for non-NULL values.

It can be used to identify records uniquely but does not establish relationships between tables like a foreign key does.

In summary, a foreign key is used to link tables together, ensuring data integrity and enforcing relationships, while a unique key ensures that values in a column are unique within a table but does not establish relationships between tables.

3.ans) A stored procedure in a database management system is a set of SQL statements that are stored in the database and can be called and executed multiple times. It allows for modular programming within the database, enabling complex operations to be performed efficiently.

The main difference between a stored procedure and a function is that a stored procedure can perform multiple operations, including data manipulation, transactions, and flow control logic. It can also return multiple result sets. On the other hand, a function typically returns a single value and is used to perform a specific computation or operation.

In summary, stored procedures are more versatile and can perform a wider range of tasks compared to functions in a database management system.

1.ans) Normalization

2.ans) Structured Query Language (SQL)

Fill in the blank's questions

1. The process of organizing data into tables in a database is known as _____.
2. A database management system provides users with a _____ to interact with the database.

Multiple choice questions

1.ans) A) Atomicity, Consistency, Isolation, Durability

1. The ACID properties in transaction management stand for:

2.ans) D) All of the above

A) Atomicity, Consistency, Isolation, Durability B) Accuracy, Consistency, Integrity, Durability C) Atomicity, Consistency, Integrity, Dependency D) All of the above.

2. What is the purpose of normalization in database management system? A) To reduce redundancy B) To improve data integrity C) To optimize query performance D) All of the above.
