**SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**

Ramapuram Campus, Bharathi Salai, Ramapuram, Chennai - 600089

**FACULTY OF ENGINEERING AND TECHNOLOGY**

# **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

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**UNIT 5 - QUESTIONBANK**

| **Degree & Branch** | **: B.TECH- CSE** |
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| **Semester & Year** | **: : IV/II** |
| **Sub Code & Subject Name** | **: 21CSC205P- Database Management Systems** |
| **Regulation** | **: 2021** |
| **Academic Year** | **: 2023-2024** |

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**UNIT 5 - QUESTION BANK**

**SUBJECT : Subject Code: 21CSC205P -** Database Management Systems

**SEM/YEAR: VI/III**

**Course Outcomes**

**CO5: Visualizing storage structure, Handling, Concurrency, Failure and recovery principles, NoSQL Concept**

| **Q.**  **No.** | **Questions** | **Course Outcome** | | **Competence**  **BT Level** | |
| --- | --- | --- | --- | --- | --- |
| 1 | Which type of database stores data in the form of documents?  a) Relational database  **b) Document-oriented database**  c) Key-value store  d) Column-oriented database | CO5 | | BT1 | |
| **2** | What is responsible for managing individual transactions in a database system?  a) Storage structure  **b) Transaction control**  c) Concurrency control algorithms  d) Failures and recovery algorithms | CO5 | | BT1 | |
| **3** | Which control ensures that transactions execute correctly when multiple transactions are running concurrently?  a) Storage structure  b) Transaction control  **c) Concurrency control algorithms**  d) Failures and recovery algorithms | CO5 | | BT1 | |
| **4** | What is the primary concern of concurrency control algorithms in database systems?  a) Managing storage structures efficiently  b) Ensuring transactions are executed in the correct order  **c) Preventing data inconsistencies when multiple transactions run concurrently**  d) Recovering from failures gracefully | CO5 | | BT1 | |
| **5** | Which of the following is a key aspect of NoSQL databases?  a) Strict adherence to ACID properties  b) Fixed schema design  c) Support for complex transactions  **d) Flexible schema design** | CO5 | | BT1 | |
| **6** | Which algorithm is commonly used for concurrency control in database systems based on graph theory?  a) Two-phase locking  b) Optimistic concurrency control  c) Timestamp ordering  **d) Conflict serializability** | CO5 | | BT1 | |
| **7** | Which type of database is best suited for scenarios where data is highly structured and needs to be queried with complex SQL queries?  a) Document-oriented database  b) Key-value store  **c) Relational database**  d) Column-oriented database | CO5 | | BT1 | |
| **8** | What are some potential issues that may arise in concurrent execution in a database system?  a) Deadlocks  b) Lost updates  c) Inconsistent retrievals  **d) All of the above** | CO5 | | BT2 | |
| **9** | Which failure and recovery algorithm focuses on maintaining a log of operations to ensure atomicity and durability?  a) ARIES  b) WAL  **c) Redo logging**  d) Checkpointing | CO5 | | BT2 | |
| **10** | Which storage structure is most suitable for OLAP (Online Analytical Processing) workloads?  a) Relational database  b) Document-oriented database  c) Key-value store  **d) Column-oriented database** | CO5 | | BT2 | |
| **11** | Which concurrency control algorithm would be preferable for a system with a high degree of contention?  **a) Two-phase locking**  b) Optimistic concurrency control  c) Timestamp ordering  d) Serializable schedule | CO5 | | BT2 | |
| **12** | Which type of storage structure organizes data in a row-wise fashion?  a) Document-oriented database  b) Key-value store  **c) Relational database**  d) Column-oriented database | CO5 | | BT1 | |
| **13** | What is the primary function of transaction control in a database system?  a) Managing storage structures  **b) Ensuring data consistency**  c) Optimizing query performance  d) Implementing security measures | CO5 | | BT1 | |
| 14 | How do concurrency control algorithms ensure data integrity in a multi-user database environment?  a) By preventing data corruption during storage  **b) By serializing transactions to avoid conflicts**  c) By optimizing disk access for faster retrieval  d) By compressing data to save storage space | CO5 | | BT3 | |
| **15** | What distinguishes NoSQL databases from traditional relational databases?  a) Use of SQL for querying  b) Strict adherence to ACID properties  **c) Schema flexibility**  d) Emphasis on normalization | CO5 | | BT3 | |
| **16** | Which concurrency control algorithm is based on assigning timestamps to transactions?  a) Two-phase locking  b) Optimistic concurrency control  **c) Timestamp ordering**  d) Conflict serializability | CO5 | | BT4 | |
| **17** | In which scenario would a column-oriented database be most beneficial?  a) Storing unstructured data  b) Performing real-time analytics  c) Handling transactional data  **d) Supporting complex joins** | CO5 | | BT4 | |
| **18** | What are the potential consequences of data inconsistency in a concurrent execution environment?  **a) Loss of data integrity**  b) Increased disk storage requirements  c) Reduced query performance  d) Inability to scale horizontally | CO5 | | BT4 | |
| **19** | Which type of database is most suitable for handling highly interconnected data with complex relationships?  a) Key-value store  b) Document-oriented database  **c) Relational database**  d) Column-oriented database | CO5 | | BT1 | |
| **20** | How does a document-oriented database differ from a relational database in terms of data storage?  a) Document-oriented databases use tables to store data.  b) Relational databases store data in JSON format.  **c) Document-oriented databases store data in a hierarchical structure.**  d) Relational databases store data as documents. | CO5 | | BT2 | |
| **21** | In a distributed database system, which concurrency control mechanism is typically used to ensure consistency across multiple nodes?  a) Two-phase locking  b) Optimistic concurrency control  **c) Paxos algorithm**  d) Timestamp ordering | CO3 | | BT3 | |
| **22** | Which storage structure is optimized for read-heavy workloads and analytical queries?  a) Document-oriented database  b) Key-value store  c) Relational database  **d) Column-oriented database** | CO5 | | BT1 | |
| **23** | What aspect of transaction control ensures that all changes made by a transaction are either applied entirely or not at all?  **a) Atomicity**  b) Consistency  c) Isolation  d) Durability | CO5 | | BT1 | |
| **24** | How does a key-value store database differ from a document-oriented database in terms of data organization?  a) Key-value store databases use a tabular structure.  **b) Document-oriented databases store data in key-value pairs.**  c) Key-value store databases use a hierarchical structure.  d) Document-oriented databases store data in collections of documents. | CO5 | | BT2 | |
| **25** | In which scenario would optimistic concurrency control be more suitable than pessimistic concurrency control?  a) High contention for resources  **b) Low contention for resources**  c) Large number of transactions  d) Small number of transactions | CO5 | | BT3 | |
| **26** | Which one of the following given statements possibly contains the error?   1. select \* from emp where empid = 10003; 2. select empid from emp where empid = 10006; 3. select empid from emp; 4. **select empid where empid = 1009 and Lastname = 'GELLER';** | CO5 | | BT1 | |
| **27** | What do you mean by one-to-many relationships?   1. One class may have many teachers 2. One teacher can have many classes 3. **Many classes may have many teachers** 4. Many teachers may have many classes | CO5 | | BT1 | |
| **28** | A Database Management System is a type of \_\_\_\_\_\_\_\_\_software.   1. **It is a type of system software** 2. It is a kind of application software 3. It is a kind of general software 4. Both A and C | CO5 | | BT1 | |
| **29** | The term "FAT" is stands for\_\_\_\_\_   1. File Allocation Tree 2. **File Allocation Table** 3. File Allocation Graph 4. All of the above | CO5 | | BT1 | |
| **30** | Which of the following can be considered as the maximum size that is supported by FAT?   1. Data Management 2. Data Mining 3. Data Warehouse 4. **Both B and C** | CO5 | | BT1 | |
| **31** | Which of the following can be used to extract or filter the data & information from the data warehouse?   1. Data redundancy 2. Data recovery tool 3. **Data mining** 4. Both B and C | CO5 | | BT1 | |
| **32** | Which one of the following refers to the copies of the same data (or information) occupying the memory space at multiple places.   1. Data Repository 2. Data Inconsistency 3. Data Mining 4. **Data Redundancy** | CO5 | | BT1 | |
| **33** | Which one of the following refers to the "data about data"?   1. Directory 2. Sub Data 3. Warehouse 4. **Meta Data** | CO5 | | BT1 | |
| **34** | Which of the following refers to the level of data abstraction that describes exactly how the data actually stored?   1. Conceptual Level 2. **Physical Level** 3. File Level 4. Logical Level | CO5 | | BT1 | |
| **35** | In general, a file is basically a collection of all related\_\_\_\_\_\_.   1. Rows & Columns 2. Fields 3. Database 4. **Records** | CO5 | | BT1 | |
| **36** | The term "Data" refers to:   1. The electronic representation of the information( or data) 2. Basic information 3. **Row Facts and figures** 4. Both A and C | CO5 | | BT3 | |
| **37** | Which one of the following is commonly used to define the overall design of the database?   1. Application program 2. Data definition language 3. **Schema** 4. Source code | CO5 | | BT3 | |
| **38** | Which one of the following keyword is used to find out the number of values in a column?   1. TOTAL 2. **COUNT** 3. SUM 4. ADD | CO5 | | BT2 | |
| **39** | Which of the following levels is considered as the level closed to the end-users?   1. Internal Level 2. **External Level** 3. Conceptual Level 4. Physical Level | CO5 | | BT2 | |
| **40** | Which one of the following is a failure to a system  a) Boot crash  b) Read failure  **c) Transaction failure**  d) All of the mentioned | CO5 | | BT2 | |
| **41** | The Database Management Query language is generally designed for the \_\_\_\_\_   1. Support end-users who use English like commands 2. Specifying the structure of the database 3. Support in the development of the complex applications software 4. **All of the above** | CO5 | | BT2 | |
| **42** | Which of the following refers collection of the information stored in a database at a specific time?   1. Independence 2. **Instance of the database** 3. Schema 4. Data domain | CO5 | | BT3 | |
| **43** | The database management system can be considered as the collection of \_\_\_\_\_\_ that enables us to create and maintain the database.   1. Translators 2. **Programs** 3. Keys 4. Language activity | CO5 | | BT3 | |
| **44** | Which one of the following commands is used to restore the database to the last committed state?   1. Savepoint 2. **Rollback** 3. Commit 4. Both A & B | CO5 | | BT2 | |
| **45** | The term "TCL" stands for\_\_\_\_\_.   1. Ternary Control Language 2. Transmission Control Language 3. Transaction Central Language 4. **Transaction Control Language** | CO5 | | BT2 | |
| **46** | The traditional storage of data organized by the customer, stored in separate folders in filing cabinets is an example of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ type of ‘database’ management system.  a) Object-oriented database management system  b) Relational database management system  c) Network database management system  **d) Hierarchical database management system** | CO5 | | BT3 | |
| **47** | Which of the following is not the utility of DBMS?  a) Backup  b) Data Loading  **c) Process Organization**  d) File organization | CO5 | | BT3 | |
| **48** | Which of the following is popular for applications such as storage of log files in a database management system since it offers the best write performance?  a) RAID level 0  **b) RAID level 1**  c) RAID level 2  d) RAID level 3 | CO5 | | BT2 | |
| **49** | The oldest DB model is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **a) Network**  b) Physical  c) Hierarchical  d) Relational | CO5 | | BT2 | |
| **50** | Which of the following belongs to transaction failure  a) Read error  b) Boot error  **c) Logical error**  d) All of the mentioned | CO5 | | BT3 | |
| **PART B (4 Marks)** | | | | | |
| **1** | .List the properties of the transaction. | | CO5 | | BT1 |
| **2** | Discuss the ACID properties and their enforcement mechanisms in transaction control. | | CO5 | | BT1 |
| **3** | Design a concurrency control algorithm considering scalability and fault tolerance for a distributed database system. | | CO5 | | BT1 |
| **4** | Analyze the challenges and strategies for mitigating issues in concurrent execution environments in database systems. | | CO5 | | BT2 |
| **5** | Evaluate the effectiveness of various failure recovery algorithms in ensuring data consistency and system reliability. | | CO5 | | BT1 |
| **6** | Explain about Recovery System. | | CO5 | | BT2 |
| **7** | Discuss about Conflict Serializability? | | CO5 | | BT2 |
| **8** | Propose a distributed database architecture using key-value pairs for a real-time messaging application. | | CO5 | | BT2 |
| **9** | Create a disaster recovery plan for a database system deployed in a cloud environment. | | CO5 | | BT1 |
| **10** | Explain how column-oriented databases optimize read-heavy workloads and analytical queries. | | CO5 | | BT1 |
|  |  | |  | |  |
| **PART C (12 Marks)** | | | | | |
| **1** | Explain how different storage structures impact data retrieval and storage efficiency in a database system | | CO5 | | BT1 |
| **2** | Explain details about RAID. | | CO5 | | BT2 |
| **3** | Discuss the impact of serialization and isolation levels on concurrency control in database systems. | | CO5 | | BT2 |
| **4** | Assess the advantages and disadvantages of using NoSQL databases compared to traditional relational databases for handling unstructured data. | | CO5 | | BT2 |
| **5** | Illustrate the role of graph-based concurrency control algorithms in managing concurrent transactions. |  | CO5 | | BT3 |
| **6** | Formulate a data migration strategy for transitioning from a relational database to a NoSQL database for a web application. | | CO5 | | BT2 |
| **7** | Devise a schema design for a document-oriented database to support an e-commerce platform. | | CO5 | | BT3 |
| **8** | Discuss the Data Dictionary Storage in detail | | CO5 | | BT3 |