✅ Unit-I: DBMS Introduction – PYQ-Based MCQs

1. Which of the following is a key feature of the database approach?
A) Data redundancy
B) Data isolation
C) Data abstraction
D) Manual data entry
Answer: C

---

2. Which model is based on real-world entities and relationships?
A) Hierarchical model
B) Network model
C) Relational model
D) Entity-Relationship model
Answer: D

---

3. What is the purpose of normalization in DBMS?
A) Increase data redundancy
B) Reduce data anomalies
C) Improve data retrieval speed
D) Decrease indexing
Answer: B

---

4. In a database, a schema is:
A) A type of database
B) A file system
C) The overall logical structure
D) A physical level design
Answer: C

---

5. Which of the following levels describes how data is physically stored?
A) External
B) Internal
C) Conceptual
D) Logical
Answer: B

---

6. Data independence means:
A) Data and programs are tightly coupled
B) Data is stored as raw files

C) Ability to modify schema without affecting applications
D) None of the above
Answer: C

---

7. The three-schema architecture consists of:
A) Internal, External, View
B) Schema, Subschema, Instance
C) Internal, Conceptual, External
D) Physical, Logical, View
Answer: C

---

8. Logical data independence refers to the capacity to change:
A) Data format without changing application
B) Application logic without changing DB
C) Conceptual schema without changing external schema
D) Hardware without changing software
Answer: C

---

9. Physical data independence refers to the capacity to change:
A) Application without schema change
B) External schema without changing physical storage
C) Internal schema without changing conceptual schema
D) Queries without changing storage
Answer: C

---

10. Which component manages the interaction between the user and the DBMS?
A) Query Processor
B) Transaction Manager
C) Storage Manager
D) File Manager
Answer: A

---

11. The function of the Storage Manager is to:
A) Manage access rights
B) Store metadata
C) Manage disk space and data structure
D) Run queries
Answer: C

---

12. Which is an example of a DBMS?
A) Microsoft Excel
B) Oracle
C) Chrome
D) Photoshop
Answer: B

---

13. A database is:
A) A collection of unrelated data
B) A spreadsheet
C) A collection of interrelated data and programs to access them
D) A file folder
Answer: C

---

14. Which of the following is *not* a function of DBMS?
A) Data security
B) Data redundancy
C) Data retrieval
D) Data integrity
Answer: B

---

15. DBMS allows:
A) Multiple users to access data simultaneously
B) Single user access only
C) Manual data entry
D) None of the above
Answer: A

---

16. Which of the following ensures that users do not see unnecessary data?
A) Conceptual schema
B) Internal schema
C) External schema
D) Logical schema
Answer: C

---

17. The language used to create and modify database schema is:
A) DML
B) DCL
C) DDL
D) SQL
Answer: C

18. Which language is used to access or manipulate data in DBMS?
A) HTML
B) DML
C) CSS
D) Java
Answer: B

---

19. The property of DBMS that ensures only valid data is stored is:
A) Data Abstraction
B) Data Integrity
C) Data Redundancy
D) Data Indexing
Answer: B

---

20. Which of the following is *not* a component of DBMS?
A) Query processor
B) Storage manager
C) File system
D) Transaction manager
Answer: C

---

21. A database instance refers to:
A) The logical structure of a database
B) The physical schema
C) The data at a particular moment
D) The storage engine
Answer: C

---

22. What is metadata in DBMS?
A) Actual data stored in tables
B) Data about data
C) Query language
D) Backup file
Answer: B

---

23. The DBMS utility that checks the integrity of data is:
A) Query Manager
B) Integrity Checker
C) Transaction Manager

D) DML Compiler
Answer: B

---

24. Which of the following is used for database recovery?
A) View
B) Transaction log
C) Cursor
D) Index
Answer: B

---

25. Which term is used for the overall design of the database?
A) View
B) Schema
C) Key
D) File
Answer: B

---

26. Which type of system provides simultaneous access to multiple users?
A) Centralized DBMS
B) Single-user DBMS
C) Multi-user DBMS
D) Real-time system
Answer: C

---

27. Which of the following is a record-based logical model?
A) Object-oriented
B) Hierarchical
C) Network
D) Relational
Answer: D

---

28. What is the full form of DML?
A) Data Manipulation Logic
B) Data Mapping Language
C) Data Manipulation Language
D) Data Maintenance Language
Answer: C

---

29. The conceptual schema in DBMS:
A) Controls user views
B) Describes logical structure of the database
C) Is the physical schema
D) Is the user interface
Answer: B

---

30. DBMS provides concurrency control to:
A) Prevent duplicate keys
B) Manage deadlocks
C) Ensure data integrity during simultaneous access
D) Encrypt data
Answer: C

✅ Unit-II: E-R Modeling – PYQ-Based MCQs (1–30)

1. In the E-R model, an entity is represented by:
A) Ellipse
B) Rectangle
C) Diamond
D) Line
Answer: B

---

2. The symbol used to represent attributes in an ER diagram is:
A) Ellipse
B) Rectangle
C) Diamond
D) Square
Answer: A

---

3. A weak entity must be associated with:
A) Another weak entity
B) A strong entity
C) A relationship
D) A key attribute
Answer: B

---

4. The relationship between a weak entity and its identifying entity is called:
A) Ternary
B) Binary
C) Identifying relationship
D) One-to-one
Answer: C

---

5. Total participation is shown in an ER diagram by:
A) Dashed line
B) Double rectangle
C) Double line
D) Thick diamond
Answer: C

---

6. A multivalued attribute is represented by:
A) A dashed ellipse
B) A double ellipse

C) A rectangle
D) A diamond
Answer: B

---

7. Which of the following best describes generalization?
A) Combining lower-level entities into a higher-level entity
B) Splitting higher-level entity into lower-level entities
C) Removing attributes
D) Adding redundant data
Answer: A

---

8. Specialization means:
A) Combining multiple entities
B) Identifying common features
C) Creating sub-entities based on differences
D) Deleting entities
Answer: C

---

9. The degree of a relationship is:
A) The number of attributes in the relationship
B) The number of entity sets participating
C) Always 2
D) The number of tuples
Answer: B

---

10. Derived attributes are represented using:
A) Dashed ellipse
B) Rectangle
C) Bold diamond
D) Line
Answer: A

---

11. In ER diagram, a diamond symbol represents:
A) Entity
B) Attribute
C) Relationship
D) Key
Answer: C

---

12. Which of the following can have a partial key?
A) Strong entity
B) Weak entity
C) Relationship
D) Attribute
Answer: B

---

13. Which of the following is an example of a binary relationship?
A) Works_For
B) Supplies
C) Manages
D) All of the above
Answer: D

---

14. A key attribute:
A) Can have duplicate values
B) Uniquely identifies each entity
C) Cannot be part of a relationship
D) Is always derived
Answer: B

---

15. Which of the following is *not* an attribute type in ER modeling?
A) Derived
B) Multivalued
C) Composite
D) Primary
Answer: D

---

16. Which of the following symbols is used for a weak entity?
A) Double rectangle
B) Double ellipse
C) Dashed diamond
D) Bold circle
Answer: A

---

17. Which is an example of a multivalued attribute?
A) Age
B) Phone numbers
C) Salary
D) ID
Answer: B

18. A super class can have:
A) No subclass
B) Only one subclass
C) One or more subclasses
D) Only weak entities
Answer: C

---

19. Inheritance in ER model means:
A) Subclass inherits attributes from superclass
B) Superclass inherits from subclass
C) Relationship inherits from entity
D) Attribute inherits from key
Answer: A

---

20. Composite attributes can be:
A) Divided into sub-parts
B) Only used in weak entities
C) Used as relationships
D) Always derived
Answer: A

---

21. Role indicators in ER model are used when:
A) The same entity participates more than once in a relationship
B) Entities are weak
C) Relationship is binary
D) Relationship is unary
Answer: A

---

22. Cardinality constraints in an ER model specify:
A) Number of attributes in an entity
B) Number of possible values for an attribute
C) Number of entities related in a relationship
D) None
Answer: C

---

23. A ternary relationship involves:
A) One entity
B) Two entities
C) Three entities

D) Four entities
Answer: C

---

24. Which of these is used to uniquely identify weak entity instances?
A) Foreign key
B) Partial key
C) Composite key
D) Surrogate key
Answer: B

---

25. The ER model is mainly used for:
A) Storage management
B) Query optimization
C) Database design
D) Performance tuning
Answer: C

---

26. Which of the following can be a relationship constraint?
A) Total participation
B) Weak entity
C) Derived attribute
D) Generalization
Answer: A

---

27. Aggregation in ER modeling is used to:
A) Show hierarchy
B) Show a relationship involving a relationship
C) Simplify attributes
D) Show multivalued data
Answer: B

---

28. Recursive relationships are those where:
A) Entities relate to themselves
B) Attributes relate to entities
C) Relationships are between three entities
D) Keys relate to multiple attributes
Answer: A

---

29. The term "entity set" refers to:
A) A collection of similar entities
B) A tuple in a table
C) A group of relationships
D) A multivalued attribute
Answer: A

---

30. Which of the following is true about weak entities?
A) They have their own primary key
B) They must be connected to a strong entity via a total participation relationship
C) They are independent of other entities
D) They cannot have attributes
Answer: B

✅ Unit-III: File Organization – PYQ-Based MCQs (1–30)

1. Which file organization allows both sequential and direct access?
A) Heap file
B) Sequential file
C) Indexed sequential access method (ISAM)
D) Hashing
Answer: C

---

2. In B+ trees, data is stored:
A) Only in internal nodes
B) In both internal and leaf nodes
C) Only in leaf nodes
D) Only in root node
Answer: C

---

3. What is the purpose of an index in file organization?
A) To store data in files
B) To provide a backup
C) To speed up data retrieval
D) To encrypt the file
Answer: C

---

4. Which of the following is true about B-trees and B+ trees?
A) B-trees have data only in leaves
B) B+ trees have data in internal nodes
C) B+ trees store data only at leaf nodes
D) B-trees don't use indexing
Answer: C

---

5. In hashing, a collision occurs when:
A) Two data items share the same value
B) Data is not inserted
C) Different keys map to the same hash address
D) Hashing function fails
Answer: C

---

6. Which method is *not* used for collision resolution in hashing?
A) Chaining
B) Open addressing

C) Linear probing
D) Normalization
Answer: D

---

7. Extendible hashing adjusts:
A) Disk space
B) Global and local depth of hash directory
C) Block size
D) Primary key size
Answer: B

---

8. What is the main advantage of B+ trees over B-trees?
A) Better encryption
B) Less height
C) Better range queries
D) More root nodes
Answer: C

---

9. Which of these file organization methods is best for range queries?
A) Hashing
B) Heap file
C) B+ Tree
D) Clustered index
Answer: C

---

10. The B-tree of order *m* can have at most:
A) m leaf nodes
B) m children per node
C) m records
D) m height
Answer: B

---

11. What is the time complexity of searching in a B-tree of order *m* with *n* keys?
A) O(log n)
B) O(m)
C) O(n)
D) O(n log m)
Answer: A

---

12. What is dynamic hashing?
A) Hashing with fixed table size
B) Hashing that grows and shrinks dynamically
C) Hashing for encryption
D) Hashing without indexes
Answer: B

---

13. Which file organization uses buckets?
A) Sequential files
B) ISAM
C) Hashing
D) B-tree
Answer: C

---

14. Which of the following provides best performance for exact-match queries?
A) B+ trees
B) Sequential files
C) Hashing
D) ISAM
Answer: C

---

15. Overflow pages are used in:
A) B-trees
B) Hashing
C) ISAM
D) Both B and C
Answer: D

---

16. The term "fanout" in tree structures refers to:
A) Number of leaf nodes
B) Number of parent nodes
C) Number of pointers per node
D) Height of the tree
Answer: C

---

17. The *root node* in a B+ tree must:
A) Be a leaf node
B) Have at least two children
C) Contain only one record
D) Be empty
Answer: B

18. Which of the following allows faster search in a large file?
A) Heap file
B) Indexed file
C) Flat file
D) Linked list
Answer: B

---

19. Bucket overflow in hashing is resolved by:
A) Duplicating buckets
B) Creating secondary buckets
C) Rehashing
D) All of the above
Answer: D

---

20. Hashing is most efficient when:
A) There are many duplicate keys
B) Access patterns are random
C) The data is sorted
D) Range queries are frequent
Answer: B

---

21. Which file organization is best for transaction systems with random access?
A) Sequential
B) Heap
C) Hashing
D) ISAM
Answer: C

---

22. In ISAM, index entries point to:
A) Next record
B) Overflow block
C) Actual data block
D) Tree node
Answer: C

---

23. In dynamic hashing, doubling the directory size is needed when:
A) Bucket is full
B) Global depth equals local depth
C) Bucket size decreases

D) Directory becomes empty
Answer: B

---

24. Leaf nodes in a B+ tree are:
A) Connected to parent only
B) Unordered
C) Linked sequentially
D) Same as internal nodes
Answer: C

---

25. The term *blocking factor* in file organization refers to:
A) Size of hash bucket
B) Number of records per block
C) Number of indexes
D) Depth of tree
Answer: B

---

26. Which collision resolution technique links all items in a list?
A) Linear probing
B) Quadratic probing
C) Separate chaining
D) Double hashing
Answer: C

---

27. Internal nodes in B+ tree contain:
A) Data and pointers
B) Only keys and pointers
C) Only data
D) No information
Answer: B

---

28. Hash function should:
A) Map different keys to the same location
B) Distribute keys uniformly
C) Be simple and non-deterministic
D) Always use ASCII values
Answer: B

---

29. In B-trees, a node with m children contains:
A) m keys
B) m + 1 keys
C) m - 1 keys
D) 2m keys
Answer: C

---

30. Which of these is best for equality search with minimum disk access?
A) Binary search
B) B-tree
C) Hash index
D) Merge sort
Answer: C

✅ Unit-IV: Relational Data Model & SQL – PYQ-Based MCQs (1–30)

---

1. In the relational model, a relation is represented as:
A) Row
B) Column
C) Table
D) File
Answer: C

---

2. Which of the following is a valid relational algebra operation?
A) Merge
B) Select
C) Add
D) Rename
Answer: B

---

3. A primary key:
A) Can be NULL
B) Must be unique
C) Can have duplicates
D) Is always numeric
Answer: B

---

4. Which of the following is not a type of SQL command?
A) DDL
B) DML
C) DCL
D) HTML
Answer: D

---

5. The result of a SQL SELECT query is a:
A) Record
B) Report
C) Relation
D) Schema
Answer: C

---

6. The attribute that uniquely identifies a record in a relation is called:
A) Candidate key
B) Alternate key
C) Primary key
D) Foreign key
Answer: C

---

7. Which SQL clause is used to eliminate duplicate records?
A) UNIQUE
B) DISTINCT
C) DELETE
D) REMOVE
Answer: B

---

8. What does the WHERE clause do in SQL?
A) Sorts the result
B) Groups rows
C) Filters rows
D) Inserts rows
Answer: C

---

9. Which SQL keyword is used to sort results?
A) GROUP BY
B) ORDER BY
C) SORT
D) ARRANGE
Answer: B

---

10. Which of the following is not a valid constraint in SQL?
A) PRIMARY KEY
B) FOREIGN KEY
C) FULL KEY
D) UNIQUE
Answer: C

---

11. What is a foreign key?
A) A key from another database
B) A key that is unique in the same table
C) A reference to a primary key in another table
D) A key that cannot be NULL
Answer: C

12. Which relational algebra operation is used to combine rows from two tables?
A) Union
B) Join
C) Select
D) Project
Answer: B

---

13. Projection in relational algebra is represented by:
A) π
B) σ
C) ρ
D) ×
Answer: A

---

14. Which of the following is a DDL command?
A) SELECT
B) INSERT
C) CREATE
D) UPDATE
Answer: C

---

15. Which SQL function is used to count rows?
A) SUM()
B) COUNT()
C) NUMBER()
D) TOTAL()
Answer: B

---

16. Which SQL statement is used to remove a table?
A) REMOVE TABLE
B) DELETE TABLE
C) DROP TABLE
D) ERASE TABLE
Answer: C

---

17. Which clause groups rows that have the same values?
A) GROUP BY
B) ORDER BY
C) SORT BY

D) CLASSIFY BY
Answer: A

---

18. Which command is used to update existing rows?
A) MODIFY
B) CHANGE
C) UPDATE
D) SET
Answer: C

---

19. A relational algebra operation that is both commutative and associative is:
A) Select
B) Join
C) Union
D) Cartesian Product
Answer: C

---

20. Which is used to rename a relation in relational algebra?
A) σ
B) π
C) ρ
D) δ
Answer: C

---

21. Which operator in SQL is used for pattern matching?
A) =
B) LIKE
C) MATCH
D) COMPARE
Answer: B

---

22. To find the total number of records in a table, you use:
A) SUM*()*
B) COUNT()
C) TOTAL*()*
D) NUMBER()
Answer: B

---

23. The intersection operation in relational algebra is denoted by:
A) ∪
B) ∩
C) −
D) ×
Answer: B

---

24. A NULL value in SQL indicates:
A) Zero
B) Blank
C) Not known
D) 0.0
Answer: C

---

25. Which of the following statements removes all rows from a table but not the structure?
A) DELETE
B) DROP
C) ERASE
D) TRUNCATE
Answer: D

---

26. Cartesian product in relational algebra is denoted by:
A) σ
B) ×
C) π
D) ∪
Answer: B

---

27. Which clause is used to filter grouped rows?
A) HAVING
B) WHERE
C) ORDER BY
D) GROUP BY
Answer: A

---

28. To fetch the first three rows from a table, which SQL clause is used?
A) FIRST 3
B) TOP 3
C) LIMIT 3
D) ROWNUM = 3
Answer: C (MySQL) / **B** (SQL Server)

29. Which relational algebra operator returns attributes vertically?
A) Select
B) Join
C) Project
D) Union
Answer: C

---

30. Which command in SQL is used to insert new data?
A) ADD
B) INSERT
C) CREATE
D) APPEND
Answer: B

✅ Unit-V: Enhanced ER Model & ER-to-Relational Mapping – PYQ-Based MCQs (1–30)

---

1. The process of converting ER diagrams into tables is known as:
A) Mapping
B) Transformation
C) Normalization
D) Aggregation
Answer: A

---

2. Which of the following is used to represent a "has-a" relationship?
A) Aggregation
B) Generalization
C) Specialization
D) Association
Answer: A

---

3. In EER, an entity that is a member of a subclass is also a member of the:
A) Relationship
B) Superclass
C) Attribute
D) Weak entity
Answer: B

---

4. Which of the following is used to represent inheritance in EER diagrams?
A) Aggregation
B) Specialization
C) Association
D) Mapping
Answer: B

---

5. A weak entity set always has:
A) Its own primary key
B) A multivalued attribute
C) A discriminator or partial key
D) Derived attribute
Answer: C

---

6. Mapping a many-to-many relationship requires:
A) A separate relation
B) Foreign key in both relations
C) Only one relation
D) Embedding
Answer: A

---

7. Which type of constraint defines the number of entities to which another entity can be associated?
A) Participation
B) Mapping cardinality
C) Key constraint
D) Referential constraint
Answer: B

---

8. In mapping EER to relations, a subclass is mapped to:
A) Separate table
B) Same table
C) Parent table
D) Relationship table
Answer: A

---

9. Disjointness constraint refers to:
A) Entities belonging to multiple subclasses
B) Subclasses having common attributes
C) An entity belonging to at most one subclass
D) None of the above
Answer: C

---

10. Total participation constraint means:
A) Some entities participate in a relationship
B) All entities participate in a relationship
C) Weak entities are independent
D) All attributes must have values
Answer: B

---

11. In specialization, which type of attribute is used to distinguish subclasses?
A) Multivalued
B) Derived
C) Discriminator
D) Composite
Answer: C

12. Which of the following is not true about weak entities?
A) They do not have a primary key
B) They depend on a strong entity
C) They can exist independently
D) They have a partial key
Answer: C

---

13. When mapping a weak entity, what must be included in its relation?
A) Only its attributes
B) Only foreign key
C) Primary key of owner + its partial key
D) All derived attributes
Answer: C

---

14. A relationship with attributes is mapped as a:
A) Column in one table
B) Separate relation
C) Constraint
D) Subclass
Answer: B

---

15. In generalization, the relationship between superclass and subclass is:
A) One-to-one
B) One-to-many
C) ISA
D) HAS-A
Answer: C

---

16. The process of extracting common features from two or more classes is:
A) Aggregation
B) Specialization
C) Generalization
D) Normalization
Answer: C

---

17. Mapping a multivalued attribute requires:
A) Storing in same table
B) Creating a separate relation
C) Ignoring the attribute

D) Creating a view
Answer: B

---

18. The default mapping for a binary 1:N relationship is:
A) Merge both entities
B) Foreign key in many side
C) Separate table
D) Foreign key in one side
Answer: B

---

19. Which of these allows an entity to belong to more than one subclass?
A) Disjoint specialization
B) Overlapping specialization
C) Total participation
D) Generalization
Answer: B

---

20. The ISA relationship in EER refers to:
A) Aggregation
B) Association
C) Generalization/Specialization
D) Mapping
Answer: C

---

21. Which of the following ensures that subclass entities must exist in the superclass?
A) Total participation
B) Partial participation
C) Specialization
D) Aggregation
Answer: A

---

22. Which of the following is used to convert an EER diagram to tables?
A) Logical design
B) Mapping rules
C) Physical schema
D) Conceptual model
Answer: B

---

23. Mapping composite attributes involves:
A) Ignoring sub-attributes
B) Creating a separate table
C) Storing only derived attribute
D) Including all simple attributes
Answer: D

---

24. When mapping a 1:1 relationship, the foreign key can be placed in:
A) Any one of the participating entities
B) A new relation
C) Both entities
D) Only weak entity
Answer: A

---

25. An EER diagram is an extension of:
A) Relational model
B) ER model
C) Network model
D) Hierarchical model
Answer: B

---

26. In a relational schema, how is a multivalued attribute stored?
A) As a derived column
B) As a single column with multiple values
C) In a separate relation with foreign key
D) Ignored during mapping
Answer: C

---

27. The specialization process results in:
A) Deletion of entity sets
B) Breaking down a higher entity into lower entities
C) Merging of tables
D) Dropping foreign keys
Answer: B

---

28. A generalization represents:
A) Bottom-up approach
B) Top-down approach
C) Horizontal mapping
D) Decomposition
Answer: A

29. Which mapping technique ensures that subclass attributes are not duplicated?
A) Table-per-subclass
B) Table-per-hierarchy
C) Table-per-concrete-class
D) Table-per-superclass
Answer: A

---

30. The process of representing entities and relationships in tabular form is:
A) Entity resolution
B) Schema generation
C) Logical mapping
D) Relational mapping
Answer: D

✅ Unit-VI: Normalization, Concurrency Control, Recovery & Security – PYQ-Based MCQs (1–30)

---

1. Which of the following is not a normal form?
A) 1NF
B) 2NF
C) 4NF
D) 6NF
Answer: D

---

2. Functional Dependency is a relationship between:
A) Rows
B) Attributes
C) Tables
D) Keys
Answer: B

---

3. A relation is in 1NF if:
A) It has a primary key
B) It has atomic values
C) It has no transitive dependency
D) It has foreign key
Answer: B

---

4. A table is in 2NF if:
A) It is in 1NF and all non-key attributes are fully dependent on the primary key
B) It has no repeating groups
C) It has a foreign key
D) It contains composite attributes
Answer: A

---

5. Which of the following removes transitive dependency?
A) 1NF
B) 2NF
C) 3NF
D) BCNF
Answer: C

---

6. BCNF is a stronger version of:
A) 1NF
B) 2NF
C) 3NF
D) 4NF
Answer: C

---

7. Which of the following is not a type of functional dependency?
A) Full
B) Partial
C) Transitive
D) Relational
Answer: D

---

8. Which of the following is used to represent a transaction in DBMS?
A) BEGIN–COMMIT
B) START–END
C) BEGIN–END
D) START–COMMIT
Answer: A

---

9. The property of transactions where results remain consistent is called:
A) Atomicity
B) Consistency
C) Durability
D) Isolation
Answer: B

---

10. In ACID properties, atomicity refers to:
A) Transactions are indivisible
B) All data is visible
C) Data is available to all
D) Queries are atomic
Answer: A

---

11. Durability ensures that:
A) Transactions are lost after a crash
B) Committed transactions survive failures
C) Data is automatically deleted
D) Uncommitted changes are retained
Answer: B

12. Lost update problem occurs due to lack of:
A) Durability
B) Isolation
C) Security
D) Redundancy
Answer: B

---

13. Which of the following protocols is used for concurrency control?
A) Two-Phase Locking
B) Write-Ahead Logging
C) Redo-Log
D) Shadow Paging
Answer: A

---

14. A lock that prevents any other transaction from accessing the same data is called:
A) Shared lock
B) Exclusive lock
C) Read lock
D) Implicit lock
Answer: B

---

15. Which of the following ensures no deadlocks occur?
A) Timeout
B) Wait-die scheme
C) Deadlock detection
D) All of the above
Answer: D

---

16. A transaction that does not complete its execution is called:
A) Committed
B) Rolled back
C) Aborted
D) Dirty
Answer: C

---

17. When two transactions read and write data at the same time, it causes:
A) Phantom read
B) Lost update
C) Deadlock

D) Rollback
Answer: B

---

18. What is the main purpose of concurrency control?
A) Avoid data loss
B) Allow parallel processing
C) Maintain database consistency
D) Improve performance
Answer: C

---

19. In 2PL protocol, when can a transaction release locks?
A) Anytime
B) Only after it has acquired all locks
C) After read operation
D) After abort
Answer: B

---

20. Recovery technique which maintains undo and redo logs is:
A) Deferred update
B) Immediate update
C) Shadow paging
D) Checkpointing
Answer: B

---

21. What does a checkpoint do in recovery?
A) Deletes all logs
B) Writes dirty buffers to disk
C) Starts transactions
D) Reverses changes
Answer: B

---

22. In SQL, GRANT and REVOKE are used for:
A) Normalization
B) Recovery
C) Transaction control
D) Authorization
Answer: D

---

23. Which of the following is a valid schedule in transaction processing?
A) Conflicting
B) Non-serializable
C) Serializable
D) Inconsistent
Answer: C

---

24. The process of ensuring only authorized users access data is:
A) Durability
B) Normalization
C) Authorization
D) Commit control
Answer: C

---

25. Which type of attack does DBMS prevent with authorization?
A) Denial-of-service
B) SQL injection
C) Unauthorized data access
D) Packet sniffing
Answer: C

---

26. The security mechanism that restricts access based on user roles is:
A) RBAC
B) MAC
C) DAC
D) TCB
Answer: A

---

27. Transaction is considered atomic when it:
A) Can be divided into sub-transactions
B) Is not visible to others
C) All its operations are done or none
D) Is dependent on another
Answer: C

---

28. Which ACID property is most affected by concurrency control?
A) Atomicity
B) Consistency
C) Isolation
D) Durability
Answer: C

29. If a transaction fails, all changes made are:
A) Written to log
B) Rolled back
C) Committed
D) Ignored
Answer: B

---

30. What is the main goal of database recovery techniques?
A) Speed up queries
B) Increase redundancy
C) Maintain integrity and consistency
D) Add constraints
Answer: C