II-I DATABASE MANAGEMENT SYSYTEM 25CY305

UNIT-V: Transaction Management, Concurrency Control and Recovery System

I. Choose the correct answer:

1. A transaction is a:

a) Collection of unrelated operations
b) Logical unit of database operations
c) File organization method
d) Data model
Answer: b) Logical unit of database operations

2. Which property of a transaction ensures that all operations are completed or none are performed?

a) Consistency
b) Isolation
c) Atomicity
d) Durability
Answer: c) Atomicity

3. Which transaction state occurs after a transaction completes successfully?

a) Active
b) Failed
c) Committed
d) Aborted
Answer: c) Committed

4. A transaction that cannot proceed further enters the _____ state.

a) Active
b) Failed
c) Committed
d) Partially Committed
Answer: b) Failed

5. Which ACID property ensures that committed changes remain permanent?

a) Atomicity
b) Consistency
c) Isolation
d) Durability
Answer: d) Durability

6. Concurrent execution of transactions improves:

a) Data redundancy
b) System performance
c) Data inconsistency
d) Storage requirement
Answer: b) System performance

7. A schedule that produces the same result as a serial schedule is called:

a) Recoverable schedule
b) Serializable schedule
c) Concurrent schedule
d) Non-recoverable schedule
Answer: b) Serializable schedule

8. Which type of serializability is based on conflict operations?

a) View Serializability
b) Conflict Serializability
c) Recoverability
d) Cascadeless Schedule
Answer: b) Conflict Serializability

9. Isolation ensures that:

a) Transactions execute independently
b) Data is stored permanently
c) Data remains consistent
d) Logs are maintained
Answer: a) Transactions execute independently

10. Which graph is used to test conflict serializability?

a) ER Graph
b) Wait-for Graph
c) Precedence Graph
d) Tree Graph
Answer: c) Precedence Graph

11. In lock-based protocols, a transaction must acquire a _____ before accessing data.

a) Timestamp
b) Lock
c) Log
d) Buffer
Answer: b) Lock

12. Which protocol uses timestamps to order transaction execution?

a) Lock-based protocol
b) Validation protocol
c) Timestamp-based protocol
d) Shadow Paging
Answer: c) Timestamp-based protocol

13. Validation-based protocols are also known as:

a) Pessimistic protocols
b) Optimistic protocols
c) Locking protocols
d) Recovery protocols
Answer: b) Optimistic protocols

14. Which recovery technique maintains a log of all database modifications?

a) Shadow Paging
b) Log-based Recovery
c) Validation
d) Timestamp Ordering
Answer: b) Log-based Recovery

15. In log-based recovery, the log record is written before the actual database update. This rule is called:

a) Immediate Update
b) Write-Ahead Logging
c) Checkpointing
d) Serialization
Answer: b) Write-Ahead Logging

16. Shadow Paging avoids the use of:

a) Indexes
b) Logs

c) Buffers
d) Transactions
Answer: b) Logs

17. Buffer management is concerned with:

a) Query optimization
b) Memory allocation for disk pages
c) Transaction scheduling
d) File indexing
Answer: b) Memory allocation for disk pages

18. Which transaction state indicates that the transaction is executing?

a) Active
b) Failed
c) Aborted
d) Committed
Answer: a) Active

19. A recoverable schedule ensures that:

a) Transactions are serializable
b) Committed transactions depend only on committed transactions
c) No locks are required
d) No logging is needed
Answer: b) Committed transactions depend only on committed transactions

20. Which of the following is an ACID property?

a) Availability
b) Atomicity
c) Accessibility
d) Adaptability
Answer: b) Atomicity

Fill in the Blanks

1. A _____ is a logical unit of work in a database system.
   Answer: Transaction
2. The ACID property that ensures all or none execution is called _____.
   Answer: Atomicity
3. A transaction that has successfully completed enters the _____ state.
   Answer: Committed

4. The ACID property that guarantees permanent storage of committed data is _____.
   Answer: Durability
5. The simultaneous execution of multiple transactions is called _____ execution.
   Answer: concurrent
6. A schedule equivalent to a serial schedule is called a _____ schedule.
   Answer: serializable
7. _____ serializability is tested using a precedence graph.
   Answer: Conflict
8. The ACID property that keeps transactions independent is called _____.
   Answer: Isolation
9. A graph used for testing serializability is called a _____ graph.
   Answer: precedence
10. In lock-based protocols, a transaction must acquire a _____ before accessing data.
    Answer: lock
11. The Two-Phase Locking protocol is a _____ based protocol.
    Answer: lock
12. The protocol that orders transactions using timestamps is called _____ protocol.
    Answer: timestamp-based
13. Validation-based protocols are also known as _____ protocols.
    Answer: optimistic
14. Recovery techniques that use logs are called _____ recovery methods.
    Answer: log-based
15. The Write-Ahead Logging principle is abbreviated as _____.
    Answer: WAL
16. _____ Paging is a recovery technique that avoids logging.
    Answer: Shadow
17. A transaction that cannot continue enters the _____ state.
    Answer: failed
18. Buffer management handles the transfer of pages between _____ and main memory.
    Answer: disk
19. A schedule in which committed transactions depend only on committed transactions is called a _____ schedule.
    Answer: recoverable
20. The four basic properties of transactions are collectively known as _____ properties.
    Answer: ACID