

## 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 \_\_\_\_\_.  
**Answer:** ACID