

الإسم ..... الرقم .....

أجب عن جميع الأسئلة

\*ورقة الإمتحان تشتمل على 5صفحة /صفحات\*

### Question (1):

For each of the following terms below pick up the best answer or the correct definition and put it on the left column. (10 Marks)

Starvation, Deadlock, Volatile storage ,Fail-stop assumption ,Log-Based Recovery,locking protocol , Lock table,Durability, Atomicity,Isolation,Access control ,Role-Based Access Control ,Mandatory Access Control, Discretionary Access Control

1.		Ensures that all direct accesses to object are authorized and protects against accidental and malicious threats
2.		A data-structure record granted locks and pending requests
3.		Multiple transactions may execute concurrently, each transaction must be unaware of other concurrently executing transactions
4.		A type of access control that grants or restricts object access via an access policy determined by an object's owner group and/or subjects.
5.		After a transaction completes successfully, the changes it has made to the database persist, even if there are system failures.
6.		A transaction may be waiting for an X-lock on an item, while a sequence of other transactions request and are granted an S-lock on the same item.
7.		A type of access control in which only the administrator manages the access controls
8.		Non-volatile storage contents are assumed to not be corrupted by system crash
9.		A sequence of records, recording all the update activities in the database
10		A set of rules followed by all transactions while requesting and releasing locks.

### Question (2):

Write down two of the followings: (10 Marks)

1. Access control mechanisms:

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2. Concurrency control mechanisms:

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3. Methods used to prevent deadlock:

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4. Distributed database system advantages:

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5. Pitfalls of Lock-Based Protocols:

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**Question (3):**

**Answer by TRUE and FALSE and correct the false answers: (10 Marks)**

1. [        ] Log records contain old value and new value.

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2. [        ] Distributed Database System decreased reliability and availability

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3. [        ] Clearance level indicates the level of sensitivity associated with some information

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4. [        ] In the account level, the DBA can control the privilege to access each individual relation or view in the database.

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5. [        ] A schedule is conflict serializable if and only if its precedence graph is acyclic.

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6. [        ] Any number of transactions can hold exclusive locks on an item, but if any transaction holds shared on the item no other transaction may hold any lock on the item.

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7. [        ] Wound-wait scheme fewer rollbacks than wait-die scheme.

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8. [        ] The immediate -modification technique ensures transaction atomicity by recording all database modifications in the log, but deferring the execution of all write operations of a transaction until the transaction partially commits.

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9. [        ] In multidatabase distributed database system each site may run different database system but the data access is managed through a single conceptual schema

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10. [        ] In Timestamp-Based Schemes: a transaction waits for a lock only for a specified amount of time. After that, the wait times out and the transaction is rolled back.

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**Question (4): Select the correct answer, from options (a, b, c, d) to each of the following questions: (15 Marks)**

1. All sites of the database system have identical setup same database system software	
a. Heterogeneous	b. Federated
c. Homogeneous	d. None of the above
2. Rollback of transactions is normally used to :	
a. Recover from transaction failure	b. Retrieve old records
c. Update the transaction	d. Repeat a transaction
3. Which of the following concurrency-control schemes is not based on the serializability property?	
a. Two-phase locking	b. Timestamp-based locking
c. Graph-based locking	d. None of the above
4. Prevent/detect/determine improper disclosure of information is :	
a. Availability	b. Confidentiality
c. Integrity	d. None of the above
5. "GRANT SELECT(NAME) ON <i>Student</i> TO Blue WHERE COURSE="CSCE 590" is :	
a. Security through views mechanism	b. Stored procedures mechanism
c. Grant and revoke mechanism	d. Query modification mechanism
6. A deadlock exists in the system if and only if the wait for graph :	
a. Has a cycle in it	b. As a path from first node to last node
c. Is a tree	d. All of the above
7. A sequences of instructions that specify the chronological order in which instructions of concurrent transactions are executed is:	
a. Schema	b. Schedule
c. Graph	d. None of the above
8. "A transaction must hold all its exclusive locks till it commits/aborts" this protocol is :	
a. Timestamp-Based protocol	b. Rigorous two-phase locking protocol
c. Strict two-phase locking protocol	d. None of the above
9. The countermeasures to statistical database security problem is called :	
a. Flow control	b. Access control
c. Inference control measures	d. Encryption
10. A schedule that "if a transaction $T_j$ reads a data item previously written by a transaction $T_i$ , then the commit operation of $T_i$ appears before the commit operation of $T_j$ " is	
a. Cascade Schedule	b. Recoverable schedule
c. Serial Schedule	d. None of the above
11. When a transaction cannot complete due to some internal error condition, type of error occurred called:	
a. System error	b. Logical error
c. System crash	d. Application error
12. Type of blocks that resides temporarily in main memory are known as :	
a. Physical blocks	b. Disk blocks
c. Logical blocks	d. Buffer blocks
13. A separate process to which transactions send lock and unlock requests, is:	
a. Recovery manager	b. Process manager
c. Lock manager	d. Database administrator

14. Some of the columns of a relation are at different sites is which of the following:	
a. Vertical fragmentation	b. Horizontal fragmentation
c. Vertical and Horizontal fragmentation	d. Data replication
15. System must deal with deadlocks that are not prevented by using schemes of :	
a. Validation	b. Deadlock detection
c. Deadlock recovery	d. Both a and b

**Question (5): (8 Marks)**

a- Consider the three transactions T1, T2, and T3, and the schedules S1 and S2 given below.

T1: r1(X); r1 (Z); w1(X);

T2: r2 (Z); r2(Y); w2(Z); w2(Y);

T3: r3(X); r3(Y); w3(Y)

S1: r1(X); r2 (Z); r1(Z); r3(X); r3(Y); w1(X); w3(Y); r2(Y); w2(z); w2(Y)

S2: r1(X); r2 (Z); r3(X); r1(Z); r2(Y); r3(Y); w1(X)

Draw the serializability(precedence) graphs for S1 and S2, and state whether each Schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedule(s).

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b. Suppose the following access control components:  
Subject: User1, User2  
Object: File1, File2  
Access right: Read ,Write, Own

Write access control implementation using "Access Control Triples"

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