QUESTION 2: CLO1.3 SO K1

Question (2.1)

Choose the correct answer for each of the following questions:

1- A transaction is delimited by statements (or function calls

_____

a) Begin transaction and end transaction
b) Start transaction and stop transaction
c) Get transaction and post transaction
d) Read transaction and write transaction

2- _____Identify the characteristics of transactions

a) Atomicity
b) Durability
c) Isolation
d) All the mentioned

3- _____ states that only a correct execution of the transaction must t database from one consistent state to another.

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

4- _____ states that a transaction should not make its update visible to transactions until it is committed.

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

5- A transaction may not always complete its execution successfully. Such a is_____

a) Aborted
b) Terminated
c) Closed
d) Committed

ION 3: CLO2.2 SO S2 [10 Marks]

n (3.1) [5 marks]

e the correct answer for each of the following questions:

order to maintain transactional integrity and database consistency, what technology oes a DBMS deploy?

a) Triggers
b) Pointers
c) Locks
d) Cursors

2- All lock information is managed by a _____ which is responsible for assigning and policing the locks used by the transactions.

a) Scheduler
b) DBMS
c) Lock manager
d) Locking agent

3- A system is in a _____ state if there exists a set of transactions such that every transaction in the set is waiting for another transaction in the set.

a) Idle
b) Waiting
c) Deadlock
d) Ready

4- What are the ways of dealing with deadlock?

a) Deadlock prevention
b) Deadlock recovery
c) Deadlock detection
d) All of the mentioned

5- A deadlock exists in the system if and only if the wait-for graph contains a _____

a) Cycle
b) Direction
c) Bi-direction
d) Rotation

QUESTION 3: CLO2.2 SO S2 [10 Ma

[5 marks]

Question (3.1)

Choose the correct answer for each of the following questions:

1- In order to maintain transactional integrity and database consistency, what technology does a DBMS deploy?

a) Triggers
b) Pointers
c) Locks
d) Cursors

2- All lock information is managed by a _____ which is responsible for assigning and policing the locks used by the transactions.

a) Scheduler
b) DBMS
c) Lock manager
d) Locking agent

3- A system is in a _____ state if there exists a set of transactions such that every transaction in the set is waiting for another transaction in the set.

a) Idle
b) Waiting
c) Deadlock
d) Ready

4- What are the ways of dealing with deadlock?

a) Deadlock prevention
b) Deadlock recovery
c) Deadlock detection
d) All of the mentioned

5- A deadlock exists in the system if and only if the wait-for graph contains a _____

a) Cycle
b) Direction
c) Bi-direction
d) Rotation

STION 4: CLO3.1 SO C1 [10 Marks]

Question (4.1) [2 marks]

What are the four types of countermeasures to be implemented to protect the database against threats (such as: loss of integrity, loss of availability, …)?

b) List four capabilities of the DBA account:

[8 marks]

Question (4.2)

Suppose that the DBA of COMPANY database creates four accounts A1, A2, A3 and A4.

a) The DBA wants only A4 to be able to create base relations. Then the DBA must issue the following GRANT command in SQL.
Write down the corresponding SQL command.

b) Suppose that A4 creates the two base relations EMPLOYEE and PROJECT and wants to grant A1 and A3 the privilege to insert and delete tuples in both of these relations, with the possibility to propagate these privileges to additional accounts for A1 but not for A3
Write down the corresponding SQL command.

c) Suppose that A3 wants to grant the privilege to delete tuples in both of these relatio
to A2.
Write down the corresponding SQL command.

d) Suppose that the DBA decides to revoke the insert privilege on the EMPLOYEE a
PROJECT relations from A1.
Write down the corresponding SQL command

else if LOCK (X) = "unlocked" then
    no_of_reads (X) ← 1
else begin wait (until LOCK (X) = "unlocked" and
    the lock manager wakes up the transaction);
    go to B
end;

[2

Question (3.3)

Assume that a transaction T issues a read_item (X) operation where:

- TS(T) = 4
- Read_TS(X) = 3
- Write_TS(X) = 4

1) Verify if the operation read_item (X) of T will be executed or not.

2) Compute the new value of Write_TS(X)

Consider the following pseudo-code. It is supposed to describe the real lock operat [3 marks]
(according to the Two-Phase Locking Techniques). However, there are some errors. T
find these errors and correct them.

```
if LOCK (X) = "unlocked" then
begin LOCK (X) ← "read-locked";
end
else if LOCK (X) ← "read-locked" then
            no_of_reads (X) ← 1
else begin wait (until LOCK (X) = "unlocked" and
      the lock manager wakes up the transaction);
      go to B
end;
```

estion (3.2)

Consider the following pseudo-code. It is supposed to describe the re
(according to the Two-Phase Locking Techniques). However, there are s
find these errors and correct them.

```
if LOCK (X) = "unlocked" then
begin LOCK (X) ← "read-locked";
end
else if LOCK (X) ← "read-locked" then
                no_of_reads (X) ← 1
else begin wait (until LOCK (X) = "unlocked" and
        the lock manager wakes up the transaction);
        go to B
end;
```