CS150A Quiz #7

TRUE OR FALSE:

Assume ARIES is the recovery algorithm used.

1) True or False

Write Ahead Logging describes a protocol where updated pages must be written to disk before a crash.
Mark only one oval.

- True
- False

2) True or False

During a transaction abort, we redo all data updates made by the transaction.
Mark only one oval.

- True
- False

3) True or False

When undoing updates of a transaction, CLR record is logged to describe the undoing of a posterior update.
Mark only one oval.

- True
- False

4) True or False

In ARIES, UPDATE log records contain the information of the previous state of the page
Mark only one oval.

- True
- False

5) True or False

The recovery manager is responsible for Atomicity and Durability, as defined by the ACID acronym.

Mark only one oval.

- ◯ True
- ◯ False

FORCE and STEAL

We run two transactions, T1 and T2. The transaction table and the dirty page table at the time of the checkpoint are both empty. We access some system metadata and observe the following:
- On disk, P1 has a pageLSN of 40.
- On disk, P2 has a pageLSN of 50.
- On disk, P3 has a pageLSN of 30.

We also have the following log:

LSN	Record
0	BEGIN_CHECKPOINT
10	END_CHECKPOINT
20	UPDATE: T1 writes P2
30	UPDATE: T1 writes P3
40	UPDATE: T2 writes P1
50	UPDATE: T2 writes P2
60	COMMIT: T1
70	COMMIT: T2

6) The system might be use two-phase locking.

Mark only one oval.

- ◯ True
- ◯ False
- ◯ Not enough information

7) The system uses a FORCE policy.

Mark only one oval.

- ◯ True
- ◯ False
- ◯ Not enough information

8) The system doesn't use a STEAL policy.

Mark only one oval.

- True
- False
- Not enough information

9) The system doesn't use the ARIES recovery algorithm.

Mark only one oval.

- True
- False

RECOVERY

Consider the following log. Some of the records have been omitted. The system crashes immediately after LSN 110 and begins recovery. During analysis, we recreate the transaction table and dirty page table shown below.

LSN	Record
0	BEGIN_CHECKPOINT
10	END_CHECKPOINT
20	UPDATE: T1 writes P1
30	UPDATE: T1 writes P3
40	UPDATE: T2 writes P2
50	ABORT: T1
60	???
70	???
80	END: T1
90	UPDATE: T2 writes P1
100	COMMIT: T2

Transaction Table			Dirty Page Table	
Transaction	**lastLSN**	**Status**	**PageID**	**recLSN**
T2	100	Committing	P1	20
			P2	40
			P3	30

10) Which of the following sequences of missing log records (??? in the image above) is correct? *Mark only one oval.*

- a
- b
- c
- d

a.

LSN	Record
60	CLR: T1 LSN 50
70	CLR: T1 LSN 30

b.

LSN	Record
60	CLR: T1 LSN 50
70	CLR: T1 LSN 20

c.

LSN	Record
60	CLR: T1 LSN 30
70	CLR: T1 LSN 20

d.

LSN	Record
60	CLR: T1 LSN 20
70	CLR: T1 LSN 30

11) Which of the following sequences of actions will occur during the REDO phase? "Orig LSN" denotes the LSN of the original action in the log above, to improve readability. (??? indicates your answer to 10.)

Mark only one oval.

- a
- b
- c
- d

a.

Orig LSN	Record
20	UPDATE: T1 writes P1
30	UPDATE: T1 writes P3
40	UPDATE: T2 writes P2
60	???
70	???
90	UPDATE: T2 writes P1

b.

Orig LSN	Record
20	UPDATE: T1 writes P1
30	UPDATE: T1 writes P3
40	UPDATE: T2 writes P2

c.

Orig LSN	Record
20	UPDATE: T1 writes P1
30	UPDATE: T1 writes P3
40	UPDATE: T2 writes P2
60	???
70	???

d.

Orig LSN	Record
20	UPDATE: T1 writes P1
30	UPDATE: T1 writes P3
40	UPDATE: T2 writes P2
90	UPDATE: T2 writes P1

12) Which of the following sequences of log records will be written during the UNDO phase?

Mark only one oval.

- a
- b
- c
- d

a.

LSN	Record
200	CLR: T2 LSN 100
210	CLR: T2 LSN 30
220	END: T2

b.

LSN	Record
No logs written during UNDO	

c.

LSN	Record
200	CLR: T2 LSN 110
210	CLR: T2 LSN 100
220	CLR: T1 LSN 50
230	CLR: T1 LSN 40
240	CLR: T2 LSN 30
250	END: T2
260	CLR: T1 LSN 20
270	END: T1

d.

LSN	Record
200	CLR: T2 LSN 110
210	CLR: T2 LSN 100
220	CLR: T2 LSN 30
230	END: T2