Q.1

Consider the following statements:

P: If a schedule is allowed by 2PL, it guarantee conflict serializable.

Correct

Q: A conflict serializable schedule is (always) allowed by 2PL.

Incorrect

Which of the following is/are correct?

[MCQ]

A. P only

B. Q only

C. Both P and Q

D. Neither P nor Q

$2PL \xrightarrow{\text{Ensure}}$ Conflict Serializable Schedule

If Schedule is Not Conflict Serializable (cycle) then its Not in 2PL (not Applied)

If a schedule is Conflict Serializable then may or may Not in 2PL

Ans (A)

Q.2

Consider the following schedule: -

S: $R_1(P)$; $W_1(P)$; $R_2(P)$; $R_2(Q)$; $R_1(Q)$; $W_1(Q)$; C_1; C_2;

Which of the following is correct?

A. S is conflict serializable.

B. S is not conflict serializable.

C. S is allowed by 2PL.
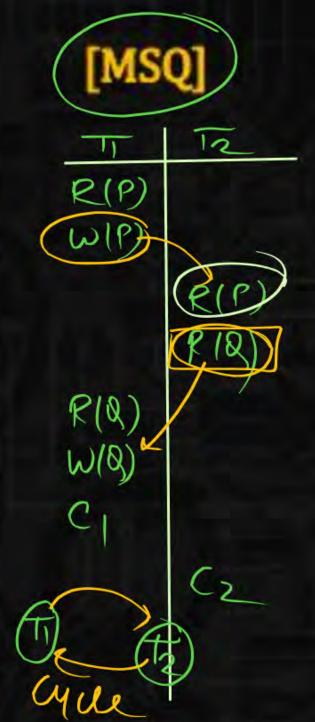
D. S is not allowed by 2PL.

$B \& D.$

cycle Not conflict
serializable
$\Downarrow$

Not allowed by 2PL

T_1 | T_2
X(P)
R(P)
W(P)
X(Q)
Unlock(P)

| R(Q)
| W(Q)
| Unlock

S(P)
R(P)
S(Q) ← Denied by T_1

S(Q)

T_1 | T_2
R(P)
W(P)
| R(P)
| R(Q)
R(Q)
W(Q)
C_1
C_2

T_1 → T_2 cycle

Q.3

Consider the following statements:
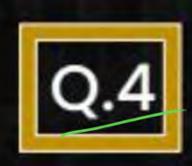
Not Correct → **P :** A schedule allowed by (2PL) is always strict - recoverable

Not Correct → **Q :** A strict recoverable schedule is always allowed by 2PL.

Which of the following statement is/are CORRECT? **[MCQ]**

(A.) Q only

(B.) Neither P nor Q

(C.) P only

(D.) Both P and Q

$2PL \xrightarrow{\text{ensure}} \text{Conflict Serializable}$ Irrecoverable schedule

Ans (B)

T₁	T₂
R(A)	
W(A)	
	R(A)
	Commit
Commit	

T₁	T₂
X(A)	
R(A)	
W(A)	
Unlock-X(A)	
	S(A)
	R(A)
	Unlock-S(A)
	Commit
Commit	

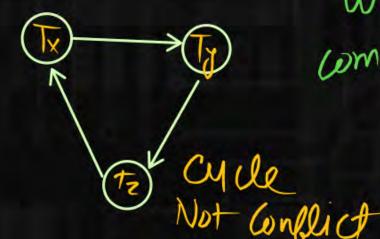But followed by 2PL

Q.4

Consider the following schedule –

$S : R_x(A); W_y(A); W_y(B); R_z(B); R_z(C); W_x(C); C_x; C_y; C_z;$
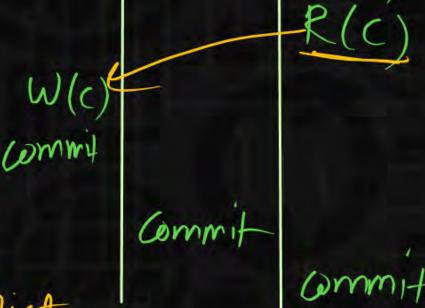
Which of the following is/are CORRECT?

A. The given schedule is conflict serializable.

B. The given schedule is allowed by 2PL.

C. The given schedule is not allowed by 2PL.

D. The given schedule is not conflict serializable.

C & D

Not conflict
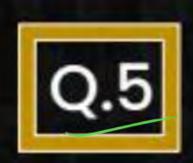↓↓
Not allowed by 2PL.

$T_x \rightarrow T_y$
T_z
Cycle
Not conflict

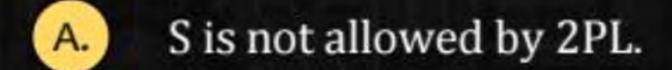| T_x	T_y	T_z
R(A)		
	W(A)	
	W(B)	
		R(B)
		R(C)
W(C)		
commit		
	Commit	
		commit

Q.5 Consider the following schedule –

$S: W_2(P); W_1(P); W_2(Q); W_3(P); W_1(Q); W_3(Q); C_1; C_2; C_3;$
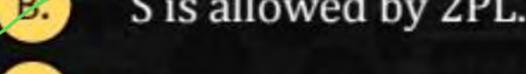
Which of the following is/are correct?

[MSQ]

(P/W)

A. S is not allowed by 2PL.

B. S is allowed by 2PL.

C. The equivalent serial schedule to S is $T_3 \to T_2 \to T_1$.

D. The equivalent serial schedule to S is $T_2 \to T_1 \to T_3$.

Conflict Serializable

$\langle T_2 \; T_1 \; T_3 \rangle$

Ans (B) & (D)

T_1	T_2	T_3
	W(P)	
W(P)		
	W(Q)	
		W(P)
W(Q)		
		W(Q)
Commit		
	Commit	
		Commit

	T_1	T_2	T_3

Left diagram (detailed schedule):

T_2: Lock−X(P)
① W(P)
Lock−X(Q)
✱ Unlock−X(P)

T_1: Lock−X(P)
② W(P)

T_2: ③ W(Q)
Unlock−X(Q)

T_1: Lock−X(Q)
✱ Unlock−X(P)
⑤ Write(Q)
Unlock−X(Q)

T_3: Lock−X(P)
④ W(P)

T_3: Lock−X(Q)
✱ Unlock−X(P)
⑥ W(Q)
Unlock−X(Q)

C_1
C_2 ②   ③

Center notes:

2PL Applied
order
LOCK Point
⟨ T_2 T_1 T_3 ⟩

Right diagram (resulting schedule):

	T_1	T_2	T_3
		① W(P)	
	② W(P)		
		③ W(Q)	
			④ W(P)
		⑤ W(Q)	
			⑥ W(Q)
	Commit		
		Commit	
			Commit

Q.6

Consider the following schedule –
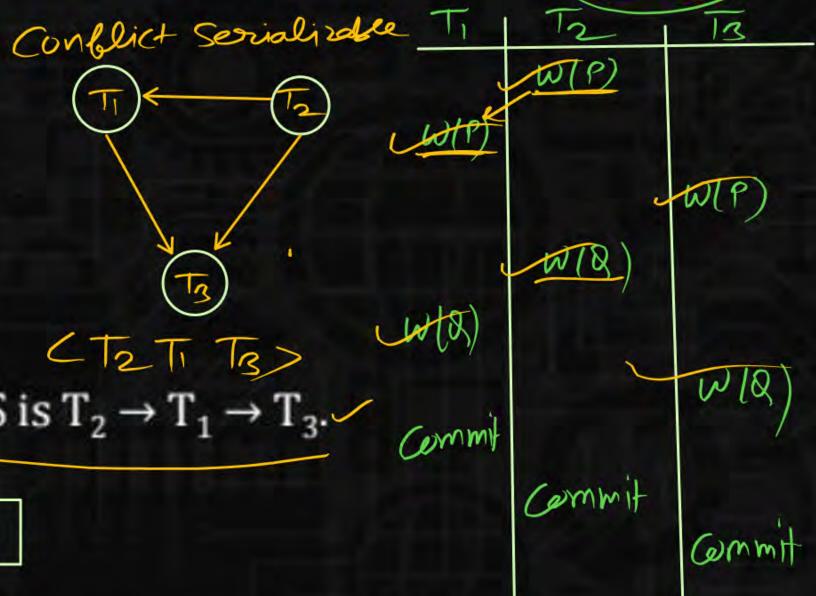
$S : W_2(P); W_1(P); W_3(P); W_2(Q); W_1(Q); W_3(Q); C_1; C_2; C_3;$
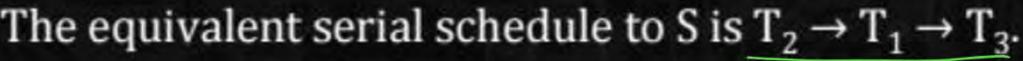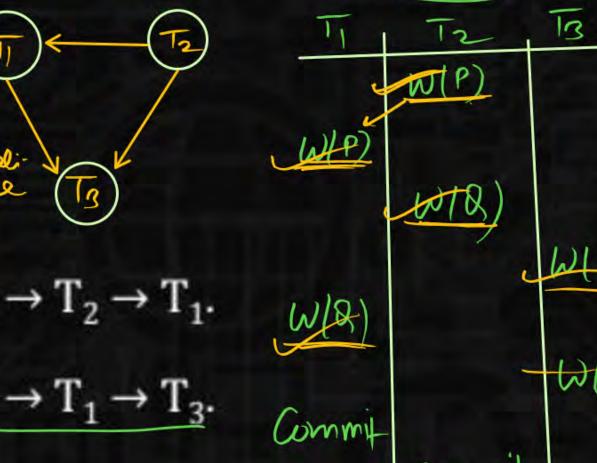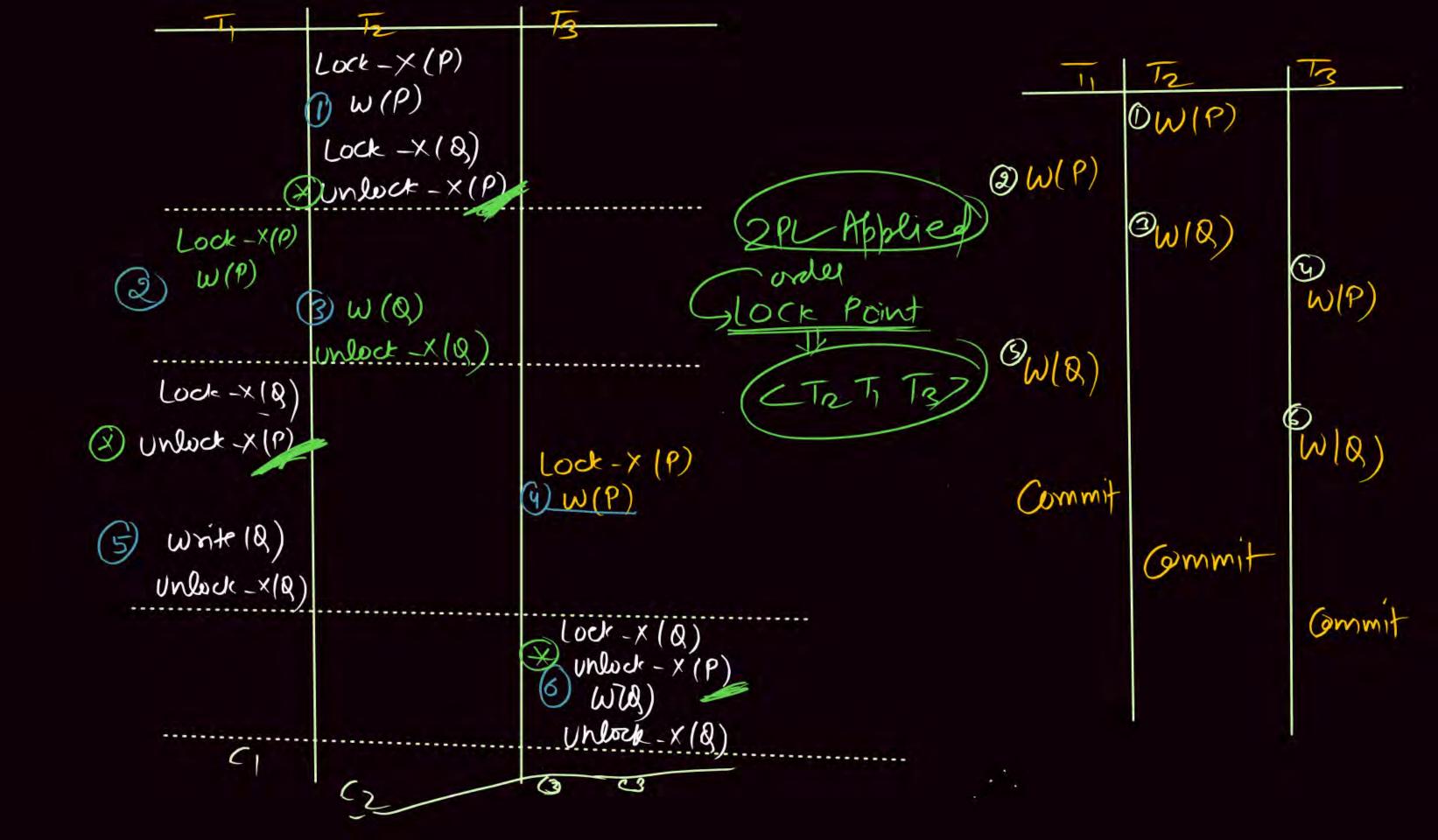
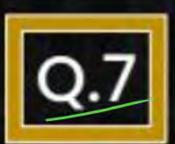Which of the following is/are correct?

A. S is conflict serializable. ✓

B. S is allowed by 2PL.

C. S is not allowed by 2PL.

D. Serial schedule equivalent to S is $T_2 \rightarrow T_1 \rightarrow T_3$. ✓

Conflict Serializable
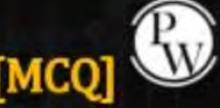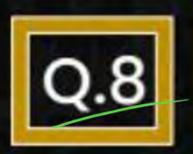
$T_1 \leftarrow T_2$

T_3

$< T_2 \ T_1 \ T_3 >$

T_1	T_2	T_3
	W(P)	
W(P)		
		W(P)
	W(Q)	
W(Q)		
		W(Q)
Commit		
	Commit	
		Commit

Ans (A), (C) & (D)

T_1	T_2	T_3
	Lock -X (P)	
	① W(P)	
	Lock -X (Q)	
	Unlock -X(P)	

Lock -X (P)

② W (P)

Denied by → Lock - X (Q)
T_2

⊗ ③ Lock - X (P) → Denied by
T_1

④ W (Q)

Not in 2PL

T_1	T_2	T_3
		① W (P)
② W(P)		
		③ W (P)
	④ W(Q)	
⑤ W(Q)		
		⑥ W(Q)
C_1	C_2	C_3

Q.7 Which of the following is FREE from deadlock? [MCQ]

A. Basic 2PL.

B. Strict 2PL.

C. Conservative 2PL.

D. Rigorous 2PL.

Ans [C]

→ No Deadlock · Starvation

Not Ensure
└→ Recoverability
· Cascading Rollback
· Deadlock

2PL	Strict 2PL	Rigorous 2PL	Conservative 2PL
• Ensure Conflict Serializable	✓ C.S.S	Suffer from	No Deadlock
• Ensure Serializability	✓ Recoverable	· Deadlock	Only
	· Cascadeless	· Starvation	Starvation
	· No Cascading Rollback		
	· Strict Recoverable		Strict 2PL
	But		Rigorous 2PL
	Suffer Deadlock		Basic 2PL
	Starvation		

Q.8

Consider the following schedule (S):
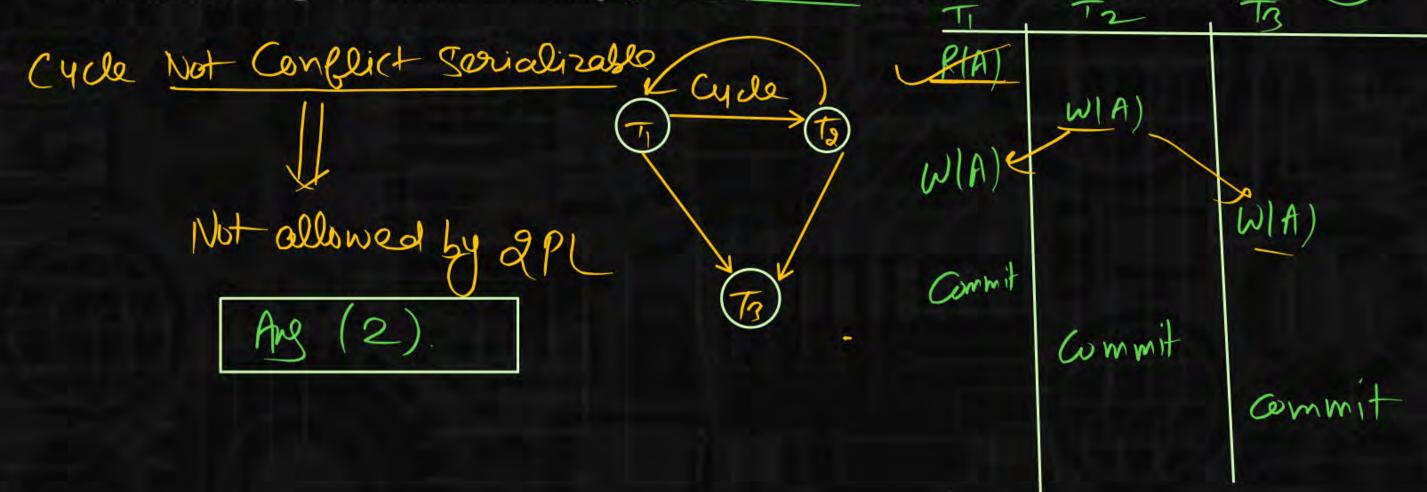
$S : R_1(A); W_2(A); W_1(A); W_3(A); C_1; C_2; C_3;$
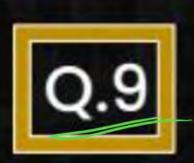
[NAT]

X (i) S is conflict serializable.

Correct → (ii) S is not conflict serializable.

Correct → (iii) S is not allowed by 2PL.
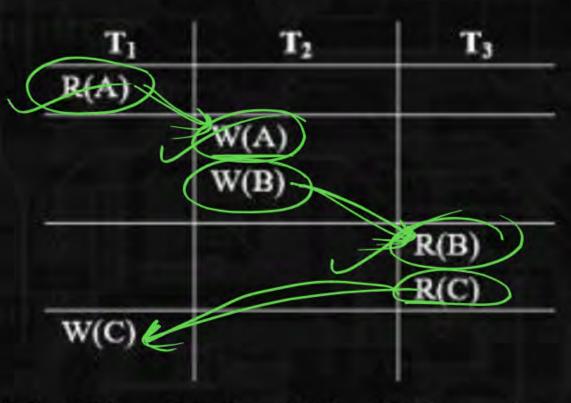
How many statements is/are correct for above schedule(s)? ②

Cycle Not Conflict Serializable
||
Not allowed by 2PL

Ans (2).

T_1	T_2	T_3
$R(A)$		
	$W(A)$	
$W(A)$		
		$W(A)$
Commit		
	Commit	
		Commit

Q.9 Consider the following transaction for schedule(S)

[MCQ]

S:

T₁	T₂	T₃
R(A)		
	W(A)	
	W(B)	
		R(B)
		R(C)
W(C)		

Cycle Not Conflict
Serializable

For schedule(S) which of the following is true?
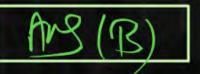
A. Conflict serializable and allowed by 2PL.

B. Not conflict serializable and not allowed by 2PL.

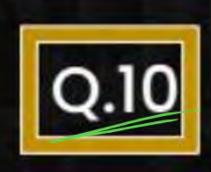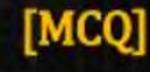C. Conflict serializable but not allowed by 2PL.

D. None of the above.

Not allowed by 2PL.

Ans (B)
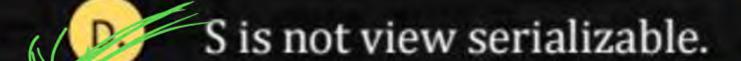
Q.10

Consider the following schedule(S)
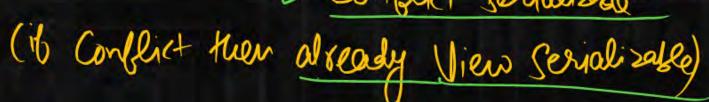
$S : W_2(A); W_1(A); W_2(B); W_3(A); W_1(B); W_3(B); C_1; C_2; C_3;$ **[MCQ]**

Which of the following is (INCORRECT?)
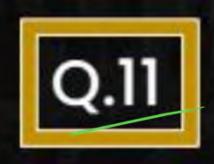
A. S is recoverable.

B. S is cascade recoverable.

C. S is conflict serializable

D. S is not view serializable.

$Ans(D)$

T_1 T_2 T_3

NO WR
Case

$W(A)$
$W(A)$
$W(B)$
$W(A)$
$W(B)$
$W(B)$

$< T_2 \ T_1 \ T_3 >$

Conflict Serializable

(if Conflict then already View Serializable)

Commit

Commit

Commit

Which of the following is true about 2PL?

A. If schedule is allowed by 2PL then, there is no lost update problem.

B. If schedule is allowed by 2PL then, there is no starvation. ✗
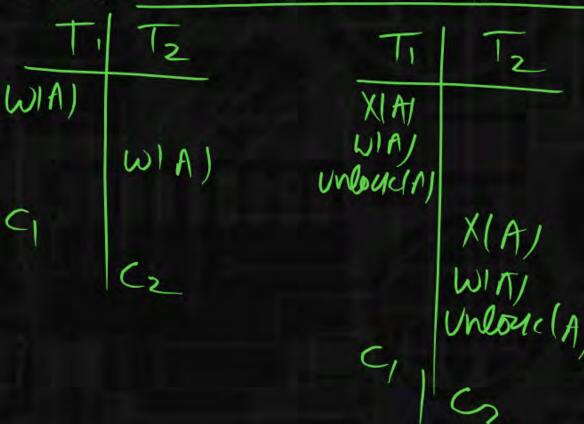
C. If schedule is allowed by 2PL then, there is possibility of deadlock.

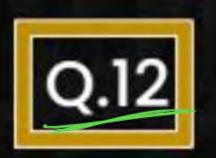D. None of the above.

Ans [C]

T_1	T_2
W(A)	
	W(A)
C₁	
	C₂

T_1	T_2
X(A)	
W(A)	
unlock(A)	
	X(A)
	W(A)
	unlock(A)
C₁	
	C₂

T_1	T_2	T_3	T_4
	S(A)		
Denied by T_2 → X(A)			
	U(A)		
		S(A)	
Denied by T_3 → X(A)			
		U(A)	
			S(A)
Denied by T_4 → X(A)			
			U(A)
Granted → X(A)			

Starvation occur

T_1	T_2
W(A)	
	R(B)
W(B)	
	R(A)

T_1	T_2
X(A)	
W(A)	
	S(B)
	R(B)
Denied by T_2 → X(B)	
Block	
	S(A) ← Denied by T_1
	Block

Deadlock

Q.12
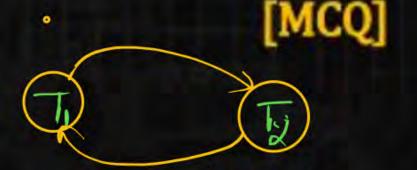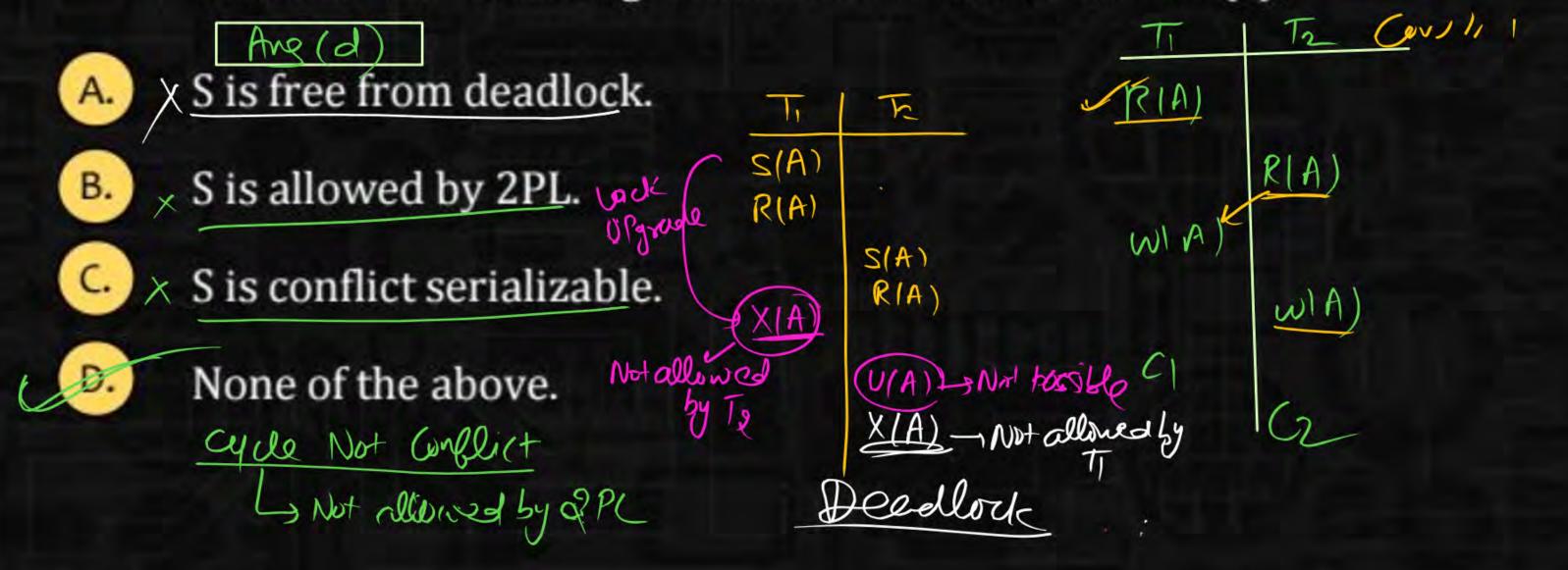
Consider the following schedule(S);

T₁	R(A)		W(A)		C	
T₂		R(A)		W(A)		C
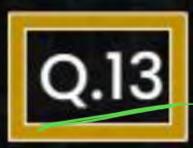
Which of the following is true about above schedule(S); Cycle Not

Ans (d)

A. ✗ S is free from deadlock.

B. ✗ S is allowed by 2PL.

C. ✗ S is conflict serializable.

D. None of the above.

cycle Not Conflict
↳ Not allowed by 2PL

Handwritten annotations:

T₁ → T₂ (cycle)

T₁	T₂	Conflict
✓R(A)		
	R(A)	
W(A)		
	W(A)	C2

lock Upgrade
S(A)
R(A)
X(A) — Not allowed by T₂

T₁: S(A), R(A), S(A), R(A), U(A) → Not possible C1
X(A) → Not allowed by T₁

Deadlock

Q.13 Consider the following statement:

S_1 : Every serial schedule is not strict 2PL schedule.

S_2 : If schedule allowed by 2PL then it is always allowed by strict 2PL.

S_3 : Every serial schedule may not be conflict serializable schedule.

Which of the following is INCORRECT?

A. S1 only.

B. S_2 and S_3 only.

C. S_1 and S_3 only.

D. S_1, S_2 and S_3.

Serial Schedule ⇒ Always Consistent

Conflict Serializable

Ans (D)

THANK YOU GW SOLDIERS !