Branch : CSE & IT Batch : Hinglish

WEEKLY TEST – 05

Subject : Database Management System

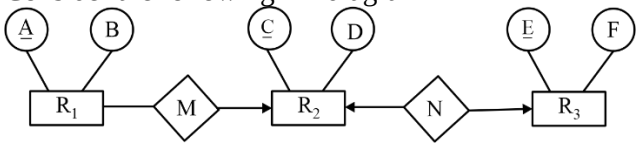
Topic : ER Model and Locking protocols

Maximum Marks 16

Q.1 to 6 Carry ONE Mark Each

[MCQ]

1. Consider the following ER diagram



The minimum number of tables needed to represent M, N, R_1, R_2, R_3 is _____

(a) 4 (b) 3
(c) 2 (d) None

[MCQ]

2. Conflict serialization is NOT satisfied by –

(a) Basic 2PL Protocol.
(b) Thomas Write Time Stamp Ordering Protocol.
(c) Basic Time Stamp Ordering Protocol.
(d) Strict 2PL Protocol.

[MCQ]

3. Consider the following statements:

P: Time Stamp Ordering Protocols are always free from deadlock.

Q: Two-phase Locking Protocols are always free from deadlock.

Which of the following statements is/are CORRECT?

(a) P only (b) Q only
(c) Both P and Q (d) Neither P nor Q

[MCQ]

4. Consider the following statements about basic ER and relational models –

P: An attribute of an entity can be composite.

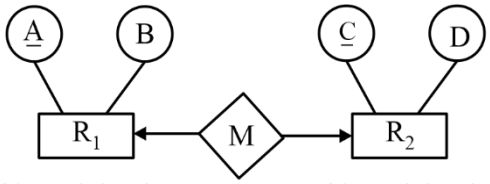
Q: An attribute cannot have more than one value in a tuple of relational table.

Which of the above statement(s) is/are CORRECT?

(a) P only (b) Q only
(c) Both P and Q (d) Neither P nor Q.

[MCQ]

5. Consider the following ERD –



70% participation 30% participation

I: R_1 M (A B C), R_2 (C D)

II: R_2 M (C D A), R_1 (A B)

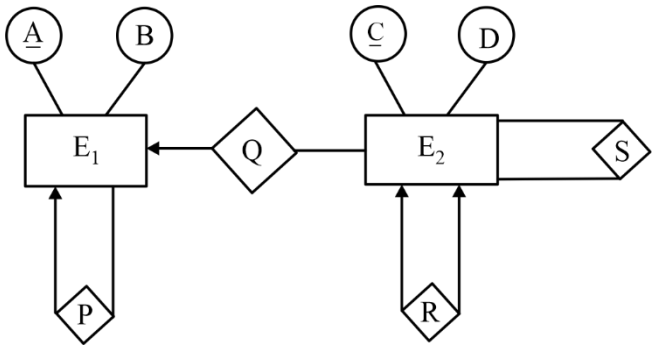
III: R_1 R_2 M (A B C D)

Among the given statements I, II and III, then incorrect solutions are ___

(a) I only
(b) II and III only
(c) III only
(d) I and II

[NAT]

6. Consider the following ERD –

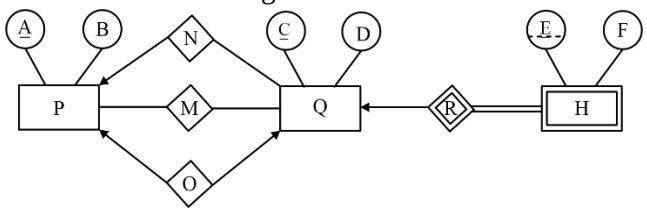


Let X is the total number of attributes and Y is number of foreign keys in the minimum relational design, then X + 2Y is _____.

Q.7 to 11 Carry TWO Marks Each

[NAT]

7. Consider the following ERD –



The minimum number of tables required to represent the above ERD is _____.

[MCQ]

8. Consider the following two schedules –

S_1: $R_1(X)\ R_3(Y)\ W_1(X)\ W_2(X)\ W_2(Y)\ W_1(Z)\ R_3(Z)$

S_2: $R_1(X)\ R_2(Y)\ W_1(X)\ W_3(X)\ W_3(Y)\ W_1(Z)\ R_2(Z)$

Which of the above given schedules are NOT allowed by Basic Time Stamp Ordering Protocol?

(Assume timestamps, $T_1 = 5$, $T_2 = 10$, $T_3 = 15$)

(a) S_1 only

(b) S_2 only

(c) Both S_1 and S_2

(d) Neither S_1 nor S_2

[MCQ]

9. Consider the following two schedules –

S_1: $W_2(X)\ W_1(X)\ W_3(X)\ W_2(Y)\ W_1(Y)\ W_3(Y)$

S_2: $W_1(X)\ W_2(X)\ W_3(X)\ W_1(Y)\ W_2(Y)\ W_3(Y)$

Which of the following is/are correct?

(a) S_1 is allowed by 2PL

(b) S_2 is allowed by 2PL

(c) S_1 and S_2 both are allowed by 2Pl

(d) Neither S_2 nor S_2 are allowed by 2PL

[MCQ]

10. Consider the following schedule-

S: $R_2(X)W_3(X)W_1(X)W_2(Y)R_2(Z)R_4(X)R_4(Y)$

Which of the following statements is correct?

(a) S is conflict serializable and allowed by 2PL

(b) S is conflict serializable and not allowed by 2PL

(c) S is not conflict serializable and allowed by 2PL

(d) S is not conflict serializable and not allowed by 2PL.

[MSQ]

11. Consider the following Schedule:

$r_1(x)\ r_2(y)\ r_2(x)\ w_1(z)\ r_1(y)\ w_3(y)\ r_3(z)\ w_2(y)\ w_3(x)$

which of the following time stamp ordering Not allows to execute schedule using Thomas Write rule time stamp Ordering Protocol?

(a) $(T_1, T_2, T_3) = (20, 30, 10)$

(b) $(T_1, T_2, T_3) = (10, 20, 30)$

(c) $(T_1, T_2, T_3) = (10, 30, 20)$

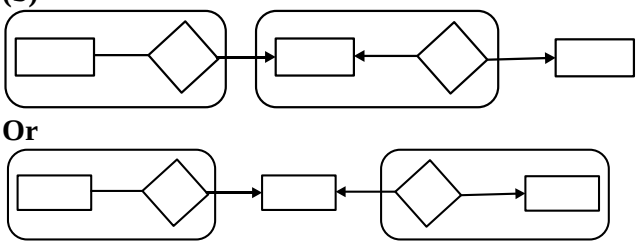
(d) $(T_1, T_2, T_3) = (30, 20, 10)$

Answer Key

1. **(b)**
2. **(b)**
3. **(a)**
4. **(c)**
5. **(b)**
6. **(19)**
7. **(4)**
8. **(a)**
9. **(d)**
10. **(a)**
11. **(a, c, d)**

Hints and Solutions

1. (b)



Or

Ans: 3

2. (b)

Conflict serializability is NOT satisfied by Thomas Write time Stamp Ordering Protocol

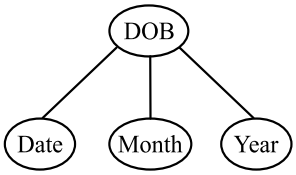
3. (a)

P: Correct TSO protocols are always free from deadlock.

Q: INCORRECT 2PL protocols suffer from deadlock.

4. (c)

P: CORRECT An attribute of an entity can be composite is ERD for e.g.



Q: CORRECT. Multi-valued attributes are not allowed.

5. (b)

Since there exists 30% participation at R_2 end there exists extra values in R_2. So, R,M (<u>A</u> B C), R2 (<u>C</u> D) is best design as it allows c to act as a foreign key.

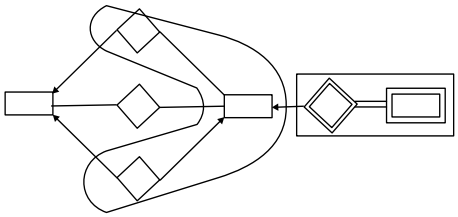
6. (19)

The best possible design.

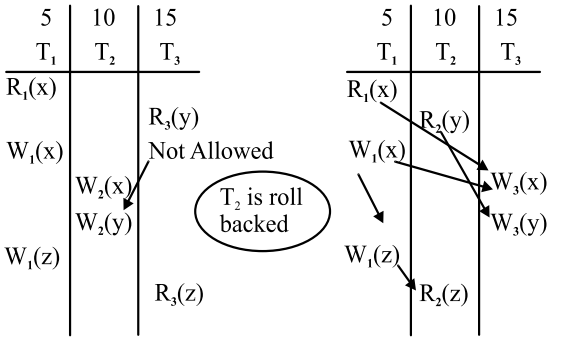
$\therefore X = 9$ and $Y = 5$

$X + 2Y = 9 + 2 \times 5 = 19$

7. (4)



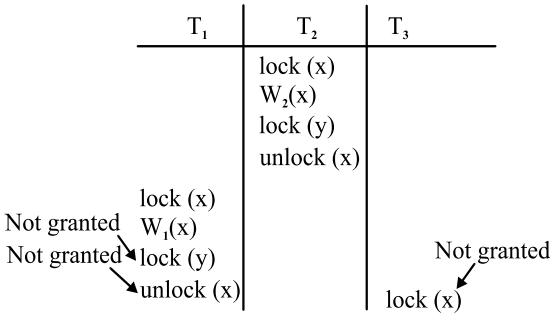
8. (a)



S_2 is allowed by Basic TSO

9. (d)

S_1:



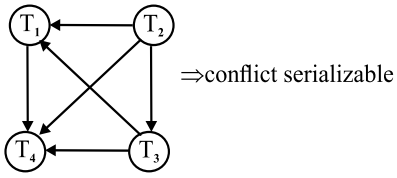
$\therefore$ Schedule S_1 is not allowed by 2PL.

S_2:

T_1	T_2	T_3
lock (x)		
$W_1(x)$		
lock (y)		
unlock (x)		
	lock (x)	Not granted
	$W_2(x)$	Not granted
	lock (y)	
	unlock (x)	
		lock (x)
		$W_3(x)$
		lock (y)
		unlock (x)

$\therefore$ S_2 is also not allowed by 2PL.

10. (a)



$\Rightarrow$conflict serializable

T_1	T_2	T_3	T_4
	lock (x)		
	$R_2(x)$		
	lock (y)		
	lock (z)		
	unlock (x)		
		lock (x)	
		$W_3(x)$	
		unlock (x)	
lock (x)			
$W_1(x)$			
unlock (x)			
	$W_2(y)$		
	unlock (y)		
	$R_2(z)$ unlock (z)		
			lock (x)
			lock (y)
			$R_4(x)$
			$R_3(y)$
			unlock (x)
			unlock (y)

$\therefore$ Allowed by 2PL.

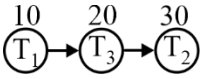
11. (a, c, d)

option (c)**:**

<T1 T2 T3> (10, 30, 20)

10 T_1	20 T_3	30 T_2
r(x)		
		r(y)
		r(x)
w(z)		
r(y)		
	w(y)	
	r(z)	
		w(y)
	w(x)	

Transaction Order:



But Conflict Operation: $r_2(y) \rightarrow w_3(y)$ ($T_2 \rightarrow T_3$)

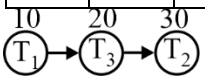
Som its option (c) not allowed under TSP(Time Stamp Protocol). Similar option (a) & (d) not allowed under TSP.

So, (a), (c), (d) not allowed under Thomas Write Rule.

$r_1(x)$ $r_2(y)$ $r_2(x)$ $w_1(z)$ $r_1(y)$ $w_3(y)$ $r_3(z)$ $w_2(y)$ $w_3(x)$

option (b):

10 T_1	20 T_2	30 T_3
r(x)		
	r(y)	
	r(x)	
w(z)		
r(y)		
		w(y)
		r(z)
	w(y)	
		w(x)



Order <T_1 T_2 T_3>

& Conflict Operation order also <T_1 T_2 T_3>

Hence, option (a, c, d) are correct.

For more questions, kindly visit the library section: Link for web: https://smart.link/sdfez8ejd80if

PW Mobile APP: https://smart.link/7wwosivoicgd4