CS & IT



ENGINERING

Database Management System

FD's & Normalization

DPP - 05 Discussion Notes



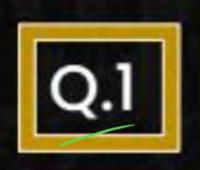
By- Vijay Agarwal sir



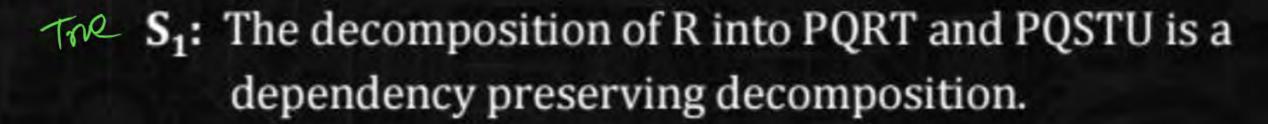
TOPICS TO BE COVERED

01 Question

02 Discussion



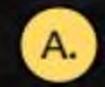
Assume a relation R = (P Q R S T U) and functional dependencies: $F = \{PQ \rightarrow RU, RT \rightarrow Q, U \rightarrow S\}$, consider the following two [MCO] statements:



 \mathbf{S}_2 : The decomposition of R into PQRT and PQSTU is a lossless RI(PQRT) A R2 (PQSTU) = PQT decomposition.

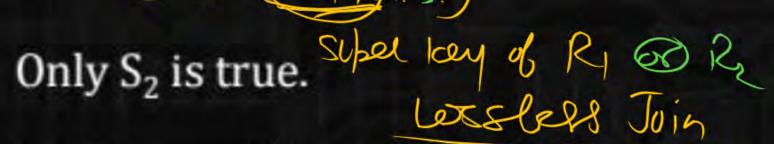


Which of the statement is/are TRUE?



Only S₁ is true.







Both S₁ and S₂ are true.



Both S_1 and S_2 are false.

PR-JRV)
RT-JR
U-JS

RI	RZ
PART	PRSTU
RT->8	VJS
POJR	PD-U

(PQ)-(PQRUS)

RIABCDE (RICE)

RIABCDE (RICE)

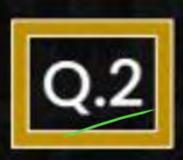
RIABCDE (RICE)

RIABCDE (RICE)

DP R/R/Rx

FIUFZUFz...FN = F

Dependency Beeserving



Consider the following two decomposition of R(P Q R S T U) with

the set of dependencies [MCQ]

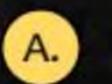
$$F = \{PQ \rightarrow R, PR \rightarrow Q, PS \rightarrow T, Q \rightarrow S, QR \rightarrow P, T \rightarrow U\}.$$



 $R_1(PQ)$, $R_2(QR)$, $R_3(PQST)$, $R_4(TU)$

 S_2 : $R_1(PQR)$, $R_2(PRST)$, $R_3(PSU)$ (Q) $[Q]^{\dagger}$: [QS]

Which of the statements is are dependency preserving and lossless-join decomposition of R?



S₁ Only

P11PQ) P21QR) B(PQST) R4(TU)





S₂ Only

RIS(POST) Ry(TU) Relar)
RIS(POST) NRY(TU) => ETJ->(TJ= (TU) Super key of Ry





None of these



Q.2

Consider the following two decomposition of R(P Q R S T U) with



the set of dependencies

$$F = \{PQ \rightarrow R, PR \rightarrow Q, PS \rightarrow T, Q \rightarrow S, QR \rightarrow P, \underline{T \rightarrow U}\}.$$

 S_1 : $R_1(PQ)$, $R_2(QR)$, $R_3(PQST)$, $R_4(TU)$

 $\mathbb{R}_{1}(PQR), R_{2}(PRST), R_{3}(PSU)$

Which of the statements is are dependency preserving and lossless-join decomposition of R? $R_1(rQR) = R_2(rRST) = R_3(rSU)$

A. S_1 Only

PI(PRR) 1 P2(PRST) => (PR) = (PR) = [PQR ...] Super key of R1

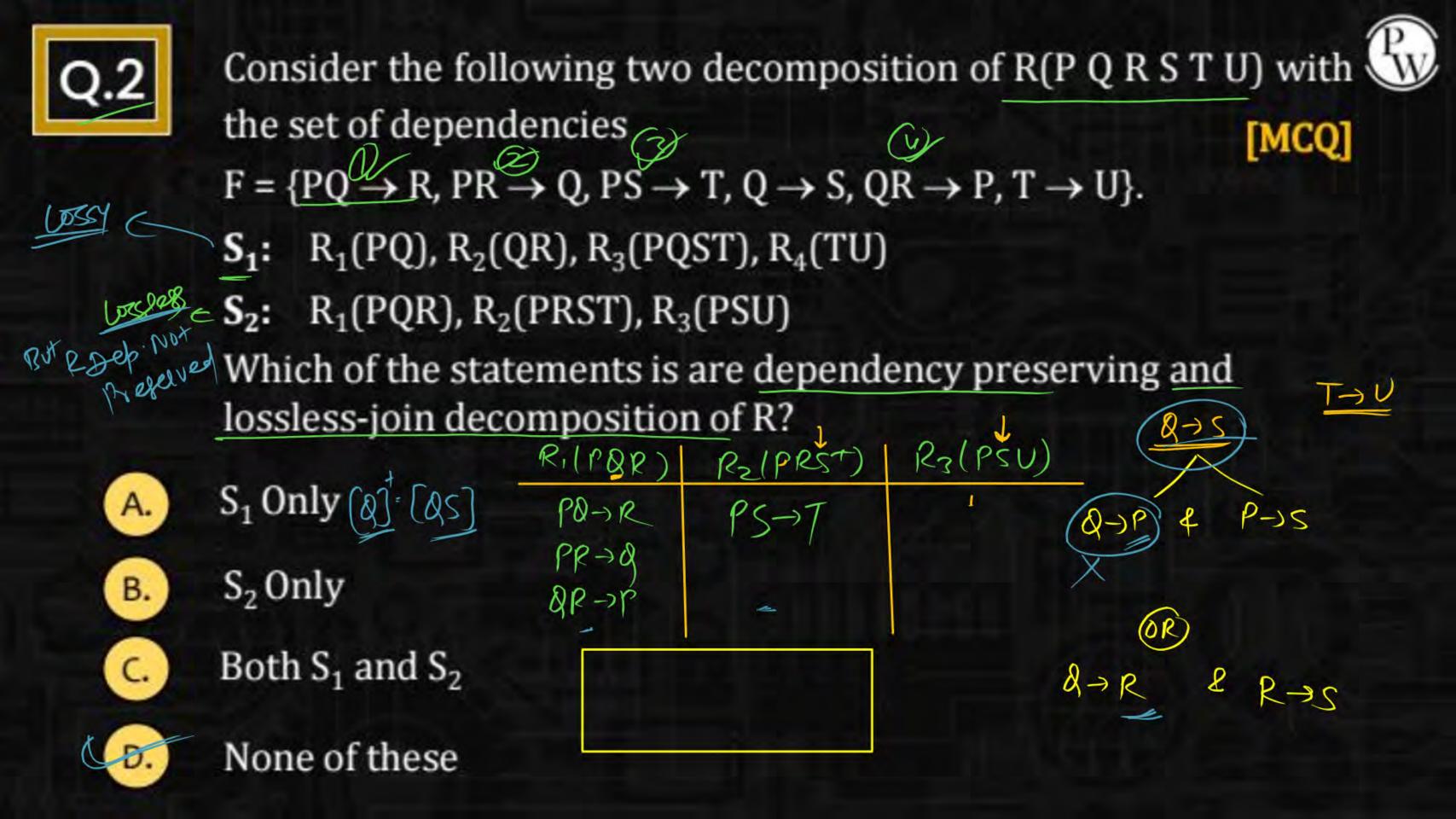
 S_2 Only

R12 (Parst) 1 R3 (PSU) > CPS) + CPST = (PST U.)

C. Both S_1 and S_2

Ring (PARSTU) Losslags. Super king & B

None of these



Q.3		
Q.3		03
0 - 1		4.5
	B	Ø sA

Consider a relation STUDENT (Name, Subject, Location, Marks). Student is decomposed into following



\mathcal{A}	R	_	D
Name	Subject	Location	Marks
Madhav	Operating System	Noida	96
Madhav	DBMS	Noida	100

BOD D-JA D-13

りつく

1. STU Sub 1 (Name, Subject, Location) and STU Sub 2 (Name, Location, Marks).

2. STU Sub 1 (Name, Location) and STU Sub 2 (Subject, Marks).

Which of the following is True?

RILABO) 1 R2 (ACD) = (AC)

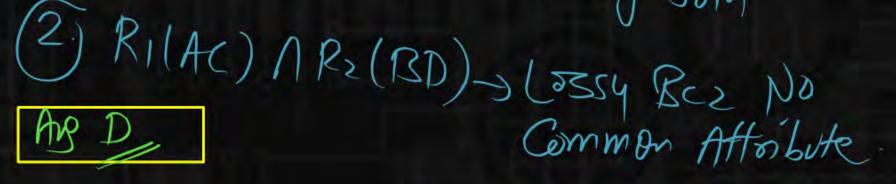


1 is lossy but 2 is lossless

(AC) - [AC] Not a Subser law of Rt

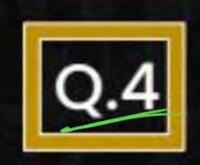
1 is lossless but 2 is lossy

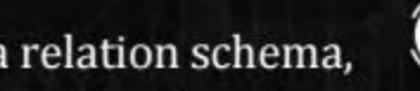
Both 1 and 2 are lossless





Both 1 and 2 are lossy





Consider a relation R(P, Q, R, S, T, U, V, W) be a relation schema, in which of the following FD sets are known to hold = $\{P \rightarrow Q,$ $P \to R, P \to S, PT \to W, T \to S, T \to U$ }. Suppose we decompose the relation into two relations, $R_1(PQRS)$, and $R_2(STUVW)$. The above decomposition is

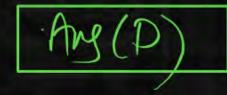
lossless join and dependency preserving.

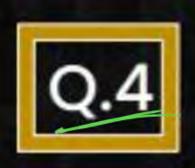
lossless join but not dependency preserving. В.

dependency preserving but not lossless join.

RIPARS) A R2/STUVW

neither dependency preserving nor lossless join.





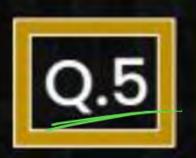


Consider a relation R(P, Q, R, S, T, U, V, W) be a relation schema, in which of the following FD sets are known to hold = $\{P \rightarrow Q, P \rightarrow R, P \rightarrow S, PT \rightarrow W\}$, $T \rightarrow S$, $T \rightarrow U\}$. Suppose we decompose the relation into two relations, $R_1(PQRS)$, and $R_2(STUVW)$. The above decomposition is

A. lossless join and dependency preserving.

c. dependency preserving but not lossless join.

neither dependency preserving nor lossless join. $(p)^{\frac{1}{2}} (pars) (pars)$



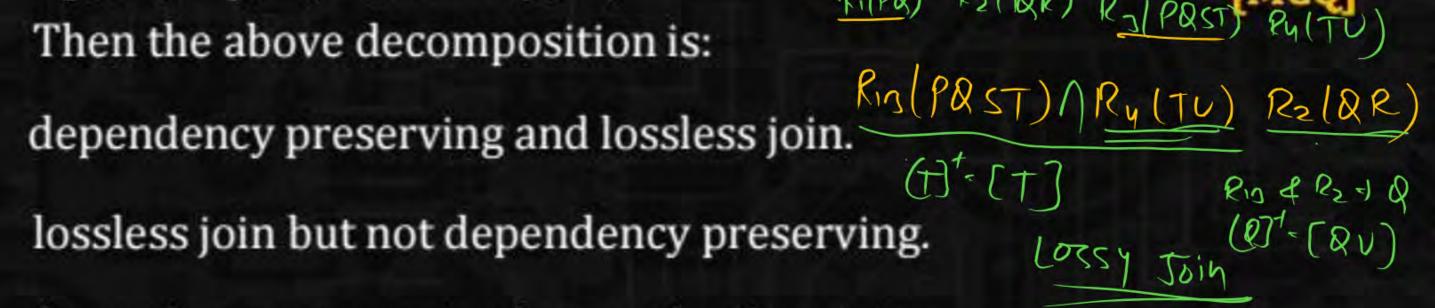
Let R(P, Q, R, S, T, U) be a relational schema, in which of the following FD' sets are known to hold $\{PQ \rightarrow R, PR \rightarrow Q, PS \rightarrow T,$ $QR \rightarrow R, Q \rightarrow U$

Suppose we decompose the relation R into four relations $R_1(PQ)$, $R_2(QR)$, $R_3(PQST)$ and $R_4(TU)$.

В.

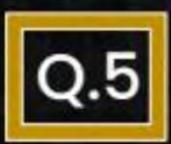
dependency preserving but not lossless join.

neither dependency nor lossless join.









Let R(P, Q, R, S, T, U) be a relational schema, in which of the following FD' sets are known to hold $\{PQ \rightarrow R\}$ $PR \rightarrow Q$, $PS \rightarrow R$ $QR \rightarrow R, Q \rightarrow U$

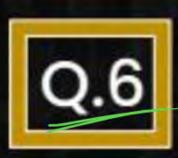
Suppose we decompose the relation R into four relations $R_1(PQ)$, $R_2(QR)$, $R_3(PQST)$ and $R_4(TU)$.

Then the above decomposition is:

(P7=[P]		1 7	
dependency preserving and lossless join.	QR-1R	Ps-7	
lossless join but not dependency preserving.			

dependency preserving but not lossless join. Deb. Not Receivily

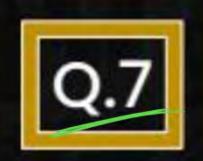
neither dependency nor lossless join.



Consider the following statements



- **S**₁: The decomposition R₁, R₂ R_n for a relation schema R are said to be lossless if their natural join results in the original relation R.
- S_2 : The decomposition R_1 , R_2 R_n for a relation schema R are said to be lossy if their natural join results into addition of extraneous tuples with the original relation R.
- A. Only S₁ is true
- B. Only S₂ is true
- Both S₁ and S₂ are true
- D. Neither S₁ nor S₂ are true



Consider the relation R(P, Q, R, S, T, U, V, W) with the following set of functional dependencies:



 $F = \{P \rightarrow QRS, P \rightarrow T, TUV \rightarrow W \text{ and } U \rightarrow VW\}$

Which one of the FD in the F is redundant?

[MCQ]

A.
$$P \rightarrow QRS$$
 $(P)^{\dagger} = [PT] \rightarrow NOT RFD$

B. $P \rightarrow T$, $(P)^{\dagger} = [PRRS] \rightarrow NOT RFD$

TUV $\rightarrow W$ $(TUV)^{\dagger} \in [TUVW] \rightarrow RFD$

D. $U \rightarrow VW$ $(V)^{\dagger} = [V] \rightarrow NOT RFD$

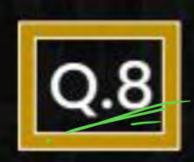


$$[X \rightarrow Y, Y \rightarrow Z, X \rightarrow Z]$$

$$F' = (x \rightarrow y \rightarrow z)$$

$$(x)^{+} = (xyz) \Rightarrow x \rightarrow z$$

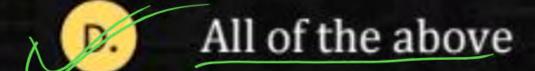
Repult
X >> 2 1x R.F.P



Which are the major and important properties of FD's?



- A. There should be one to one relationship between attributes in FDs.
- B. FDs must be defined in schema.
- C. FDs should be non-trivial.



Ang (D)



