CS & IT ENGINEERING

Database Management System

Query Language

DPP – 01

Discussion Notes
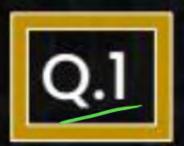
By- Vijay Agarwal sir

Q.1

Consider the following statements:

[MCQ] PW

$$S_1: \pi_{\underline{\text{List N}}} \left(\pi_{\underline{\text{List N}-1} \underset{\text{L.H.S}}{\ldots\ldots}} \left(\pi_{\underline{\text{List 1}}} (R) \right) \right)$$

$$\equiv \pi_{\underline{\text{List 1}}} \left(\pi_{\underline{\text{List 2}} \ldots\ldots} \left(\pi_{\underline{\text{List N}}} (R) \right) \right)$$

Not Correct

$$S_2: \sigma_{c_{\underline{n}}} \left(\sigma_{c_{\underline{n-1}}} \ldots \left(\sigma_{c_{\underline{1}}} (R) \right) \right) \equiv \sigma_{c_{\underline{1}}} \left(\sigma_{c_{\underline{2}}} \ldots \left(\sigma_{c_{\underline{N}}} (C) \right) \right)$$
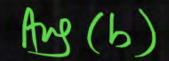
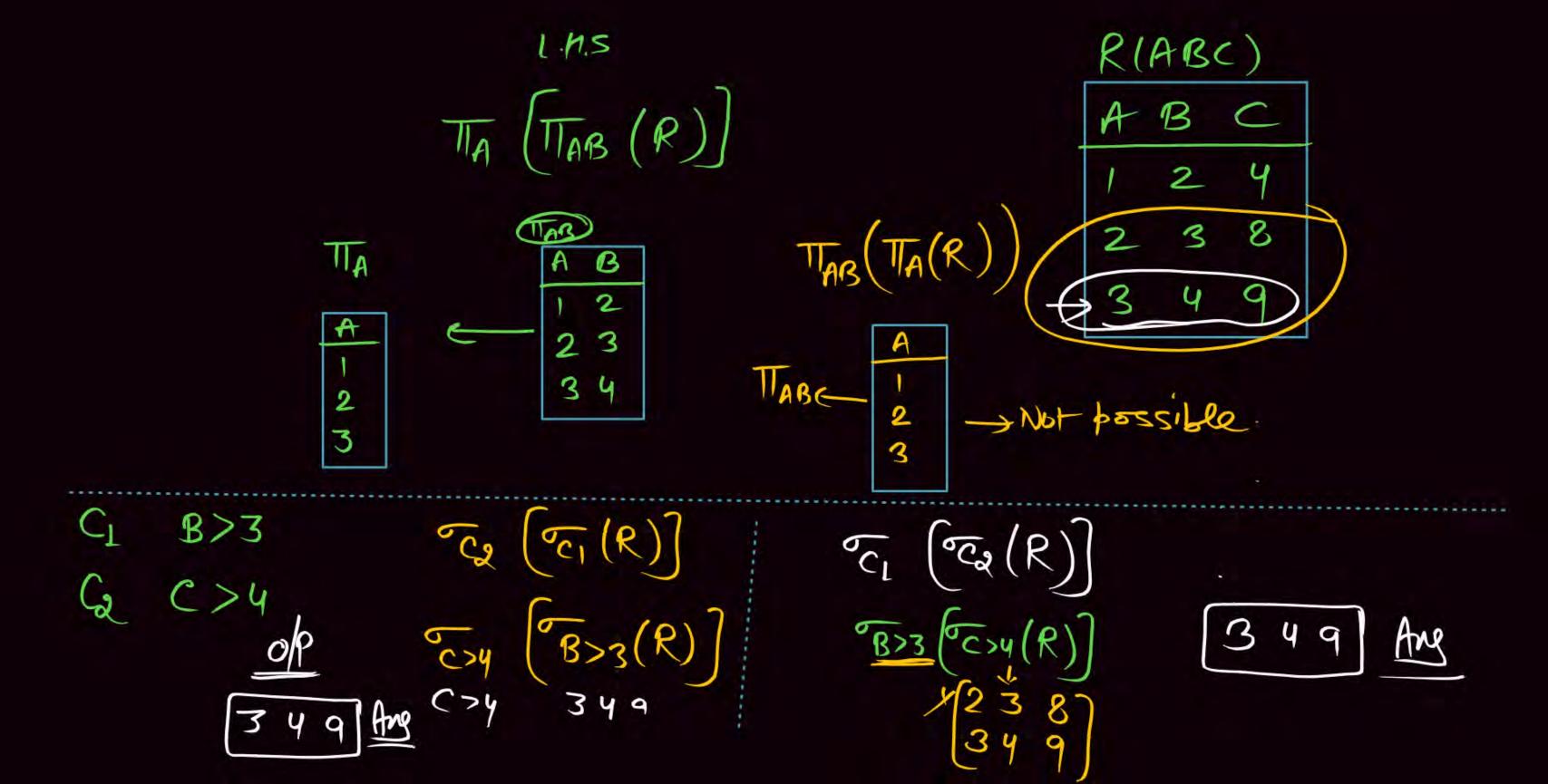Which of the following statement(s) is/are correct?

(A.) S_1 only

(B.) S_2 only   Ans (b)

(C.) Both S_1 and S_2 only

(D.) Neither S_1 nor S_2

$$\text{L.H.S}$$

$$\Pi_A \left[\Pi_{AB} (R) \right]$$

R(ABC)

A	B	C
1	2	4
2	3	8
3	4	9

Π_A

A
1
2
3

Π_{AB}

A	B
1	2
2	3
3	4

$$\Pi_{AB} \left(\Pi_A (R) \right)$$

Π_{ABC}

A
1
2
3

$\rightarrow$ Not possible

$C_1 \quad B > 3$

$C_2 \quad C > 4$

$\underline{o/p}$

| 3 | 4 | 9 | Ans |

$$\sigma_{C_2} \left[\sigma_{C_1} (R) \right]$$

$$\sigma_{C > 4} \left[\sigma_{B > 3} (R) \right]$$

$C > 4 \qquad 3 \; 4 \; 9$

$$\sigma_{C_1} \left[\sigma_{C_2} (R) \right]$$

$$\sigma_{B > 3} \left[\sigma_{C > 4} (R) \right]$$

$$\begin{bmatrix} 2 & 3 & 8 \\ 3 & 4 & 9 \end{bmatrix}$$

| 3 | 4 | 9 | Ans |

$$\Pi_B \left[\Pi_{BC}(R) \right] \neq \Pi_{BC} \left[\Pi_B(R) \right]$$

Π_B

Π_{BC}

Not

Possible

B
5
6
7
8

R

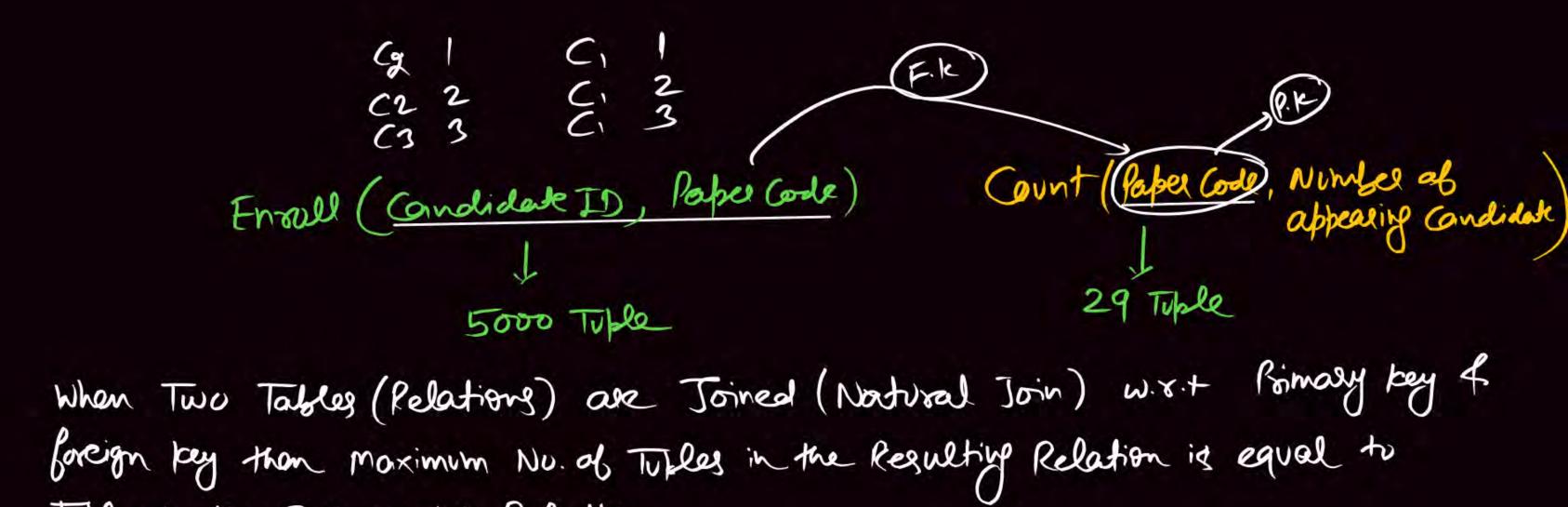| A	B	C	D
1	5	2	1
2	6	3	4
3	7	5	8
4	8	6	9
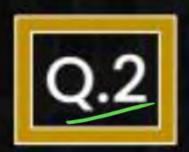
Q.2 Consider the following relations-

Enroll (CandidateID, Papercode) with 5000 tuples and

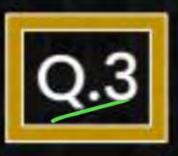Count(Papercode, Number_of_appearing_candidates) with 29 tuples.

Assume, one candidate can enroll for multiple Papercode. Let p and q be the maximum and minimum number of records in Count ⋈ Enroll then the value of p + q is _10,000_ . Ans
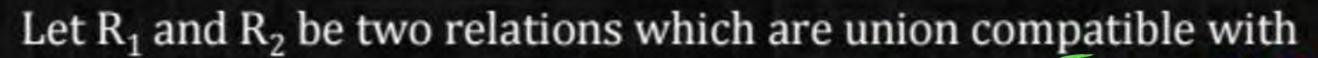
$P : 5000$

$q : 5000$

$P + q = 5000 + 5000$

$= 10000$ | Ans

C_g 1 C_1 1

C_2 2 C_1 2

C_3 3 C_1 3

F.k

P.k

Enroll (<u>Candidate ID</u>, <u>Paper Code</u>)

Count (Paper Code, Number of appearing Candidate)

↓

5000 Tuple

↓

29 Tuple

When Two Tables (Relations) are Joined (Natural Join) w.r.t Primary key & foreign key then Maximum No. of Tuples in the Resulting Relation is equal to Tuples in the Referencing Relation

Referencing Reln → Enroll ⋈ Count ⟹ <u>Maximum</u> ⟹ $\boxed{5000 \text{ Tuple} = P.}$

• Paper Code is Primary key of Count Table so Not Contain NULL & Paper Code Used as foreign key in the Enroll Table. & Candidate ID & Paper Code is a key for enrolled Relation
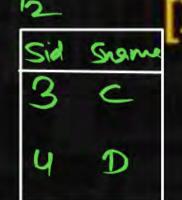
Minimum : 5000.

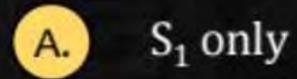**Q.3** Let R_1 and R_2 be two relations which are union compatible with the same set of attributes.

[MCQ]

Correct ← $S_1: R_1 \cap R_2 = T_1 \bowtie T_2$

Incorrect ← $S_2: R_1 \cup R_2 = T_1 \bowtie T_2$
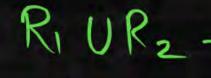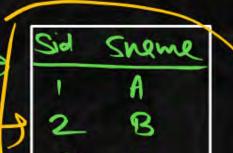
Which of the above statement(s) are INCORRECT?

A. S_1 only

B. S_2 only

C. Both S_1 and S_2 only

D. Neither S_1 nor S_2

S_1

$R_1 \cap R_2 = \phi$

$T_1 \bowtie T_2 = \phi$

T_1
Sid	Sname
1	A
2	B

T_2
Sid	Sname
3	C
4	D

$T.sid = T_2.sid \land T_1.sname = T_2 same$ $(T_1 \times T_2)$

S_2 $R_1 \cup R_2 \longrightarrow$

$\neq$ O/P $\rightarrow$

$T_1 \bowtie T_2 = \phi$

Sid	Sname
1	A
2	B
3	C
4	D

Ans (B)

R & S ⚌

① Arity of R & S must be same (# of Attribute)

YES it possible

Arity:2

Arity:3   Not possible

② Range of Attribute Must be similar.

Sid	Sname

Bronch	CGPA

Not possible.

Sid	Sname

Sid	Sname

Now Possible.

Q.4

Consider the following relations: [MSQ] (P W)

Enroll (Sid, Papercode), Paper(Papercode, Desc) Which of the following relational algebra displays the sid's who only enrolled for Papercode having descriptions (Desc) as "CS"?

A. π_{sid} (Enroll ⋈ Paper)

$\boxed{A \& C}$ Ans

$$Desc = CS$$

Non CS

B. π_{sid} (Enroll) $- \pi_{sid}$ ((Enroll ⋈ σ (Paper))

$$Desc = CS$$

→ Sid of student who enrolled in CS

C. π_{sid} (Enroll) $- \pi_{sid}$((Enroll ⋈ σ (Paper))

$$Desc <> CS$$

Sid of student who enrolled in Non CS.
OR
Not enrolled in CS

D. None

Sid who enrolled in CS.   Not equal

Q.5

Consider a relations work $(\underbrace{EmpiD}_{E}, \underbrace{Project\ ID}_{P})$ $\rho \to$ Rename   **[MCQ]**
                                                              operator

The suitable relational algebra expression that projects the employee ids who work exactly in one project is-

~~A.~~ $\pi_{Empid}(Work) - \pi_{Empid}(Work \bowtie \rho_{E,P}(work))$

           $\underline{Empid = E}$
                 $\wedge$
           $\underline{Project\ Id = P}$

$Eid \overset{\curvearrowright work\ in}{} One\ Project$

$Total - Not\ work\ in\ One\ Project$
$\left(More\ than\ One\ Project\right)$

(E₁) ~~B.~~ $\pi_{Empid}(Work \bowtie \rho_{E,P}(work))$

           $\underline{Empid = E}$
                 $\wedge$
           $\boxed{Project\ ID \neq P} \to Eid\ Who\ working$
                              $More\ than\ One\ Project$

C. $\underline{\pi_{Empid}(work)} - \pi_{Empid}(work \bowtie \rho_{E,P}(work))$
                              $Empid = E$
                                 $\wedge$
   $\bar{E}1$
   E_2 $- E_1$ $E_1 \overset{JOIP}{\leftarrow}$
        $\Vert$
        E_2 $Project\ ID \neq P$

$\boxed{Ans(c).}$

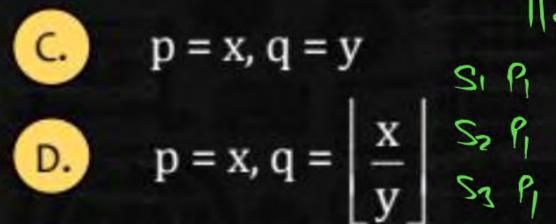| Eid	Pid
E₁	P₁
E₁	P₂
E₂	Pₗ

D. None (E₂)

Q.6 Consider two relations R and S with x and y number of distinct record. Let p and q be the minimum and maximum number of records in the resultant R/S, then-
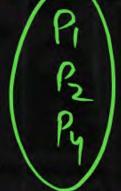
[MCQ]

minimum = P maximum = Q

A. $p = 0, \quad q = x + 1$

B. $p = 0, q = \left\lfloor \dfrac{x}{y} \right\rfloor$

C. $p = x, q = y$

D. $p = x, q = \left\lfloor \dfrac{x}{y} \right\rfloor$

R/S

Minimum = 0

$\pi_{sid, Pid}(R)$

S_1	P_1
S_2	P_1
S_3	P_1
S_1	P_2
S_3	P_4

$\pi_{Pid}(S)$

P_1
P_2
P_4

O

$\left\lfloor \dfrac{x}{y} \right\rfloor$

Ans (B).
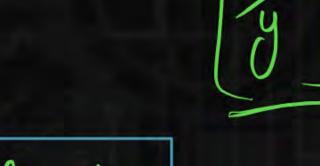
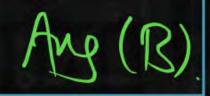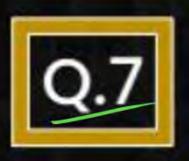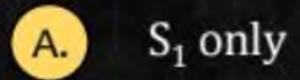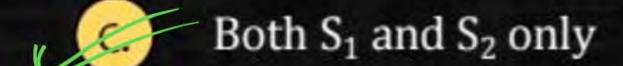**Q.7** Let R_1 and R_2 be two relations with n and m tuples. [MCQ]

S_1: The maximum number of records in $R_1 - R_2$ is n.
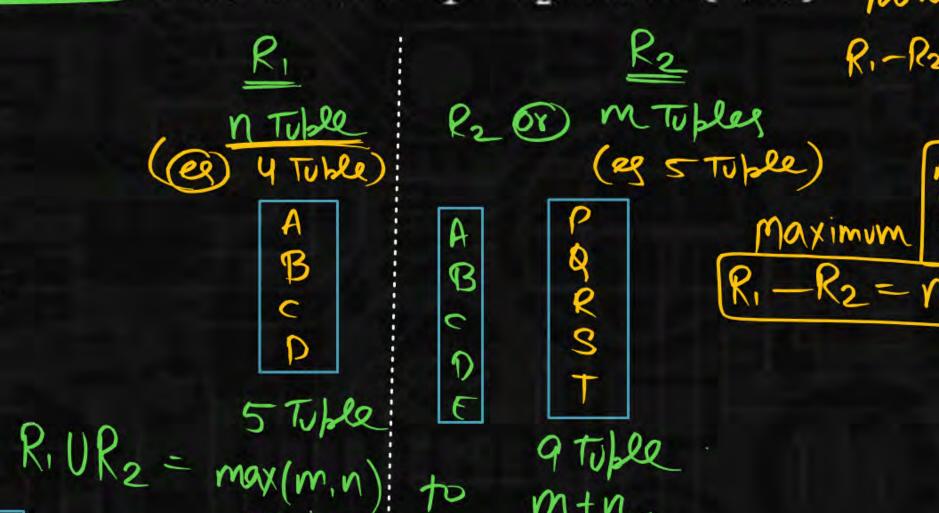
S_2: The minimum number of records in $R_1 \cup R_2$ is max (n, m)

A. S_1 only

B. S_2 only

C. Both S_1 and S_2 only

D. Neither S_1 nor S_2

Ans (C).

minimum

$R_1 - R_2 = \phi$

R_1

n Tuple
(eg) 4 Tuple
A
B
C
D

R_2 or m Tuples
(eg 5 Tuple)

R_2

A
B
C
D
E

P
Q
R
S
T

maximum

A
B
C
D

$R_1 - R_2 = n$

5 Tuple

$R_1 \cup R_2 = \max(m, n)$
Minimum

to

9 Tuple
$m+n$
Maximum
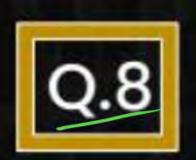
R_1: n Tuple R_2: m Tuple	Minimum	Maximum
① $R_1 \cup R_2$	$\max(m, n)$	$m + n$
② $R_1 - R_2$	ϕ	n

| $R_1 \cap R_2$ | ϕ | $\min(m, n)$ |

Q.8

Consider the following RA expression- → Rename [MCQ]

$P: \pi_{sid}(\text{student}) - \pi_{sid}(\text{student} \bowtie \rho_{I, G, M}(\text{Student}))$

Less marks in Respective Gender

$\text{Marks} < M \wedge \text{Gender} = G$

On a relation student (sid, Gender, Marks) and $\rho_{I = sid}$, $\rho_{G = Gender}$, $\rho_{M = Marks}$.

The above R.A displays?

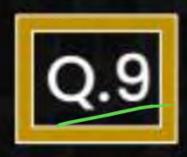A. The sid of the student who obtained the maximum marks.

B. The sids of the male and female students who obtained the maximum marks in their respective gender.

C. The sids of male student who scored higher than all the female students

$\boxed{Ans(B)}$

D. None

Q.9

Consider the relation-

[MSQ]
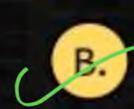
Works (<u>Eid Pid</u>) project (<u>Pid</u>, Name)   Division observation

The relational algebra expression that displays the Eids who work in every project Name = '<u>M</u> _____.

A. $\pi_{Eid, Pid}(works) / \pi_{Pid}(\sigma_{Name = M}(Project))$
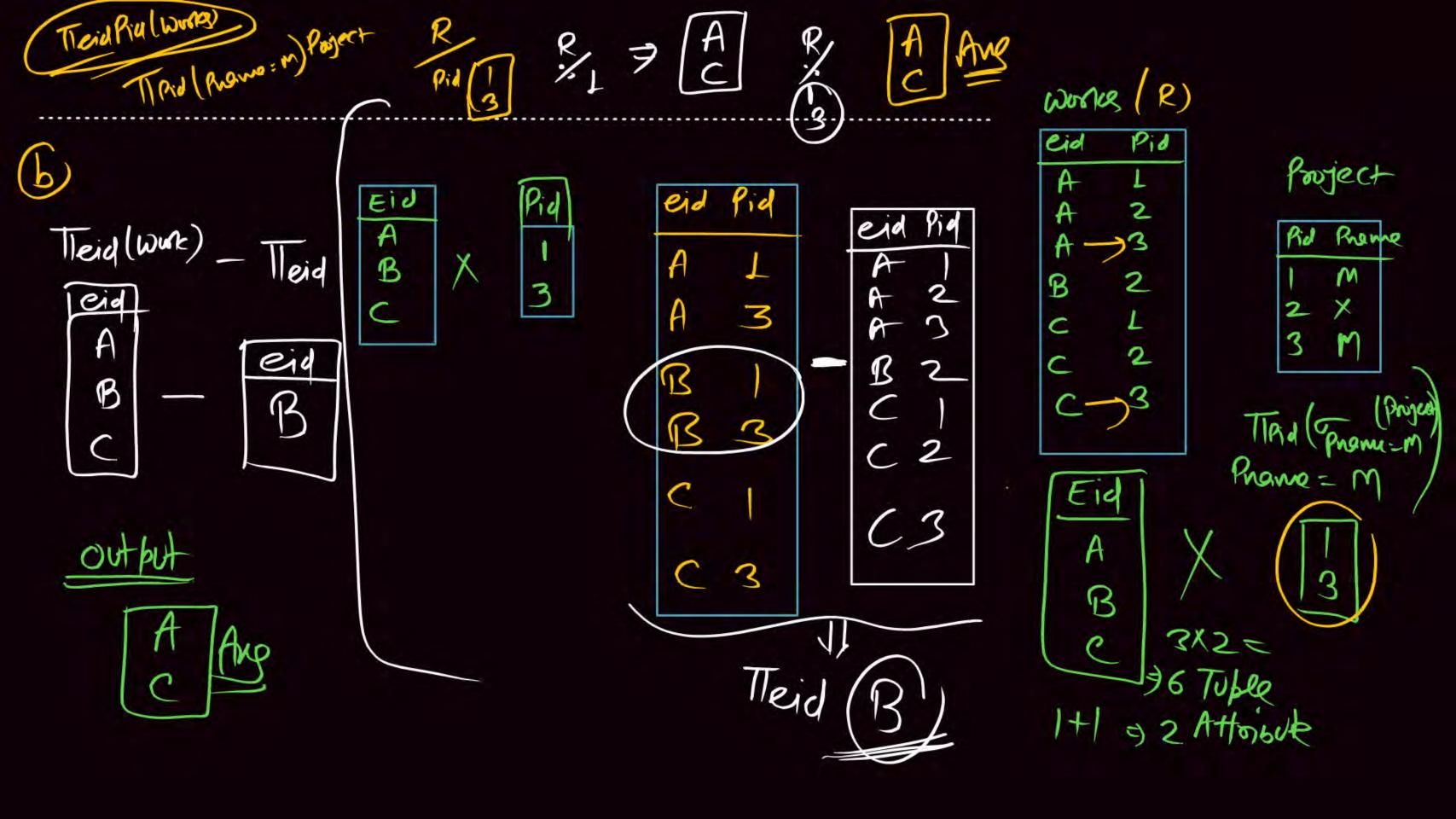
B. $\pi_{Eid}(Work) - \pi_{Eid}\left[\pi_{Eid}(Work) \times \pi_{pid}\left(\sigma_{Name = m}(Project)\right) - \pi_{Eid\ Pid}(works)\right]$

C. $\pi_{Eid}(Work) - \left[\pi_{Eid}(Work) \times \pi_{pid}\left(\sigma_{Name <> m}(Project)\right) - \pi_{Eid\ Pid}(works)\right]$

D. None

Ans (A) & (B).

$\Pi_{eid, Pid}(works)$

$\Pi_{Pid}(\sigma_{Pname = M})$ Project

$\dfrac{R}{Pid}\boxed{\begin{array}{c}1\\3\end{array}}$ $\dfrac{R}{\%} \perp \Rightarrow \boxed{\begin{array}{c}A\\C\end{array}}$ $\dfrac{R}{\%}\overset{\textstyle\bigcirc}{\underset{3}{1}}$ $\boxed{\begin{array}{c}A\\C\end{array}}$ Ans

works (R)

(b)

$\Pi_{eid}(work) - \Pi_{eid}$

eid
A
B
C

$-$

eid
B

Eid
A
B
C

X

Pid
1
3

eid	Pid
A	1
A	3
B	1
B	3
C	1
C	3

$-$

eid	Pid
A	1
A	2
A	3
B	2
C	1
C	2
C	3

Eid	Pid
A	1
A	2
A	3
B	2
C	1
C	2
C	3

Project

Pid	Pname
1	M
2	X
3	M

$\Pi_{Pid}(\sigma_{Pname = M}$ (Project))

Pname = M

$\boxed{\begin{array}{c}1\\3\end{array}}$

$\Downarrow$

Π_{eid} (B)

output

A
C

Ans

Eid
A
B
C

X

3×2 =

→ 6 Tuple

1 + 1 ⇒ 2 Attribute

$$\pi_{AB}(R) \Big/ \pi_B(S)$$

Expansion

$$\pi_A(R) - \pi_A \Big[\pi_A(R) \times \pi_B(S) - R \Big]$$
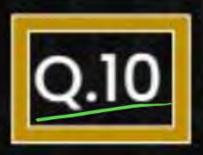
Q.10 Consider the two relations R_1 and R_2 such that they have no attributes in common then-

[MCQ]

$S_1:$ $R_1 \bowtie R_2 = R_1 \times R_2$ ✓

Incorrect ✗ $S_2:$ $R_1 \bowtie R_2 \neq \phi$ ✗

$R_1(AB)$ $R_2(CD)$

Which of the given statement(s) is/are correct?

A. S_1 only ✓

B. S_2 only   Ans (A)

C. Both S_1 and S_2 only

D. Neither S_1 nor S_2

$R \bowtie S = $

Step3
$\Pi_{Distinct\ Attribute}$

Step2 $\sigma_{equality\ Condition\ on}$ (R X S) Step1
All Common Attribute

$R_1 \bowtie R_2 \equiv R_1 \times R_2$

Condition:
iol → $R_1 \bowtie R_2 = \phi$ if Any One of the Relation Empty
But in question $R_1 \& R_2$ Non empty.

THANK YOU GW SOLDIERS !