

[PUE] - Numerical

[Ans=4] [OR]

$$F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$$

$$G = \{A \rightarrow CD, E \rightarrow AH\} \text{ check whether they are equivalent or}$$

Soln:-
If we can derive all FD of G using FD of F & Vice-Versa then they are said to be equivalent.

Derive G using F :-

from F₁

$$\text{ci) } \frac{A \rightarrow C}{AC \rightarrow D} \quad \text{--- (1)}$$

$$\Rightarrow A^+ = \{ACD\}$$

$$\Rightarrow \frac{A \rightarrow D}{\quad} \quad \text{--- (2)}$$

Union of (1) and (2):

$$\Rightarrow A \rightarrow CD$$

$$\text{cii) } E \rightarrow AH$$

from F₁ $E \rightarrow AD$

decompose it:

$$E \rightarrow A \quad \text{--- (3)}$$

$$E \rightarrow D \quad \text{--- (4)}$$

$$\text{Also, from F, } E \rightarrow H \quad \text{--- (5)}$$

Union of (3) & (4) & (5):

$$\boxed{E \rightarrow AH}$$

∴ we can derive all FD of G using F.

Derive F using G!

$$G = \{ A \rightarrow CD, E \rightarrow AH \}$$

di) $A \rightarrow C$

from $A \rightarrow CD$ — ①

Decompose it :

$$\boxed{A \rightarrow C}$$
$$A \rightarrow D$$

— ②

~~di) $A \rightarrow CD$~~

di) $AC \rightarrow D$

from $A \rightarrow CD$

~~$A \rightarrow AC$~~

~~$A \rightarrow D$~~

$A \rightarrow CD$

Using augmentation property:

$$X \rightarrow Y$$

$$\Rightarrow XZ \rightarrow YZ$$

$$A \rightarrow CD$$

$$\Rightarrow AC \rightarrow CD$$

Decompose:

$$AC \rightarrow C$$

$$\boxed{AC \rightarrow D}$$

[trivial dependency]

di) $E \rightarrow AD$

$\therefore E \rightarrow AH$ (from G)

Decompose it : $E \rightarrow A; E \rightarrow H$

~~$A \rightarrow A$~~

$\therefore A \rightarrow D$ [obtained in (i)]

and ~~A~~ ~~D~~ $E \rightarrow A$ — (3)

Transitively, $E \rightarrow D$ — (4)

Union (3) & (4):

$$\boxed{E \rightarrow AD}$$

(iv) $E \rightarrow H$

$E \rightarrow AH$

Decompose

$$\boxed{E \rightarrow H}$$

Q.7.

Ans. (b)

(a) Passport No, License No, SSN.

(b)

Q.8.

EMP (Id, Name,

Q.9.

EMP_PROJ (SSN, PNO, Name, Phone, Location)

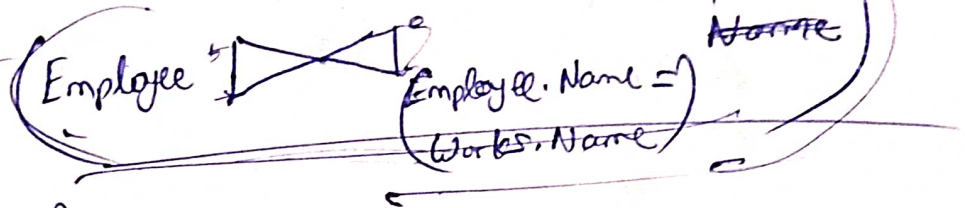
Re-POE

Q.3.

Ans (a)

(i) $\pi_{\text{name}} \left(\sigma_{\text{company-name} = 'ABC'} (\text{Works}) \right)$

(ii) $\sigma_{\text{company-name} = 'ABC' \text{ and } \text{salary} > 15000}$



$\sigma_{\text{company-name} = 'ABC' \text{ and } \text{salary} > 15000}$

a. $D^+ = \{DE\}$

$\therefore A \not\subseteq D^+$

$\therefore D \rightarrow A$ is not implied

(a) SELECT * FROM EMPLOYEE INNER JOIN WORKS
ON EMPLOYEE.Name = WORKS.Name WHERE company-name
= 'ABC' AND salary > 15000;

Q. 4.

Ans. (a)

• 1NF

By definition, a relation is always in 1NF.

So, R is ~~not~~ in 1NF.

• 2NF

• Q is 1NF

Satisfied

is No Partial Functional Dependency

~~Candidate~~

Candidate:

is County-Name, Lot-Number \rightarrow Prop-Id, Area

• County-Name \neq {County-Name}

• Lot-Number \neq {Lot-Number}

Since, none of County-Name and Lot-Number can individually derive Property-Id or Area.

Hence, it is a Full Functional Dependency.

No other candidate for P.F.D.

So, R is in 2NF.

3NF

i) R in 2NF
satisfied.

ii) No. transitive dependency of Non-prime attribute on candidate key.

Candidate key:

(Country-Name, Lot-Number)

∴ $\text{Country} \rightarrow \text{Name-Lot-Number} \rightarrow \text{Property-ID}$
and $\text{Property-ID} \rightarrow \text{Area}$.

∴ It is transitive dependency.

∴ decompose R:

R (Country-Name, Lot-Number, Property-ID, Area).
into

R1 (Country-Name, Lot-Number, Property-ID)

R2 (Property-ID, Area).

∴ R1, R2 in 3NF.

Q. 8.

Ans. (a)

Student (RollNo, Name, Sub1, Sub2, Sub3)

Procedure

Create OR REPLACE PROCEDURE PRINT
(ROLL IN NUMBER).

AS

Begin

SELECT Name, RollNo, (Sub1 + Sub2 + Sub3) / 3
as 'Avg. marks' FROM Student
where RollNo = ROLL;

END PRINT;

Q. 6.

Ans (b)

i) SELECT RollNo, Name FROM Student
WHERE BRANCH = 'CSE';

ii) SELECT Name FROM (Student INNER JOIN
ISSUE ON Student.RollNo = ISSUE.RollNo) ~~AND~~
INNER JOIN Book ON Book.ISBN = ISSUE.ISBN
WHERE Publisher = 'ABC';

(iii) < From 112 WHERE Student Name = 'PY2';

(iv) SELECT TITLE FROM Book INNER JOIN
ISSUE ON Book.ISBN = ISSUE.ISBN
WHERE Date of Issue ~~≠~~ = '01-JAN-2011';

(v) SELECT TITLE FROM Book WHERE Publisher
= 'ABC';

Q9.

Ans. (b)

$R(A, B, C, D, E, F)$

FD: $\{ C \rightarrow A, D \rightarrow E, F \rightarrow A, E \rightarrow D \}$

$R_1(A, C, D)$

$R_2(B, C, D)$

$R_3(E, F, D)$

Check Lossless

Ans Create matrix $S = [b_{ij}]$

	A	B	C	D	E	F
R1	a₁₁ b ₁₁	b ₁₂	a₁₃ b ₁₃	a₁₄ b ₁₄	b ₁₅	b ₁₆
R2	b ₂₁	a₂₂ b ₂₂	a₂₃ b ₂₃	a₂₄ b ₂₄	b ₂₅	b ₂₆
R3	b ₃₁	b ₃₂	b ₃₃	a₃₄ b ₃₄	a₃₅ b ₃₅	a₃₆ b ₃₆

ii) Create new. tables.

	A	B	C	D	E	F
R1	a₁	b ₁₂	a ₁₃	a ₄	b ₁₅ a ₅	b ₁₆
R2	b ₂₁ a ₁	a ₂	a ₃	a ₄	b ₂₅ a ₅	b ₂₆
R3	b ₃₁	b ₃₂	b ₃₃	a ₄	a ₅	a₆ a ₆

(iii) Check for each FD.

~~X → Y~~

If $X, Y \in R_i$

and $X \rightarrow Y$

then search another R_j such that $i \neq j$

where $X = a_i$

but $Y \neq a_i$

and change $Y = a_i$

So it is lossy decomposition:-