#Q.Assume a relation schema R with 5 attributes P, Q, R, S, T and the set of FD'S

P → RS, Q → RT, T → Q consider the statements:

S_1: The only candidate keys of R are PQ and PT

✕ S_2: The highest normal form satisfied by R is 2NF

Which of the statement is true?

$PQ^+ = \{P, Q, R, S, T\}$

$\downarrow$

PT^+

P

A Only S_1 is true

B Only S_2 is true

C Both S_1 and S_2 are true

D Neither S_1 and S_2 is true

#Q. Assume a relation R = (P, Q, R, S) and a set F of functional dependencies:

F = {PR → S, S → P, S → Q, S → R}, Highest normal form satisfied by the relation R is?

A 2NF

B 3NF

C BCNF

D 1NF

$S^+ = \{ P, Q, R, S \}$

PR^+

#Q.Consider a relation R(P, Q, R, S, T, U, V, W) with the

following functional dependencies:

{RW→V, P → QR, Q → RUW, T → P, U → TV}, then highest normal form of the relation R is _____.

A   1NF

B   2NF

C   3NF

D   BCNF

$P S^+ = \{ P, Q, R, S, U, W, T, V \}$

$TS, \quad US, \quad QS$

#Q.Consider a table/Relation R has only one candidate key, then which of the following is always true?

A If R is in 2NF, then it is also in 3NF.

B If R is in 3NF, then it is also in BCNF.

C If R is in 2NF, but it is not in 3NF.

D None of the above.

#Q.Consider a relation R(P, Q, R, S, T) with the set of FD's

{PQR →ST and T → QRS} which of the following statements is true?

A   R is not in 2NF

B   R is in 2NF but not in 3NF

C   R is in 3NF but not in BCNF

D   R is in BCNF

$PQR^+ = \{P, Q, R, S, T\}$

PT

$T \rightarrow S$

#Q.Consider a relation R (L, M, N, O) with the functional dependencies:

$$L \rightarrow M,$$
$$M \rightarrow N,$$
$$N \rightarrow O$$

lossy

Which one of the following decompositions is not lossless?

A R_1 (L, M), R_2(M, N), R_3 (N, O)

B R_1(L, M), R_2(L, N), R_3 (L, O)

C R_1(L, O), R_2(M, O), R_3 (N, O)

$L \rightarrow O$ $M \rightarrow O$ $N \rightarrow O$

D   All of the above are lossless

#Q.Suppose functional dependency Q → R holds in relation R (P, Q, R, S) which additional FD will make R be in 3NF, but not BCNF?

A $S \to PQ$ ✓

B $PR \to S$

C $RS \to Q$

D $PS \to Q$

$A = \{ \; Q \to R, \quad \underset{BCNF}{S \to PQ} \; \}$
$\qquad \underset{\times 3NF}{}$

$S^+ = \{ \; S, P, Q, R \; \}$

$B = \{ \; \overset{PSCK}{Q \to R}, \; \overset{NPA}{PR \to S} \; \}$

$PQ^+ = \{ P, Q, R, S \}$

$3NF$

$C = \{ \; \overset{PSCK}{Q \to R}, \quad \overset{PA}{\underset{PSCK}{RS \to Q}} \; \}$

$PS^+ = \{ P, S \}$

$\begin{cases} PQS^+ = \{ P, Q, R, S \} \\ \qquad \downarrow \\ \qquad PRS \end{cases}$

$\overset{2NF}{}$
$D = \{ \; Q \to R, \quad \underset{BCNF}{PS \to Q} \; \}$

$PS^+ = \{ P, S, \; Q, R \}$

#Q.Consider a relation schema S = { A, B, C, D, E, F, G, H } with the following set of functional dependencies:

$AB \rightarrow E$

$A \rightarrow CF$

$B \rightarrow D$

$D \rightarrow GH$

$B^+ = \{ B, D, G, H, \}$

#Q.Now, consider the following decompositions of S:

Decomposition 1: $D_1 = \{ S_1, S_2, S_3, S_4 \}$

$S_1 = \{ A, B, C \}$

$S_2 = \{ A, D, F \}$

$S_3 = \{ B, E \}$

$S_4 = \{ D, G, H \}$

Decomposition 2: $D_2 = \{ S_1, S_2, S_3, S_4 \}$

$S_1 = \{ A, B, C \}$

$S_2 = \{ D, F \}$

$S_3 = \{ B, E \}$

$S_4 = \{ D, G, H \}$

Which of the above decompositions has the lossless join property?

$B \rightarrow AC$ ✗

$B \rightarrow E$ ✗

$S_3 \bowtie S_1$

$S_3 \cap S_1 = \{ B \}$

A Only D_1

B Only D_2

C Both D_1 and D_2

D Neither D_1 nor D_2

#Q.Which of the following statements is FALSE ?

$R(A, B)$

$P \rightarrow q \equiv T$

AB is CK

A Any relation with 2 attributes is in BCNF. *True*

B A relation in which every key has only one attribute is in 2NF

TRUE → PSCK → NPA
X

C A prime attribute can be transitively dependent on a key in a 3NF relation. *TRUE*

D A prime attribute can be transitively dependent on a key in a BCNF relation.

#Q.A functional dependency of the form P → Q is trivial if:

$$P \supseteq Q$$

A $Q \subseteq P$

B $P \subset Q$

C $P \subseteq Q$

D $P \subseteq Q$ and $Q \subseteq P$

THANK - YOU