

4T YASH SARANG DBMS ASSIGNMENT 1.

Q1. $R(ABCD)$ $A \rightarrow BC$. $\overline{AD}^* \rightarrow ADBC$.
 $\therefore CK = \{AD\}$, $PA = \{A, D\}$.

Q2. $R(ABCD)$ $A \rightarrow B$, $B \rightarrow C$, $C \rightarrow A$; $AD^* = BD^* = CD^* = ABCD$.
 $CK = \{AD, BD, CD\}$.

Q3. $R(ABCDEF)$ $AB \rightarrow C$, $C \rightarrow D$, $B \rightarrow AE$; $ABF^* = ABFCDE$
 $CBF^* = CBEADF$.
 $\therefore CK = \{ABF, CBF\}$

Q4. Convert to 3NF. $R(ABCDE)$ $AB \rightarrow C$, $B \rightarrow D$, $D \rightarrow E$.
 $AB^* = ABCDE$. $CK = \{AB\}$, $PA = \{A, B\}$, $NPA = \{C, D, E\}$
 $R_1(ABC)$ $R_2(BD)$ $R_3(CDE)$.

Q5. Identify normal form. $R(ABCDEF)$ $BC \rightarrow ADE$, $D \rightarrow B$.
 $BC^* = BCADFE$, $CK = \{BC\}$, $PA = \{B, C\}$, $NPA = \{A, D, E\}$
 $BC \rightarrow ADE$ $D \rightarrow B$

BCNF

✓

X

3NF

✓

✓

\therefore Given relation is in 3NF.

Q6. Convert to 2NF & 3NF. $R(ABCDEFGHIJ)$
 $AB \rightarrow C$, $AD \rightarrow GH$, $BD \rightarrow EF$, $A \rightarrow I$, $H \rightarrow J$.
 $ABD^* = ABCDEFGHIJ$, $CK = \{ABD\}$,
 $PA = \{A, B, D\}$ $NPA = \{C, E, F, G, H, I, J\}$

i) Convert to 2NF $R(ABCDEF\bar{GHIJ})$

$$R_1(ADGHI) \quad R_2(ABD) \\ R_3(ABC) \quad R_4(BDEF) \quad R_5(AI)$$

ii) Convert to 3NF

$$R_1(ADEH) - R_1(H,J) \\ R_2(ABC) \quad R_3(BDEF) \\ R_4(AI) \quad R_5(ABD).$$

Q7. $R(ABCDEF)$ $AB \rightarrow C, DC \rightarrow AB, E \rightarrow F^o, ABD^* = (BD^*)^* = ABCDEF$

$$CK = \{ABD, CBD\} \quad PA = \{AB, CD\} \quad NPA = \{E, F\}.$$

$$AB \rightarrow C \quad DC \rightarrow AC \quad E \rightarrow F$$

BCNF	\times	\times	\times	
3NF	\checkmark	\times	\times	Given relation
2NF	\checkmark	\times	\times	is in 1NF
1NF	$_$	\checkmark	\checkmark	

Q8. $R(ABCD\bar{EF})$ $AB \rightarrow C, C \rightarrow DE, E \rightarrow F, F \rightarrow A^o, AB^* = FB^* = EB^* = (B^*)^* = ABCDEF$

$$CK = \{AB, FB, EB, CB\} \quad PA = \{A, B, C, E, F\} \quad NPA = \{D\}$$

$$AB \rightarrow C \quad C \rightarrow DE \quad E \rightarrow F \quad F \rightarrow A$$

BCNF	\checkmark	\times	\times	
3NF	\checkmark	\times	\checkmark	Given relation
2NF	\checkmark	\times	\checkmark	is in 1NF.
1NF	\checkmark	\checkmark	\checkmark	

Q9. $R(ABCDEF)$ $FD \rightarrow AB \rightarrow C, C \rightarrow D, C \rightarrow E, E \rightarrow F, F \rightarrow A^o, \cancel{ABCDEF}, \cancel{ABCDEF}, \cancel{ABCDEF}$

$$AB^* = FB^* = EB^* = (B^*)^* = ABCDEF, CK = \{AB, FB, EB, CB\}^o, \cancel{ABCDEF}, \cancel{ABCDEF}$$

$$PA = \{A, B, C, E, F\}$$

$$NPA = \{D\}$$