

1. When a relation $R(A, B, C)$ with FDs $A \rightarrow BC$, $B \rightarrow C$ is decomposed into $R_1(A, B)$, $A \rightarrow B$ and $R_2(B, C)$, $B \rightarrow C$, the functional dependency $A \rightarrow C$ is lost after the decomposition. **【B】**
A. True. B. False

2. If a relation contains two attributes, then the highest normal form it certainly belongs to can be

【D】

- | | |
|--------|---------|
| A. 1NF | B. 2NF |
| C. 3NF | D. BCNF |

3. If a relation has FDs $(AB \rightarrow CD, A \rightarrow D)$, then the highest normal form it belongs to is:

【A】

- | | |
|--------|---------|
| A. 1NF | B. 2NF |
| C. 3NF | D. BCNF |

4. Consider the relation with schema $R(A, B, C, D, E, F)$ and the following functional dependencies (FDs): $A \rightarrow BC$, $D \rightarrow AF$

1. What are the candidate keys of this relation?

(D, E)

2. Is relation R in BCNF? If it is, explain why it is. If it is not, explain why not and give a decomposition of R into a collection of relations that are in BCNF.

No, because there are dependencies as $D \rightarrow A$ and $A \rightarrow B$, which is transitive. And $(D, E) \xrightarrow{P} BC$.

The relation should be decomposed into:

$R_1(D, A, F)$ (candidate keys(D))

$R_2(D, E)$ (candidate keys(D, E))

$R_3(A, B, C)$ (candidate keys(A))