Armstrong's Axioms and rules for splitting and combining.

$$
\begin{aligned}
X \subseteq Y &\Rightarrow Y \rightarrow X \quad \text{(Reflexivity)} \\
X \rightarrow Y &\Rightarrow XZ \rightarrow YZ \quad \forall Z \quad \text{(Augmentation)} \\
X \rightarrow Y \wedge Y \rightarrow Z &\Rightarrow X \rightarrow Z \quad \text{(Transitivity)} \\
X \rightarrow Y \wedge X \rightarrow Z &\Rightarrow X \rightarrow YZ \quad \text{(Combining)} \\
X \rightarrow YZ &\Rightarrow X \rightarrow Y \wedge X \rightarrow Z \quad \text{(Splitting)}
\end{aligned}
$$

Consider the relation $R(A, B, C, D)$. For each of the following sets of FDs,

(1) $C \rightarrow D, C \rightarrow A, B \rightarrow C$

(2) $B \rightarrow C, D \rightarrow A$

(3) $ABC \rightarrow D, D \rightarrow A$

(4) $A \rightarrow B, BC \rightarrow D, A \rightarrow C$

(5) $AB \rightarrow C, AB \rightarrow D, C \rightarrow A, D \rightarrow B$

assuming those are the only dependencies that hold for R, do the following:

(a) Identify the candidate key(s) for R.

(b) Identify the best normal form (3NF or BCNF) that R satisfies.

(c) If R is not in BCNF, decompose it into a set of BCNF relations.