Question 1
Given the relation scheme \( R = \{A, B, C, D, E\} \) and the FDs \( A \rightarrow B, BD \rightarrow E, \) and \( C \rightarrow D \):
(a) Determine all the attributes that are functionally determined by \( AC \). Use the Algorithm from the textbook.
(b) Find all candidate keys of \( R \).

Question 2
Consider the relation scheme \( R = \{A, B, C, D, E\} \), with the following functional dependencies:
\( A \rightarrow BC \)
\( CD \rightarrow E \)
\( B \rightarrow D \)
\( E \rightarrow A \)
Find all candidate keys of \( R \). Note that, in general, a relation may have several candidate keys.
SHOW YOUR WORK.

Question 3
(a) Is it possible to have a relation (instance) on the scheme \( R = \{A, B, C, D\} \) that satisfies the FDs \( A \rightarrow CD \) and \( D \rightarrow B \) but violates the FD \( A \rightarrow B \)? If it is possible, then write down such a relation with the fewest number of tuples possible. If it is not possible then prove (justify, argue) why it is not possible.
(b) Is it possible to have a relation (instance) on the scheme \( R = \{A, B, C\} \) that satisfies the FDs \( A \rightarrow C \) and \( B \rightarrow C \) but violates the FD \( A \rightarrow B \)? If it is possible, then write down such a relation with the fewest number of tuples possible. If it is not possible then prove (justify, argue) why it is not possible.

Note: In the above questions, if an instance exists, then it is possible to find one with only two tuples.