

Each multiple-choice quiz problem is based on a "root question," from which the system generates different correct and incorrect choices each time you take the quiz. Thus, you can test yourself on the same material multiple times. We strongly urge you to continue testing on each topic until you complete the quiz with a perfect score at least once. Simply click the "Reset" button at the bottom of the page for a new variant of the quiz.

After submitting your selections, the system will score your quiz, and for incorrect answers will provide an "explanation" (sometimes for correct ones too). These explanations should help you get the right answer the next time around. To prevent rapid-fire guessing, the system enforces a minimum of 10 minutes between each submission of solutions.

Multiple Choice

6/8 points (graded)

[Q1] Consider relation $R(A,B,C,D,E)$ with functional dependencies:

$AB \rightarrow C, C \rightarrow D, BD \rightarrow E$

Which of the following sets of attributes does **not** functionally determine E?

☒ ABC

☐ BE

☐ ACD

☐ BC

Answer-Selection Feedback

No; $ABC^+ = ABCDE$, which includes E.

[Q2] Consider relation $R(A,B,C,D,E)$ with functional dependencies:

$D \rightarrow C$, $CE \rightarrow A$, $D \rightarrow A$, $AE \rightarrow D$

Which of the following is a key?

☐ BCE

☐ BD

☐ CE

☒ CDE

Answer-Selection Feedback

$CDE^+ = CDEA$; a key must functionally determine all attributes ABCDE.

[Q3] Let relation $R(A,B,C,D,E,F,G,H)$ satisfy the following functional dependencies:

$A \rightarrow B$, $CH \rightarrow A$, $B \rightarrow E$, $BD \rightarrow C$, $EG \rightarrow H$, $DE \rightarrow F$

Which of the following FDs is also guaranteed to be satisfied by R?

☐ $ADE \rightarrow CH$

☒ $BDG \rightarrow AE$

☐ $CGH \rightarrow BF$

☐ $BCD \rightarrow FH$

Answer-Selection Feedback

Yes; $BDG^+ = BDGECHAF$ (all attributes), which contains AE.

[Q4] Consider relation $R(A,B,C,D,E,F)$ with functional dependencies:

$CDE \rightarrow B$, $ACD \rightarrow F$, $BEF \rightarrow C$, $B \rightarrow D$

Which of the following is a key?

☐ BDF

☐ ADEF

☐ CD

☒ ACDE

Answer-Selection Feedback

Yes; $ACDE^+ = \text{all attributes}$.

[Q5] Consider relation $R(A,B,C,D,E,F,G)$ with functional dependencies:

$AB \rightarrow C$, $CD \rightarrow E$, $EF \rightarrow G$, $FG \rightarrow E$, $DE \rightarrow C$, and $BC \rightarrow A$

Which of the following is a key?

☐ ABEF

☐ BCDE

☐ BDEG

☒ BDFG

Answer-Selection Feedback

Yes; $BDFG^+ = ABCDEFG$.

[Q6] Let relation $R(A,B,C,D,E)$ satisfy the following functional dependencies:

$AB \rightarrow C$, $BC \rightarrow D$, $CD \rightarrow E$, $DE \rightarrow A$, $AE \rightarrow B$

Which of the following FDs is also guaranteed to be satisfied by R ?

☒ $AB \rightarrow D$

☐ $D \rightarrow B$

☐ $AD \rightarrow C$

☐ $B \rightarrow A$

Answer-Selection Feedback

Yes; $AB^+ = ABCDE$, which contains D .

[Q7] Let relation $R(A,B,C,D)$ satisfy the following functional dependencies:

$A \rightarrow B$, $B \rightarrow C$, $C \rightarrow A$

Call this set S1. A different set S2 of functional dependencies is *equivalent* to S1 if exactly the same FDs follow from S1 and S2. Which of the following sets of FDs is equivalent to the set above?

☐ $A \rightarrow B, B \rightarrow A, B \rightarrow C$

☐ $A \rightarrow BC, C \rightarrow AB$

☒ $A \rightarrow BC, B \rightarrow AC, C \rightarrow AB$

☐ $A \rightarrow B, B \rightarrow C, C \rightarrow B$

[Q8] Suppose relation $R(A,B,C)$ currently has only the tuple $(0,0,0)$, and it must always satisfy the functional dependencies $A \rightarrow B$ and $B \rightarrow C$. Which of the following tuples may be inserted into R legally?

☐ $(0,2,0)$

☒ $(1,1,0)$

☐ $(0,0,2)$

☐ $(0,1,2)$

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