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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

8/8 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?

- (●) ACD ✔
- ( ) AB
- ( ) BC
- ( ) ABC

Answer-Selection Feedback
Yes; $ACD^+ = ACD$, so E is not functionally determined.

[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?

- (●) ABE ✔
- ( ) A
- ( ) CE
- ( ) BD

Answer-Selection Feedback
Yes; $ABE^+ = ABCDE$.

[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?

- ○ CGH → BF
- ○ BCD → FH
- ◉ BDG → AE ✔
- ○ ACG → DH

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 → B, ACD → F, BEF → C, B → D

Which of the following is a key?

- ○ ADEF
- ○ BDF
- ○ ABE
- ◉ ACDE ✔

Answer-Selection Feedback
Yes; $ACDE^+$ = all attributes.

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

AB → C, CD → E, EF → G, FG → E, DE → C, and BC → A

Which of the following is a key?

- ◉ BCDF ✔
- ○ ABEF
- ○ ABFG
- ○ BDF

Answer-Selection Feedback
Yes; $BCDF^+$ = ABCDEFG.

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

AB → C, BC → D, CD → E, DE → A, AE → B

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

- ◉ ACE → D ✔
- ○ BD → A
- ○ C → A
- ○ AD → B

Answer-Selection Feedback
Yes; ACE^+ = 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?

- $A \rightarrow B$, $B \rightarrow C$, $C \rightarrow B$
- $C \rightarrow B$, $B \rightarrow A$, $A \rightarrow C$ ✔
- $A \rightarrow BC$, $B \rightarrow AC$
- $A \rightarrow BC$, $C \rightarrow AB$

[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?

- (0,1,0)
- (0,1,2)
- (1,1,0) ✔
- (1,0,2)

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