CS 775/875 Quiz 8 3/31/2021 Name _____

1. (1) Consider the relation R(a,b,c) with functional dependencies:

   $a \rightarrow b, c \rightarrow b$

   What relations would be produced by the 3NF decomposition algorithm? Select **one** option.

   (a) R1(a,b,c)
   (b) R1(a,b), R2(a,c)
   (c) R1(a,b), R2(c)
   (d) R1(a,b), R2(b,c)

2. Consider the relation R(a,b,c,d) with functional dependencies:

   $a \rightarrow bc, b \rightarrow a$

   (a) (2) Which of the following are 3NF decompositions of R?
      i. R1(a,b,d), R2(a,c)
      ii. R1(a,b,d), R2(b,c)
      iii. both the above decompositions are correct.
      iv. both the decompositions are wrong.

   (b) (2) Which of the following are 3NF decompositions of R?
      i. R1(a,b,c), R2(a,d)
      ii. R1(a,b,c), R2(b,d)
      iii. both the above decompositions are correct.
      iv. both the decompositions are wrong.

3. Consider the relation R(a,b,c,d,E) with functional dependencies:

   $d \rightarrow ac, E \rightarrow cd, cE \rightarrow a.$

   (a) (2) Which of the following FDs is also guaranteed to be satisfied by R? Select **one** correct option.
      i. $ac \rightarrow b$
      ii. $acd \rightarrow E$
      iii. $c \rightarrow a$
      iv. $bE \rightarrow dc$

   (b) (2) What relations would be produced by the 3NF decomposition algorithm? Select **one** correct option.
      i. R1(a,b,c,d,E)
      ii. R1(a,b,c), R2(b,d,E)
      iii. R1(a,c,d), R2(b,d,E)
      iv. R1(a,c,d), R2(d,E) R3(b,E)