Relational database design

Question 1:

Given a relation schema R(A, B, C, D, E, G, H),

with F={A→BC, B→C, C→DG, D→CG, H→DEG, E→DH}

1- Give a minimal cover of F

2- Determine **all** keys of R

3- Give a 3NF decomposition of R

4- Is your decomposition BCNF? If not give a BCNF decomposition.

Question 2:

Given a relation schema R(A,B,C,D,E, F) with F={A→BC, B→C, C→BD, BD→E, E→D}

1- Give two different minimal covers of F

2- Determine all keys of R

3- Determine C^+ and $(CE)^+$

4- Why R is not in 2NF?

5- Give a 2NF decomposition of R

6- Give a 3NF decomposition of R

7- Is your decomposition BCNF? If not give a BCNF decomposition.

Question 3:

Given the following relation schemas and the sets of FD's:

a- R(A,B,C,D) F={AB→C,C→D, D→A, BC→C}

b- R(A,B,C,D) F={B→C, B→D, AD→B}

c- R(A,B,C,D) F={AB→C, DC→D, CD→A, AD→B}

d- R(A,B,C,D) F={AB→C, C→D, D→B, D→E}

e- R(A, B, C, D, E) F = {AB→C, DB→E, AE→B, CD→A, EC→D}

In each case,

(i)   Give all candidate keys

(ii)   Indicate the BCNF violation

(iii)   Give the minimal cover and decompose R into a collection of relations that are BCNF. Is it lossless? Does it preserve the dependencies?

(iv)   Indicate the 3NF, and decompose R into a 3 NF decomposition