Q5a

AB->AB {A,B}

AB->CE {A,B,C,E}

BE->CF {A,B,C,E,F}

AC->DE {A,B,C,D,E,F}

Therefore, the attribute closure of AB is {A,B,C,D,E,F}

Q5b

AB, AC, BE, BF

Q5c

F = {AB->CE, ACD->B, BE->CF, AC->DE, BF->A}

STEP1 let RHS single

{AB->C, AB->E, ACD->B, BE->C, BE->F, AC->D, AC->E, BF->A}

Step2 remove AB->C since redundant FD

{AB->E, ACD->B, BE->C, BE->F, AC->D, AC->E, BF->A }

Step2 remove AC->E since redundant FD

{AB->E, ACD->B, BE->C, BE->F, AC->D, BF->A }

Step3 change ACD->B into AC->B since redundant attributes in ACD

{AB->E, AC->B, BE->C, BE->F, AC->D, BF->A }

Q5d

It is not preserved with such decomposition. Notice that with dependencies BE->F, B is in R1, and FE are in R3, thus it is interrelational, therefore by definition, such decomposition is not dependency preserving.

Q5e

Key: {A,C,D} or {C, D, E}

(A, B, C, D, E)

A->B BCNF violation

(A, C, D, E) (A, B)

DE->A BCNF violation BCNF .

(C, D, E) (D, E, A) .

BCNF .