1.

(a)

R = (BookISBN(A), Title(B), price(C), QuantityOnHand(D), OrderNumber(E), OrderDate(F), SupplierCode(G), SupplierName(H), SupplierAddress(I), QuantityOrdered(J))

F = (

BookISBN(A) → Title(B), Price(C), QuantityOnHand(D)

OrderNumber(E) → OrderDate(F), SupplierCode(G)

SupplierCode(G) → SupplierName(H), SupplierAddress(I)

BookISBN(A), OrderNumber(E) → QuantityOrdered(J)

)

Key = (BookISBN(A), OrderNumber(E))

R(A, B, C, D, E, F, G, H, I, J)

A->B R1(A, C, D, E, F, G, H, I, J)

R22(A,B)

A->C R11(A, D, E, F, G, H, I, J)

R23(A, C)

A->D R111(A, E, F, G, H, I, J)

R24(A,D)

G->H R1111(A, E, F, G, I, J)

R31(G,H)

G->I R11111(A, E, F, G, J)

R32(G,I)

E->F R111111(A, E, G, J)

R41(E, F)

E->G R111111(A, E, G, J)

R42(E, G)

AE->J R1111111(A, E, J)

R51(A, E, J)

R1 = (A, B, C, D)

R2 = (E, F, G, H , I)

R3 = (A, E, J)

(b)

	A	B	C	D	E	F	G	H	I	J
R1(A,B,C,D)	a1	a2	a3	a4	U15	U16	U17	U18	U19	a10
R2(E,F,G,H,I)	U21	U22	U23	U24	a5	a6	a7	a8	a9	a10
R3(A, E,J)	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10

The decomposition is lossless. It is ugly.

2.(a)

After simplify

A->B

B->D

B->C

E->F

Group FDs with same determinant:

A->B

B->C, D

E->F

Construct a relation for each group:

R1(A, B)

R2(B, C, D)

R3(E, F)

Add relation with the key

R4(A, E)

(b)

	A	B	C	D	E	F
R1(A,B)	a1	a2	a3	a4	U15	U16
R2(B,C,D)	a1	a2	a3	a4	U25	U26
R3(E,F)	U31	U32	U33	U34	a5	a6
R4(A,E)	a1	a2	a3	a4	a5	a6

The decomposition is lossless.