Part 2:
Question 1:
a)
All of the FDs violate BCNF: LPR → Q, LR → ST, M → LO, MR → N

LPR^+ = LPQRST, LPR is not a superkey
LR^+ = LRST, LR is not a superkey
M^+ = LMO, M is not a superkey
MR^+ = LMNORST, MR is not a superkey

b)
R1 = LMNOPQRST
Decompose R1 using LPR → Q. LPR^+ = LPQRST. R2 = LPQRST. R3 = LPRMNO.

Project FDs onto R2 = LPQRST, LR → ST violates BCNF because LR^+ = LRST.
Decompose R2 using LR → ST. LR^+ = LRST. R4 = LRST. R5= LRPQ.

Project FDs onto R3 = LPRMNO, M → LO violates BCNF because M^+ = MLO.
Decompose R3 using M → LO. M^+ = MLO. R6 = MLO. R7 = MNPR.

Project FDs onto R4, R5, R6 doesn't violates BCNF.
Project FDs onto R7 = MNPR, MR → N violates BCNF because MR+ = MRN.
Decompose R7 using MR → N. MR^+ = MRN. R8 = MRN. R9 = MRP.

Project FDs onto, R4, R5, R6, R8, R9
Final relations are
R4 = LRST with FD: LR → ST,
R5 = LPQR with FD: LPR → Q,
R6 = LMO with FD: M → LO,
R8 = MNR with FD: MR → N,
R9 = MPR with FD: None.

Question 2:
a)
Split the right hand side of FDs
S1:
1. A B → C
2. A B → D
3. A C D E → B
4. A C D E → F
5. B → A
6. B → C

7. B → D
8. C D → A
9. C D → F
10. C D E → F
11. C D E → G
12. E B → D

Remove Attributes from FDs' LHS with |LHS| >= 2
S2:
1. B → C
2. B → D
3. C D E → B
4. C D → F
5. B → A
6. B → C
7. B → D
8. C D → A
9. C D → F
10. C D → F
11. C D E → G
12. B → D

Remove duplicate FDs:
S3:
1. B → C
2. B → D
3. C D E → B
4. C D → F
5. B → A
6. C D → A
7. C D E → G

FD	Exclude these from S2	Closure	Decision
1	1	Cannot get to c without this FD	keep
2	2	Cannot get to b without this FD	keep
3	3	Cannot get to b without this FD	keep
4	4	Cannot get to f without this FD	keep
5	5	b+ = bcdaf	discard

6	5, 6	Cannot get to a without this FD	keep
7	5, 7	Cannot get to g without this FD	keep

Minimum Basis:
B → C
B → D
C D → A
C D → F
C D E → G
C D E → B

b)
No FDs imply {E, H}, so {E, H} must be in key
{A, F, G} implied nothing and is implied by something, so they should not be in key
EHB+ = ABCDEFGH ← key(superset of EHB can not be key)
EHC+ = CEH
EHD+ = CDE
EHCD+ = ABCDEFGH ← key

All candidate key: (E, H, C, D) (E, H, B)

c)
Merge Right Hand Side:
B → C D
C D → A F
C D E→ B G

We can get new relations:
R1(B, C, D)
R2(A, C, D, F)
R3(B, C, D, E, G)

R1 is in R3 so remove R1:
R2(A, C, D, F)
R3(B, C, D, E, G)

ACDF+ = ACDF
BCDEG+ = ABCDEFG
No relation is a superkey for R(A, B, C, D, E, F, G, H).
Add a relation R4(B, E, H) and the final set is:
R2(A, C, D, F)

R3(B, C, D, E, G)
R4(B, E, H)

d)
This schema does not allow redundency. Even though 3NF does not guarantee no redundency, by projecting the FDs onto R2, R3, R4, we can see that none of the projected FDs violates BCNF, so there is no redundency