Q(1) $R(A, B, C, D, E, G, H)$

$F = \{AB \to CD,\ E \to D,\ ABC \to DE,\ E \to AB,\ D \to AG,\ ACD \to BE\}$

$\therefore F' = \{AB \to C,\ E \to D,\ ABC \to D,\ E \to A,\ D \to A,\ ACD \to B,$
$AB \to D,\ ABC \to E,\ E \to B,\ D \to G,\ ACD \to E\}$

$\because E \to AB \to C$ & $E \to D \to G$.

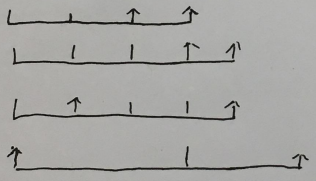
$\therefore E^+ = \{A, B, C, D, E, G\}$.

~~$\{E, H\}^+ = \{A, B, C, D, E, G, H\}$.~~ $\{E, H\}^+ = \{A, B, C, D, E, G, H\}$.

$\therefore \{E, H\}$ are ~~candidate~~ key

Q2: A B C D E G H.

FD}



$AB \to D$, $ABC \to D$

$\therefore$ ~~$D \to AG$, $ACD \to BE$~~ makes non-prime attribute in R.

partially dependent ~~on {D}~~ on $\{A, B, C\}$

$\therefore R \notin 2NF$ & $\because$ attribes in R are all ~~individual~~ indivisible value

$\therefore R$ is 1NF

Q3: A B C D E G H

R_1 a_1 a_1 a_1 a_1 b_1 b_1 b_1

R_2 b_2 b_2 b_2 a_2 a_2 a_2 a_2.

⇓ FD { D → AG }

a_1 a_1 a_1 a_1 b_1 b_1 $\underline{a_2}$

$\underline{a_1}$ b_2 b_2 a_2 b_2 a_2 a_2

∴ others FD would not make any difference

∴ {~~AB, E, D~~ ABCD, DEGH} is not lossless-join

Q4: base on the algorithm To-BCNF

∵ AB → D (make R is not BCNF)

R_1 (ABD) R_2 (ABCEGH)

∵ E → AB make R is not BCNF

R_{21} (EAB) R_{22} (ECGH)

∴ decompose R into R_1 (ABD) R_2 (EAB) R_3 (ECGH) which is BCNF.