16.93 2.500g KCl AND NaH_2CO_3 mixed in UNKNOWN ratios.

- ACID is added to the solid 2.500g mixture. The acid will react with the HCO_3^-.
  - We said acids react with carbonates to make CO_2.
  - The acid will not react with K^+ or Cl^-.

spectators (aq) before and after; conjugates of strong acids & bases,

(A) The molecular reaction $H_2SO_4 + 2NaHCO_3 \rightarrow Na_2SO_4 + 2CO_2(g) + 2H_2O(l)$

(aq) (aq) (aq)

net ionic $H^+ + HCO_3^- \rightarrow CO_2 + H_2O$

(B) The H_2SO_4 added is 25.00mL of .437M H_2SO_4
- This is more acid than needed (excess).
- We add excess because we do not know how much carbonat is in the 2.500g mixture.

Total moles of H^+ added

moles = M·V = .437M x .025L H_2SO_4 (this was given)

= .010925 moles H_2SO_4

H_2SO_4 has 2:1 mole ratio of H^+

$.010925 \text{ mol } H_2SO_4 \times \frac{2 \text{ mol } H^+}{1 \text{ mol } H_2SO_4} =$ **.02185 moles H^+**

* We add NaOH to mixture to find out how much extra acid was added. Using an indicator the NaOH is added until it is basic. The amount of NaOH reacted with H^+ subtracted from the total amount of H^+ moles will give us H^+ reacted with carbonate.

Moles NaOH = M V = .0354L x 0.108M NaOH = **.003823 moles NaOH**

the key uses the wrong volume

This is equal to excess moles of acid!

Total H^+ − Moles OH^- (used to react) = excess = Moles H^+ reacted with HCO_3^-

.02185 − .003823 = **.01803 moles H^+ react with HCO_3^-**

from Net Ionic 1:1 ratio ∴ = moles HCO_3^-

$NaHCO_3 \longrightarrow Na^+ + HCO_3^-$

X? .0180 moles

1:1 ratio. $\therefore$ $NaHCO_3$ = .0180 moles.

(c) Take moles of $NaHCO_3$ → g, then divide by initial total.

$$.01803 \text{ mol} \times \frac{84.01 \text{ g } NaHCO_3}{1 \text{ mol } NaHCO_3} = 1.514 \text{ g } NaHCO_3$$

$$\frac{\text{mass of } NaHCO_3}{\text{Total Mass}} \times 100\% = \text{percent } NaHCO_3$$

$$\frac{1.514 \text{ g}}{2.500 \text{ g}} \times 100 = 60.6\% \ NaHCO_3$$

$$100\% - 60.6\% = 39.4\% \ KCl$$