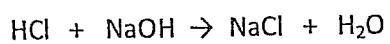
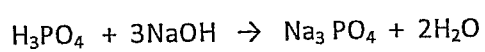


1. 20 ml of 0.4M hydrochloric acid was needed to neutralise 40 ml of NaOH. How many grams of NaOH were added to the 40 ml of NaOH to make this solution?



2. 35 ml of 0.25M phosphoric acid was used to neutralise 15 ml of NaOH.



- a. What is the concentration of the NaOH?
- b. How many grams of water were produced?

40

OH

|

H

guc

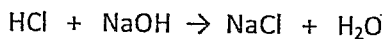
>

0

20

|

1. 20 ml of 0.4M hydrochloric acid was needed to neutralise 40 ml of NaOH. How many grams of NaOH were added to the 40 ml of NaOH to make this solution?



$$M_a V_a = M_b V_b$$

$$M_b = \frac{M_a V_a}{V_b}$$

$$= \frac{0.4 \times 20}{40}$$

$$= 0.2 \text{ M}$$

$$M = \frac{n}{L}$$

$$n = M \times L$$

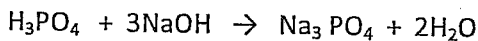
$$= 0.2 \times 0.04$$

$$= 0.008 \text{ moles NaOH}$$

$$n = \frac{\text{mass}}{\text{molar mass}}$$

$$\text{mass} = \text{moles} \times \text{molar mass}$$

2. 35 ml of 0.25M phosphoric acid was used to neutralise 15 ml of NaOH. = 0.008 x 40



$$= 0.32 \text{ g NaOH}$$

- a. What is the concentration of the NaOH?

Triprotic acid.

$$3M_a V_a = M_b V_b$$

$$M_b = \frac{3M_a V_a}{V_b} = \frac{3 \times 0.25 \times 35}{15} = 1.75 \text{ M NaOH}$$

- b. How many grams of water were produced?

Phosphoric acid

$$M = \frac{n}{L}$$

$$n = M \times L$$

$$= 0.25 \times 0.035$$

$$= 0.00875 \text{ moles H}_3\text{PO}_4$$

Mole ratio according to equation

$$\textcircled{1} : 3 : 1 : \textcircled{2}$$

$$1 : 2$$

$$0.00875 : 0.0175$$

$$0.0175 \text{ moles of H}_2\text{O produced}$$

$$\text{moles} = \frac{\text{mass}}{\text{molar mass}}$$

$$\text{mass} = \text{moles} \times \text{molar mass}$$

$$= 0.0175 \times 18$$

$$= 0.315 \text{ g H}_2\text{O}$$