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# pH of MIXTURES of STRONG ACIDS & STRONG BASES

Calculate moles  $\text{H}^+$



Calculate moles  $\text{OH}^-$



Calculate moles excess  $\text{H}^+$  or  $\text{OH}^-$

Excess  $\text{H}^+$



Calculate excess  $[\text{H}^+]$



Calculate pH

Excess  $\text{OH}^-$



Calculate excess  $[\text{OH}^-]$



$$\text{pH} = -\log [\text{H}^+]$$

$$[\text{H}^+] = 10^{-\text{pH}}$$

$$K_w = [\text{H}^+] [\text{OH}^-]$$

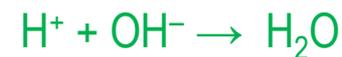
always give pH to 2dp

Calculate the pH of the solution formed when 50 cm<sup>3</sup> of 0.100 mol dm<sup>-3</sup> H<sub>2</sub>SO<sub>4</sub> is added to 25 cm<sup>3</sup> of 0.150 mol dm<sup>-3</sup> NaOH

$$\text{moles H}^+ = 2 \times 0.100 \times \frac{50}{1000} = 0.0100$$

$$\text{moles OH}^- = 0.150 \times \frac{25}{1000} = 0.00375$$

$$\text{XS moles H}^+ = 0.0100 - 0.00375 = 0.00625$$



$$\text{excess } [\text{H}^+] = \frac{0.00625}{\frac{75}{1000}} = 0.0833$$

$$\text{pH} = -\log [\text{H}^+] = -\log 0.0833 = 1.08$$

$$\text{pH} = -\log [\text{H}^+]$$

$$[\text{H}^+] = 10^{-\text{pH}}$$

$$K_w = [\text{H}^+] [\text{OH}^-]$$

always give pH to 2dp

Calculate the pH of the solution formed when 25 cm<sup>3</sup> of 0.250 mol dm<sup>-3</sup> H<sub>2</sub>SO<sub>4</sub> is added to 100 cm<sup>3</sup> of 0.200 mol dm<sup>-3</sup> NaOH.

$$\text{moles H}^+ = 2 \times 0.250 \times \frac{25}{1000} = 0.0125$$

$$\text{moles OH}^- = 0.200 \times \frac{100}{1000} = 0.0200$$

$$\text{XS moles OH}^- = 0.0200 - 0.0125 = 0.0075$$



$$\text{excess } [\text{OH}^-] = \frac{0.0075}{\frac{125}{1000}} = 0.0600$$

$$[\text{H}^+] = \frac{K_w}{[\text{OH}^-]} = \frac{1 \times 10^{-14}}{0.0600} = 1.67 \times 10^{-13}$$

$$\text{pH} = -\log [\text{H}^+] = -\log 1.67 \times 10^{-13} = \mathbf{12.78}$$