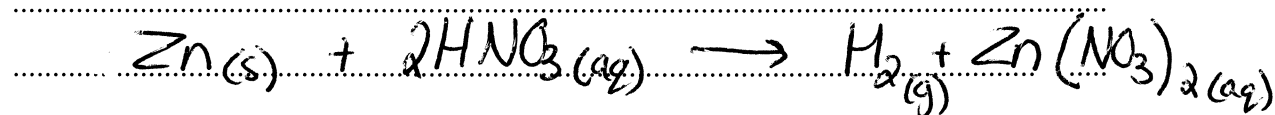


Question 26 (4 marks)

A gas is produced when 10.0 g of zinc is placed in 0.50 L of 0.20 mol L⁻¹ nitric acid. 4

Calculate the volume of gas produced at 25°C and 100 kPa. Include a balanced chemical equation in your answer.



$$\begin{aligned} n(\text{Zn}) &= 10.0 \div 65.41 \\ &= 0.1528818224 \text{ moles} \end{aligned}$$

~~$$\begin{aligned} n(\text{H}^+) &= 0.1528818224 \times (2 \times 1000) \text{ moles} (\times 24.79) \\ &= 0.3057636448 \\ &= 3.789940376 \end{aligned}$$~~

$$\begin{aligned} n(\text{HNO}_3) &= 0.20 \div 2 \\ &= 0.1 \text{ moles} (\times 2 (2\text{HNO}_3)) \\ &= 0.2 \text{ moles} \end{aligned}$$

~~$$n(\text{H}_2) =$$~~

$$n(\text{HNO}_3 \text{ used}) = 0.3057636448$$

$$\begin{aligned} \therefore n(\text{H}_2) &= 0.3057636448 \div 2 \\ &= 0.1528818224 \times 24.79 \\ &= 3.789940376 \\ &= 3.79 \text{ L (3 sig fig)} \end{aligned}$$