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.

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

\[ \text{Nitric acid: } \text{H}_2\text{NO}_3 \rightarrow \text{H}_2\text{O} + \text{NO}_2 \]

\[ \text{Zn} + \text{H}_2\text{NO}_3 \rightarrow \]

\[ n = 0.2 \times 0.5 \]

\[ = 0.1 \text{ mol} \]

\[ \text{Volume} = nRT / PV \]

\[ = 0.1 \times 82.06 \times 298 / (0.1 \times 100) \]

\[ = 24.6 \text{ L} \]