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.

$2Zn_{(s)} + 2HNO_{3(l)} \rightarrow 2ZnNO_{3(aq)} + H_{2(g)}$

moles of zinc $= \frac{10}{65.41} \approx 0.153$ mol L^{-1}

Since $2Zn_{needed}$ $0.153 \times 2 \approx 0.306$ mol L^{-1}

conc zinc $= \frac{\text{moles}}{\text{volume}} = \frac{0.306}{24.79} = 0.0123$

$0.0123 \times \frac{0.50 \times 0.20}{24.79} = 0.0036$ L