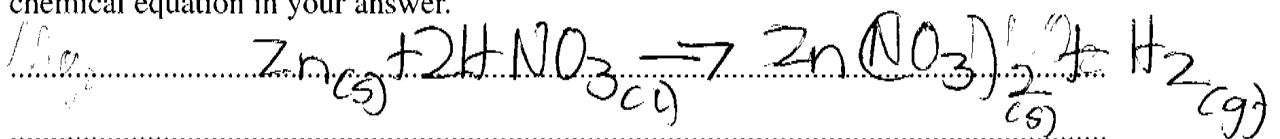## Question 26 (4 marks)

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.

$$Zn_{(s)} + 2HNO_{3(l)} \rightarrow Zn(NO_3)_{2(s)} + H_{2(g)}$$

$$\frac{10}{65.41} = 0.1524 \text{ moles} \qquad n = CV$$
$$= 0.5 \times 0.2$$
$$= 0.1 \text{ moles}$$

∴ This the zinc that is in excess.

$$\frac{0.1}{2} = 0.05 \text{ moles}$$

$$0.05 \times 24.47999$$

$$= 1.24 \text{ L} \quad (3 \text{ sig fig})$$

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