Oxford Cambridge and RSA

GCSE Chemistry A (Gateway Science)

J248/02 C4-C6 and C7 Foundation (Foundation Tier)

Question Set 14

1 A student added 2.4 g of magnesium to hydrochloric acid. She observed that no magnesium was left when the reaction was complete.

The student transferred the solution to an evaporating basin. She heated the solution using a
Bunsen burner and evaporated all the water.

(a) Explain how you can tell from the student's observation that the hydrochloric acid was in excess.

No magnesium was left meaning not all hydrochloric acid has reacted **[1]**

(b) Look at the equation for the reaction.

$$Mg + 2HCl \rightarrow MgCl_2 + H_2$$

The student knows the reaction is complete when there is no magnesium left.

Use the equation to explain one **other** way the student could tell that the reaction was complete.

When no more hydrogen gas is produced, reaction is complete. **[1]**

(c) The student predicts she should make 9.5 g of magnesium chloride, $MgCl_2$.

She actually makes 7.9 g.

Calculate the **percentage yield**.

Give your answer to **3** significant figures.

$$\% \text{ yield} = \frac{\text{actual yield}}{\text{theoretical yield}} \times 100$$

$$= \frac{7.9}{9.5} \times 100$$

$$= 83.157...$$

Answer = 83.2% **[3]**

(d) Write down one reason, other than a mistake, why the student may have obtained a percentage yield of less than 100%.

Loss of reactants / product while transferring from one vessel to another **[1]**

Total Marks for Question Set 14: 6