Oxford Cambridge and RSA

GCSE Chemistry A (Gateway Science)

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

Question Set 8

1 Iron rusts when it gets wet.

(a) The word equation for rusting is

iron + water + oxygen → rust (hydrated iron(III) oxide)

Balance the symbol equation for the formation of rust.

$4Fe(s) + 6H_2O(l) + \frac{3}{2}O_2(g) \rightarrow 2Fe_2O_3 \cdot 3H_2O(s)$

[2]

(b) (i) Calculate the percentage by mass of iron in rust.

Give your answer to **2** decimal places.

Relative formula mass of rust = 213.6

$Fe = 55.8 \times 2 = 27.9$

$\frac{27.9}{213.6} \times 100$ Answer = 13.06 %

$= 13.06$

[2]

(ii) A 1.0 kg iron bar is left outside in the rain to rust.

A student predicts that the mass of the bar will increase by no more than 0.8 kg if it completely turns to rust.

Calculate the mass of rust produced, if the 1.0 kg iron bar completely turns to rust, to see if the student is correct.

Give your answer to the nearest gram

	Fe	rust
1000g =	1kg	1913.98g
	55.8	213.6
	17.9	8.96
	2	1

1913.98 − 1000 = 913.98g ↑

Answer = 914 g

Is the student's prediction correct and why?

No, because more would be produced than 0.8kg (914g > 800g).

[3]

Total Marks for Question Set 8: 7