Do not write outside the box

0 6 This question is about oxygen (O_2) and sulfur dioxide (SO_2).

0 6 . 1 Give the test and result for oxygen gas.

[2 marks]

Test _____

Result _____

0 6 . 2 The reaction between oxygen and sulfur dioxide is at equilibrium.

$$O_2(g) + 2\,SO_2(g) \rightleftharpoons 2\,SO_3(g)$$

Some of the sulfur trioxide (SO_3) is removed.

Explain what happens to the position of the equilibrium.

[2 marks]

_____

_____

_____

_____

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0 6 . 3 Sulfur dioxide is an atmospheric pollutant.

Sulfur dioxide pollution is reduced by reacting calcium oxide with sulfur dioxide to produce calcium sulfite.

$$CaO + SO_2 \rightarrow CaSO_3$$

7.00 g of calcium oxide reacts with an excess of sulfur dioxide.

Relative atomic masses (A_r): O = 16 S = 32 Ca = 40

Calculate the mass of calcium sulfite produced.

[4 marks]

Mass of calcium sulfite produced = _____ g

8

Turn over for the next question

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	glowing splint relights		1 1	AO1 5.8.2.2
06.2	equilibrium shifts to right-hand side (because) concentration of SO_3 decreases	allow towards the products allow in favour of the forward reaction this marking point is dependent on first marking point being awarded allow pressure decreases allow to increase the concentration of SO_3 allow to re-establish equilibrium	1 1	AO3 AO2 5.6.2.5 5.6.2.7
06.3	(M_r CaO =) 56 (M_r $CaSO_3$ =) 120 $\frac{7}{56} \times 120$ = 15(.0 g)	an answer of 15(.0 g) scores **4** marks in all approaches allow a correct calculation using an incorrectly calculated M_r **alternative approach A** (M_r CaO =) 56 (1) $\frac{7}{56}$ = 0.125 (moles) (1) (mass $CaSO_3$ =) 0.125 × 120 (1) = 15(.0 g) (1)	1 1 1 1	AO2 5.3.1.2 5.3.2.1 5.3.2.2

		alternative approach B (M_r CaO =) 56 (1) $\frac{56}{7}$ = 8 (factor) (1) (M_r $CaSO_3$ =) 120 (1) $\frac{120}{8}$ = 15(.0 g) (1) **alternative approach C** (M_r CaO =) 56 (1) (M_r $CaSO_3$ =) 120 (1) $\frac{120}{56}$ = 2.14235714 (factor) (1) 2.14235714 × 7 = 15(.0 g) (1)		

Total			**8**