

ACTIVITY 3a – AO2 in Exams

Paper 2C, Q2(b)

(b) Chlorine has two isotopes of mass numbers 35 and 37

The relative percentage of each isotope in a sample of chlorine is

chlorine-35 77.78% chlorine-37 22.22%

Calculate the relative atomic mass of this sample of chlorine.

Give your answer to one decimal place.

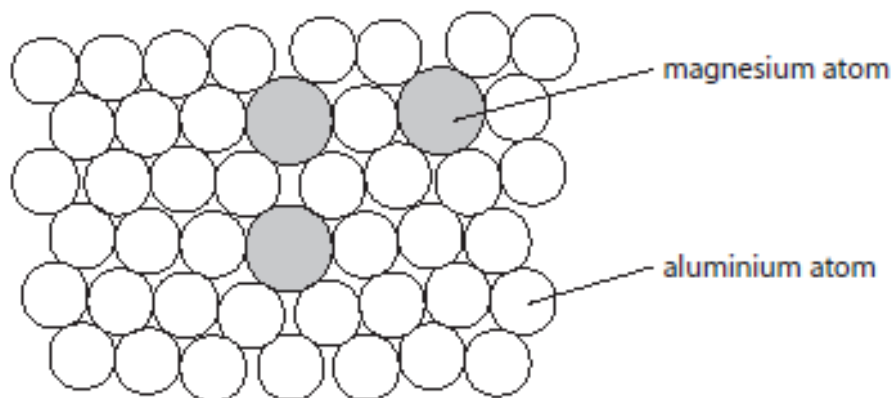
(3)

(b)	M1 $(35 \times 77.78) + (37 \times 22.22)$ OR 3544.44 M2 $3544.44 \div 100$ OR 35.4444 OR M1 $\div 100$ M3 35.4	$(35 \times 0.7778) + (37 \times 0.2222)$ OR 35.4444/35.444/35.44 with no working scores 2 35.4 with no working scores 3 M3 can be ECF from an incorrect M2	3
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Paper 2C, Q4(c)(ii)

(c) Magnalium is an alloy of aluminium and magnesium.

The diagram shows how the atoms are arranged in this alloy.



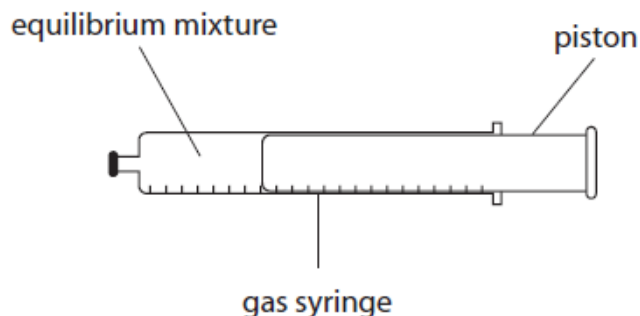
(ii) Explain why magnalium is harder than aluminium.

(3)

Question number	Answer	Additional guidance	Marks
4 (c) (ii)	<p>An explanation that links together the following three points:</p> <p>M1 the regular arrangement of atoms is distorted/disrupted OWTTE</p> <p>M2 because magnesium atoms are larger than aluminium atoms</p> <p>M3 and therefore it is more difficult for the layers to slide over one another</p>	<p>ALLOW lattice/layers/rows of atoms are disrupted/distorted</p> <p>ALLOW lattice/layers/rows of atoms less regular</p> <p>ALLOW magnesium and aluminium atoms are of different sizes</p> <p>ALLOW layers cannot (as easily) slide over one another</p> <p>IGNORE references to strength of metallic bonds</p>	3

Paper 2C, Q7(b)(i)

- (b) Some N_2O_4 and some NO_2 are put into a sealed gas syringe and allowed to form an equilibrium mixture.



This equilibrium mixture is brown.

- (i) The pressure of the gas in the syringe is increased by pushing in the piston. The mixture is then allowed to reach a new equilibrium at the same temperature as before.

Explain why the new equilibrium mixture contains less NO_2 than the original equilibrium mixture.

(2)

(b) (i)	<p>An explanation that links together the following two points:</p> <p>M1 (the position of) equilibrium has moved to the left</p>	<p>ALLOW (position of) equilibrium has shifted in backwards direction</p> <p>ALLOW (position of) equilibrium has shifted towards the N_2O_4 /reactants (side)</p> <p>ALLOW increasing pressure shifts (position of) equilibrium in direction that produces fewer moles (of gas)</p> <p>IGNORE references to Le Chatelier's Principle eg increasing pressure favours the side that has fewer moles of gas / increasing pressure favours the backwards reaction</p>	2
	<p>M2 because there are fewer moles/molecules (of gas) on the left</p>	<p>ALLOW particles REJECT atoms</p> <p>ALLOW because there are fewer moles of N_2O_4 (than NO_2) ALLOW because there are fewer moles of reactant (than product)</p> <p>ACCEPT reverse argument</p>	

Paper 2C, Q8(b)

- (b) (i) Calculate the amount, in moles, of chlorine gas produced.
Assume one mole of chlorine gas occupies $24\,000\text{ cm}^3$.

(2)

amount of chlorine = mol

- (ii) Determine the amount, in moles, of NaClO in 4.00 cm^3 of bleach.

(1)

amount of NaClO = mol

- (iii) Calculate the concentration, in mol/dm^3 , of the bleach solution.

(2)

concentration = mol/dm^3

(b) (i)	M1 $60 \div 24\,000$ M2 0.0025 (mol)	0.0025 with no working scores 2 marks REJECT 0.003 for M2	2
(ii)	0.0025 OR answer to M2 from (i)		1
(iii)	M1 $(0.0025 \div 4.00) \times 1000$ M2 $0.625\text{ (mol/dm}^3\text{)}$	Mark CSQ on (b)(ii) ACCEPT any number of sig fig except 1 (unless ECF answer is exactly 1 sig fig correct answer with no working throughout (b) scores 2 marks	2

