- 13 Magnesium carbonate, MgCO₃, decomposes to make magnesium oxide,
 - MgO. Carbon dioxide is a waste product.

 $MgCO_3 \rightarrow MgO + CO_2$

Relative formula mass (M_r): MgO = 40.3 CO₂ = 44.0

What is the atom economy of the reaction?

			<i>M</i> r of desired product	_	
	Use	the equation: atom economy = -	total $M_{\rm r}$ mass of all products \times 100)	
	Α	47.8%			
	В	52.2%			
	С	91.6%			
	D	109.0%			
	You	r answer		ouk	[1]
14	Whi	ch substance is an unsaturated	hydrocarbon?	.CO.C.	
	A C	H4 B	Notesai		
	C2⊦	16 C	om 17 of 50		
	Сз⊦	¹⁶ Breview D	ade /		
	Сз⊦	18			
	You	r answer			[1]
15	Wha	at happens when liquid bromine,	Br2,		
	boil	s? A Covalent bonds break			
	ΒE	lectrostatic forces break C			
	Inte	rmolecular forces break D			
	Ioni	c bonds break			

[1]

Your answer

19 A student investigates the neutralisation reaction between sodium hydroxide solution and dilute hydrochloric acid.

They do a titration experiment.

The diagram shows the apparatus they use.



(d) The neutralisation reaction between sodium hydroxide solution, NaOH, and dilute hydrochloric acid, HC*l*, makes a salt and water.

Write the **balanced symbol** equation for the reaction.

.....[2]

(e) In another neutralisation reaction dilute sulfuric acid, H₂SO₄, reacts with potassium hydroxide solution, KOH.

 $H_2SO4 + 2KOH \rightarrow K_2SO4 + 2H_2O$

Calculate the mass of potassium sulfate, K2SO4, that could be made from 6.54 g of dilute sulfuric acid, H2SO4.

Give your answer to 3 significant figures.

Relative atomic mass (Ar): H = 1.0 K = 39.1 O = 16.0 S = 32.1

Preview from Notesale.co.uk Preview from 16 of 50 Mass of pote Mass of potassium sulfate = g [4]

PLEASE DO NOT WRITON GISPAGE PREVIEW from 20 of 50 page 20 of 50

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Suggest one other change that could be made to the reaction conditions.

.....[1]

Annotation	Meaning
1	alternative and a set able answers for the same marking point
fron	Separates marking non s
DONETVILOW	Answeiswhien are not worthy of credit
IGNORE Pay	Statements which are irrelevant
ALLOW	Answers that can be accepted
()	Words which are not essential to gain credit
_	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

Abbreviations, annotations and conventions used in the detailed Mark Scheme (to include abbreviations and subject-specific conventions).

J248/02



Question		Answer	Marks	AO element	Guidance
20	(a)	Balance Beaker Gas syringe ✓ NoteSale Pipette		2.2	
	(b) ()(Linear scale on y and one points can be plotted, with axis numbered All points plotted correctly scores 2 marks	3	3 x 2.2	IGNORE poor choice of axis scale as it is likely to cause problems with the point plotting as well ALLOW $\pm \frac{1}{2}$ square 3 or 4 points plotted correctly scores 1 mark
	(1	Curve of best fit through all the points	1	1.2	IGNORE downturn after 270 sec, not before ALLOW line to miss an occasional point by a square or so. If 2 squares out, should be a clear reason. DO NOT ALLOW a bit of double line DO NOT ALLOW straight line dot-to-dot except first interval
	(i) 240 (s)	1	2.2	ALLOW ECF
	(i	 Idea that all the (dilute hydrochloric) acid was used up / (dilute hydrochloric) acid was the limiting reactant 	1	2.2	ALLOW the reactants are used up, not 'may be' IGNORE 'Too many marble chips for the acid to dissolve'/ 'The acid stops giving off CO ₂ ' / 'The marble is used up'