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Mark Scheme (Results)
Summer 2010

IGCSE

IGCSE Chemistry (4335) Paper 03
IGCSE Science (Double Award) (4437) Paper 08

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IGCSE CHEMISTRY 4335/03 – SUMMER 2010

Question			Mark	Acceptable answers	Notes	Total
1	a		M1	B		1
			M2	E		1
			M3	A		1
			M4	D		1
			M5	H		1
	b		M1	corrosive / irritant	Accept burns/harms/damages/is dangerous to eyes / causes blindness Ignore dangerous / harmful / burns skin / high pH / affects eyes Reject flammable / acidic	1
	c		M1	20.65	Reject all other answers	1
			M2	1.80	Reject all other answers including 1.8	1
					Award 1 mark for M1 and M2 both correct but wrong way round	
			M3	18.85	**CQ on M1 – M2**	1
	d	i	M1	ticks under 3rd and 4th columns		1
		ii	M1	$\frac{20.35 + 20.45}{2}$	CQ on ticked values If no values ticked, then do not award M1, but M2 can be awarded CQ on values used in M1	1
			M2	20.40 / 20.4	Award M1 and M2 for correct answer with no working Ignore units	1
					If other than 3rd and 4th values ticked, see separate table showing acceptable answers for possible combinations of ticked values 2 dp needed, except for 20.30, for which 20.3 is acceptable	

Question			Mark	Acceptable answers	Notes	Total
2	a		M1	carbon dioxide / CO_2 / gas AND given off /lost / released / formed / produced	Ignore carbonate decomposes / zinc oxide formed / carbon dioxide disappears Accept evaporates in place of given off Reject mention of O_2 , water and other incorrect substances	1
	b	i	M1	4		1
			M2	mass unchanged after 1st/2nd/repeated heating OR mass unchanged after 5/10 minutes OR mass already constant OR zinc carbonate completely decomposed / OWTTE	M2 dependent on M1 Ignore references to the mass being constant after 3rd heating or after 15 minutes	1
		ii	M1	1		1
			M2	mass still changing / not constant OR mass changed when heated three times/after 15 minutes OR zinc carbonate not completely decomposed / OWTTE	M2 dependent on M1	1
	c	i	M1	6.1		1
		ii	M1	4(.0)		1

Question			Mark	Acceptable answers	Notes	Total
3	a		M1	to prevent/reduce heat loss OR polystyrene is an insulator OR glass conducts (heat) <u>better than polystyrene</u>	Accept keeps heat in Accept it in place of polystyrene Ignore stops heat getting in / references to light **Reject reference to constant temperature** **and** **temperature loss / glass cracking or breaking**	**1**
	b		M1	18.8(0)		**1**
			M2	22.2(0)		**1**
					Award 1 mark for M1 and M2 correct but wrong way round	
			M3	3.4	CQ on M2 – M1 Ignore trailing zeroes Reject −3.4	**1**
	c		M1	(more) accurate	Accept precise / exact in place of accurate / more scale divisions Ignore references to taps / stability / capacity	**1**

	d		M1 M2	8 points correctly plotted	Points should be within ½ a small square Deduct 1 mark for each error No penalty if points cannot be seen but lines go through them Point at origin not needed provided line goes through origin or would if extrapolated	**2**
			M3	straight line of best fit through first five points	Line must ignore anomalous point and start from origin	**1**
			M4	straight line of best fit through last three points	Do not award M4 if lines do not cross or if second line bends to meet 5th point	**1**
					Do not award M3 or M4 if not drawn with a ruler	

Question			Mark	Acceptable answers	Notes	Total
3	**e**	**i**	**M1**	correct lines give 29.4-29.5	CQ on candidate graph Answer must be to within 0.1 ºC of where lines cross Answer must be to 1 or more dp Ignore units	**1**
		ii	**M1**	correct lines give 20.5-21(.0)	CQ on candidate graph Answer must be to within 0.25 cm^3 of where lines cross Ignore units	**1**
					3e cannot score if lines do not cross or meet	

Question			Mark	Acceptable answers	Notes	Total
3	**f**	**i**	M1	point at 15 cm^3/24.2 °C circled	Award mark even if wrongly plotted but still anomalous	**1**
		ii	M1	(anomalous) point/temperature is too low/below the line / (anomalous) point/temperature would be higher/above the line	Ignore references to reaction rate	**1**
		iii	M1	(all acid from the) same bottle/burette	Accept same (nitric) acid / same container / other results OK / later results not affected Ignore same (acid) concentration	**1**
		iv	M1	statement that temperature would have decreased / would have stayed the same (if NaOH used) OR statement that temperature did increase	Ignore no reaction / was told to add 5 cm^3 / acid is in the burette	**1**
		v	M1	reaction incomplete / acid would not react (fully) OR stirring would increase the extent of the reaction OR thermometer recorded the temperature of the added acid	Ignore stirring increases temperature and references to rate of reaction	**1**
		vi	M1	correct because the mixture would cool / temperature would decrease / heat would be lost OR incorrect because later temperatures would also be too low	Reject correct because less reaction / slower reaction Reject incorrect because time has no effect	**1**
	g	**i**	M1	45 (cm^3)	Ignore trailing zeroes	**1**
		ii	M1	11.5 (°C)	Ignore trailing zeroes Reject all negative values	**1**
		iii	M1	2200 (J)	Accept 2170 / 2174 / 2173.5 CQ on gi and gii Ignore units	**1**
			M2	2.2 (kJ)	Accept 2.17 / 2.174 / 2.1735 CQ on M1 Ignore units	**1**

Question			Mark	Acceptable answers	Notes	Total
4	**a**		M1 M2	5 bars of correct heights in any order	Heights should be within ½ a small square Deduct 1 mark for each error No penalty for vertical lines or bars of different widths	**2**
			M3	labels identifying all five bars (eg showing name or formula of metal or metal oxide) in any unambiguous position	Ignore numerical scale for *x*-axis	**1**
					If graph drawn instead of bar chart, award M1 for five points at correct heights Award M3 only if points suitably labelled	
	b	**i**	M1	data/M_r not continuous / no intermediate values / only certain M_r values possible		**1**
		ii	M1	% of oxygen decreases as relative formula mass of oxide increases OR % of oxygen increases as relative formula mass of oxide decreases	Accept formula mass, M_r and RAM but not mass in place of relative formula mass Accept negative correlation Ignore inversely proportional Accept statements the other way round: ie relative formula mass of oxide increases as % of oxygen decreases OR relative formula mass of oxide decreases as % of oxygen increases	**1**

Question			Mark	Acceptable answers	Notes	Total
4	c		M1	weigh magnesium / magnesium of known mass	Ignore measure magnesium Ignore apparatus and procedure (eg crucible / tube / syringe / passing air over magnesium Mark independently If reduction or decomposition of MgO described, do not award M2 or M4 (the other marks can be awarded because they are for data collection and processing) Any five for 1 mark each	5
			M2	heat/burn/ignite magnesium / put magnesium in flame		
			M3	weigh magnesium oxide / contents of tube/crucible		
			M4	heat and reweigh to constant mass		
			M5	mass of MgO minus mass of Mg		
			M6	$\frac{\text{(mass of) oxygen}}{\text{(mass of) MgO}} \times 100$		
					$\frac{\text{(mass of) MgO} - \text{(mass of) Mg}}{\text{(mass of) MgO}} \times 100$ scores M5 and M6	

PAPER TOTAL: 50 MARKS

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