

Sample Mark Scheme

Paper 2C

Question number	Answer	Notes	Marks
1 (a)	red	IGNORE qualifiers such as pale / dark NOT 'brick red'	1
(b) (i)	barium chloride / barium nitrate (solution) (dilute) hydrochloric acid / nitric acid white precipitate	ACCEPT correct formulae ACCEPT solid / suspension / ppt(e)	3
(ii)	$\text{BaCl}_2 + \text{Li}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{LiCl}$	ACCEPT correct ionic equation 1 mark for formula of BaSO_4 1 mark for rest of equation	2
Total: 6			6

Question number	Answer	Notes	Marks
2 (a) (i)	ethene / C ₂ H ₄ water / steam / H ₂ O	ACCEPT in either order	2
(ii)	Any two from: 300 °C (+/- 50 °C) 60 - 70 atm phosphoric acid (catalyst)		max 2
(b) (i)	glucose	NOT sugar	1
(ii)	water / H ₂ O		1
(c) (i)	aluminium oxide	ACCEPT porous pot / conc. sulfuric acid / conc. phosphoric acid	1
(ii)	dehydration		1
(iii)	C ₂ H ₅ OH → C ₂ H ₄ + H ₂ O		1
(d)	3 O ₂ AND 2 CO ₂ AND 3H ₂ O	ACCEPT multiples	1
Total: 10			

Question number	Answer	Notes	Marks
3 (a)	A description linking five of the following points: • set up tubes containing iron (nail) in rainwater and iron (nail) in seawater • control tube / tube with iron (nail) and no water • same mass of iron (nail) / same volume of water • leave tubes for same length of time / stated time interval • method to measure rusting e.g. colour change / mass change • repeat experiment / more than one set of tubes set up		max 5
(b)	involves gain / addition of oxygen	ACCEPT involves loss of electrons / increase in oxidation number	1
			Total: 6

Question number	Answer	Notes	Marks
4 (a) (i)	$\text{H}^+ / \text{H}_3\text{O}^+ / \text{Cl}^-$	ACCEPT in either order	2
(ii)	hydrochloric acid		1
(b)	hydrogen chloride in methylbenzene: no reaction / no bubbles / magnesium does nothing hydrogen chloride in water: any two from: bubbles / fizzing / gas produced magnesium ribbon gets smaller / reacts away / disappears test tube becomes warm	NOTE candidates can only score full marks by giving observations for BOTH tubes NOT 'hydrogen produced' NOT 'magnesium dissolves'	max 3
Total: 6			

Question number	Answer	Notes	Marks
5 (a) (i)	monomer = propene / propylene AND polymer = poly(propene) / polypropylene	Both must be correct for 1 mark	1
(ii)	An explanation linking any two from: • not biodegradable • (because) they are inert • (because) they have strong C-C / C-H bonds		max 2
(b)	$\begin{array}{c} \text{H} \quad \text{CN} \\ \quad \\ \text{C}=\text{C} \\ \quad \\ \text{H} \quad \text{COOCH}_3 \end{array}$	IGNORE the geometry of the molecule	1
(c)	Any valid comparison e.g. Addition: only one type of monomer reacts with itself Condensation: two different monomers OR Addition: only one product formed Condensation: forms another product / water / hydrogen chloride	ACCEPT: differences in properties e.g. Addition: inert Condensation: may be hydrolysed / broken down REJECT: comparison of uses	2
		Total: 6	

Question number	Answer	Notes	Marks
6 (a) (i)	neutralisation	ACCEPT exothermic	1
(ii)	$\text{KOH} + \text{HCl} \rightarrow \text{KCl} + \text{H}_2\text{O}$		1
(iii)	orange	ACCEPT red	1
(iv)	28.75 2.20 26.55	NOT 2.2 3 rd mark consequential on other two	3
(b) (i)	ticks under 26.70 and 26.50		1
(ii)	$\frac{26.70 + 26.50}{2}$ = 26.6(0)	consequential on ticked results 2 nd mark consequential on 1 st	2

(c)	Any two from the following: P: initial solution contaminated with indicator I: repeat titration / mix same volumes with no indicator / add charcoal and filter (to remove indicator) P: solution heated for too little / too long a time I: evaporate until crystallisation point / check solution with glass rod P: liquid poured off when crystals start to form I: leave to cool until crystallisation complete P: crystals lost when solution poured off I: filter / centrifuge / decant carefully to obtain crystals P: blotting paper may not dry crystals completely I: place crystals in (warm) oven to dry	In each case, 1 mark for identifying the problem; and 1 mark for a correct suggestion for that problem	max 4
(d) (i)	$\frac{0.200 \times 25.0}{1000}$ $= 0.005(00)$	2 nd mark consequential on 1 st IGNORE units	2
(ii)	0.0025	ACCEPT answer from (d)(i) $\div 2$	1
(iii)	$\frac{0.0025 \times 1000}{28.4}$ $= 0.088(0)$	2 nd mark consequential on 1 st IGNORE units and sig figs ACCEPT correct answer from incorrect (d)(ii)	2
Total: 18			

Question number	Answer	Notes	Marks
7 (a)	all points plotted correctly to nearest gridline straight line through first 5 points	Deduct 1 mark for each error	2 1
(b)	Answer in range 3.8 - 3.9 (g)	Consequential on candidate's line Units not needed, but do not award mark if incorrect units given	1
(c)	all water lost / same amount of water lost	ACCEPT reactions/decompositions complete	1
(d)	5		1
(e)	$24 \times 0.03(0)$ $= 0.72 \text{ (dm}^3\text{)}$	Units not needed, but award max 1 if incorrect units	2
			Total: 8