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IGCSE Chemistry 4335/2H
Mark Scheme (Results)
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IGCSE

IGCSE Chemistry (4335/2H)

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The following acronyms are used

owtte	or words to that effect
ecf	error carried forward
dop	dependent on previous
nwn	no working necessary

Question Number	Correct Answer	Notes	Mark
1 (a) (i)	hydrogen peroxide $\rightarrow$ water + oxygen		**(1)**

Question Number	Correct Answer	Notes	Mark
1 (a) (ii)	catalyst		**(1)**

Question Number	Correct Answer	Notes	Mark
1 (b)	over water / displacement of air with downward delivery / upward displacement of air. *Could be shown on a diagram*.	Accept "through water".	**(1)**

Question Number	Correct Answer	Notes	Mark
1 (c)	relights a glowing splint	Reject "glows more brightly"	**(1)**

Question Number	Correct Answer	Notes	Mark
1 (d) (i)	Red (ignore pale/dark), crimson / scarlet	Reject references to orange / yellow /pink	**(1)**

Question Number	Correct Answer	Notes	Mark
1 (d) (ii)	electron transfer from lithium to oxygen Li atoms each lose one electron and O atom gains two electrons	Covalent / sharing scores zero	**1** **1** **1** **(3)**

Question Number	Correct Answer	Notes	Mark
1 (d) (iii)	Li^+ O^{2-}	Both correct but reversed scores 1	**1** **1** **(2)**

(Total 10 marks)

Question Number	Correct Answer	Notes	Mark
2 (a)	Brown / red brown (reject "light", accept "dark") Grey (reject "light", accept "dark")/ black	Reject red alone or reference to orange Reject purple or violet	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
2 (b) (i)	diffusion		**(1)**

Question Number	Correct Answer	Notes	Mark
2 (b) (ii)	$Br_2(l) \rightarrow Br_2(g)$ *Reactants = 1, products = 1*		**(2)**

Question Number	Correct Answer	Notes	Mark
2 (b) (iii)	moving (faster) further apart owtte		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
2 (c) (i)	bromine + hydrogen $\rightarrow$ hydrogen bromide	Ignore "gas"	**(1)**

Question Number	Correct Answer	Notes	Mark
2 (c) (ii)	**hydrobromic** (acid)		**(1)**

Question Number	Correct Answer	Notes	Mark
2 (d) (i)	melt/molten/fused (lead (II) bromide)	Allow "dissolve in water" not just heat or add water	**(1)**

Question Number	Correct Answer	Notes	Mark
2 (d) (ii)	(A) electrons (B) lead(II) ions / Pb^{2+} (C) bromide ions / Br^-	If ions named in wrong order, award 1 mark for both. If "ions" omitted **twice**, max 1 for B and C. If B and C "positive ions" and "negative ions" - 1 mark.	**1** **1** **1** **(3)**

Question Number	Correct Answer	Notes	Mark
2 (e)	Gain of electrons (by Pb^{2+})		**(1)**

(Total 14 marks)

Question Number	Correct Answer	Notes	Mark
3 (a) (i)	neutralisation	Accept "exothermic"	**(1)**

Question Number	Correct Answer	Notes	Mark
3 (a) (ii)	$KOH + HNO_3 \rightarrow KNO_3 + H_2O$ *Reactants = 1, products = 1*	Correct formulae with incorrect balancing = 1 Ignore state symbols	**(2)**

Question Number	Correct Answer	Notes	Mark
3 (b) (i)	burette		**(1)**

Question Number	Correct Answer	Notes	Mark
3 (b) (ii)	pink / red (reject purple) colourless	Award 1 mark for correct colours in wrong order One colour on its own is zero	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
3 (c)	Same volumes without indicator Heat/warm/boil/leave(in a warm) to evaporate water Cool (not given if not heated) filter off crystals dry between filter paper/ in (warm) oven (not leave to dry) **if no attempt at M2, max 1** **if heat to dryness in M2, max 2** OR Boil titration mixture with charcoal and filter Heat/warm/boil/leave(in a warm) to evaporate water Cool (not given if not heated) filter off crystals dry between filter paper/ in (warm) oven (not leave to dry) **if no attempt at M2, max 1** **if heat to dryness in M2, max 2**		**1** **1** **1** **1** **1** **(5)**

(Total 11 marks)

Question Number	Correct Answer	Notes	Mark
4 (a) (i)	$C_2H_4 + H_2O \rightarrow CH_3CH_2OH$	Accept C_2H_5OH	**(1)**

Question Number	Correct Answer	Notes	Mark
4 (a) (ii)	(concentrated) phosphoric acid	Reject "dilute"	**(1)**

Question Number	Correct Answer	Notes	Mark
4 (b)	sugar / sucrose / glucose yeast **two from** dissolve in water absence of air temperature in range 20 - 40 °C *Any two conditions for 1 mark each*	Additional wrong reagents negate sugar mark Reject "heat" accept "warm"	**1** **1** **2**

Question Number	Correct Answer	Notes	Mark
4 (c) (i)	$CH_3CH_2OH(l) + CH_3COOH(l) \rightarrow CH_3COOCH_2CH_3(l) + H_2O(l)$ Reactants = 1, products = 1, state symbols (dependent on correct formulae) = 1	Accept C_2H_5 in place of CH_2CH_3	**(3)**

Question Number	Correct Answer	Notes	Mark
4 (c) (ii)	pleasant/fruity/glue smell / oily drops	Not just "smell"	**(1)**

(Total 10 marks)

Question Number	Correct Answer	Notes	Mark
5 (a) (i)	number of electrons in outer shell is same as group OR number of shells with electrons in is same as period		**(1)**

Question Number	Correct Answer	Notes	Mark
5 (a) (ii)	2.8.8.2	Accept any punctuation	**(1)**

Question Number	Correct Answer	Notes	Mark
5 (b)	ATOMS with (If atoms omitted, max 1) same atomic number/same number of protons/same element(1) different numbers of neutrons/mass number (1)	Ignore same electrons	**(2)**

Question Number	Correct Answer	Notes	Mark

Number of neutrons	Number of protons	Atomic number of isotope	Mass number of isotope	Percentage isotope in the element
12 (1)	**12(1)**	12	24	79
13	12	12	**25**(1)	**10**(1)
14	12	**12(1)**	26	11

5 (c) (i) **(5)**

Question Number	Correct Answer	Notes	Mark
5 (c) (ii)	Magnesium/Mg		**(1)**

Question Number	Correct Answer	Notes	Mark
5 (c) (iii)	cq on percentages in table. If use only two isotopes max 1. evidence of multiplication of mass numbers by percentages *correct answer* *answer to 3 sig figs.* 24.3 = 3 24.32 = 2	 If divide by 10 or 1000 rather than 100, max 1 First step nonsense = 0	**1** **1** **1** **(3)**

Question Number	Correct Answer	Notes	Mark
5 (c) (iv)	Effervescence/ bubbles/ same/no difference same electronic configuration / same element / same number of electrons / number of neutrons has no effect		**1** **1** **(2)**

(Total 15 marks)

Question Number	Correct Answer	Notes	Mark
6 (a) (i)	electrons able to move/can flow/mobile (dependent on first mark)	Ignore "delocalised"	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
6 (a) (ii)	layers/rows/lines (of ions /atoms) **not electrons** slide/slip / move over each other (dependent on first mark) *do not accept answers based on atoms moving into gaps or electrons acting as ball bearings.*		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
6 (b)	left hand electrode labelled (pure) copper right hand electrode labelled impure copper electrolyte labelled as any soluble copper salt (solution)	Accept cathode Accept anode	**1** **1** **1** **(3)**

Question Number	Correct Answer	Notes	Mark
6 (c) (i)	solution has lower melting point/melting point of aluminium oxide is too high. *allow lowers mp of aluminium oxide.*		 **(1)**

Question Number	Correct Answer	Notes	Mark
6 (c) (ii)	Carbon (accept graphite)		 **(1)**

Question Number	Correct Answer	Notes	Mark
6 (d)	Copper: electrical wires / coins / water pipes / allow pans / Associated property (conductor must be qualified). Aluminium: overhead cables/ specified transport/ pans / cooking foil / drink cans Associated property (conductor must be qualified).	Reject coins	**1** **1** **1** **1** **(4)**

Question Number	Correct Answer	Notes	Mark
6 (e)	**either**: electrolysis (1) more reactive than C/can not be reduced by C/similar reactivity to Al/Al is extracted by electrolysis. (1) **or:** react with a NAMED more reactive metal (1) Ti less reactive than metal used/metal used more reactive than Ti/ metal will displace Ti. (1)		**(2)**

(Total 15 marks)

Question Number	Correct Answer	Notes	Mark
7 (a)	$Fe + 2HCl \rightarrow FeCl_2 + H_2$ reagents = 1 products = 1 balanced = 1 (dependent on first two marks given)		**(3)**

Question Number	Correct Answer	Notes	Mark
7 (b)	exothermic/gives out (heat) energy		**(1)**

Question Number	Correct Answer	Notes	Mark
7 (c)	• make chlorides into solutions/add water • green ppt • brown ppt • correct linking of at least one observation to a cation		**(4)**

(Total 8 marks)

Question Number	Correct Answer	Notes	Mark
8 (a) (i)	contain oxygen/contains an element other than C and H		**(1)**

Question Number	Correct Answer	Notes	Mark
8 (a) (ii)	CH_3 / H_3C		**(1)**

Question Number	Correct Answer	Notes	Mark
8 (a) (iii)	any TWO from • same general formula • members differ by CH_2 • same/similar chemical reactions /same functional group • gradation in physical properties	Accept trend in stated property	**(2)**

Question Number	Correct Answer	Notes	Mark
8 (a) (iv)	6 C-H bond pairs and one C-C bond pair. No other outer electrons Not ethane = 0	Ignore inner electrons	**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
8 (a) (v)	poly(propene)/polypropene/polypropylene		**(1)**

Question Number	Correct Answer	Notes	Mark
8 (a) (vi)	1 correct repeat unit shown with continuation bonds (dependent on correct structure)		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
8 (a) (vii)	E has double bond/unsaturated polymer no double bond/saturated		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
8 (b)	three correct structures from: but-1-ene but-2-ene methylpropene cyclobutane methylcyclopropane	Penalise CH_3 or CH_2 once Penalise sticks once	**(3)**

(Total 14 marks)

Question Number	Correct Answer	Notes	Mark
9 (a) (i)	= 64	Ignore units	**(1)**

Question Number	Correct Answer	Notes	Mark
9 (a) (ii)	2 (cq) (128/a(i))		**(1)**

Question Number	Correct Answer	Notes	Mark
9 (a) (iii)	6 (cq) (a(ii) x 3)		**(1)**

Question Number	Correct Answer	Notes	Mark
9 (a) (iv)	6x12 =72 cq (a(iii) x 12)	Units not required, incorrect units lose mark.	**(1)**

Question Number	Correct Answer	Notes	Mark
9 (b) (i)	$Ca(OH)_2$		**(1)**

Question Number	Correct Answer	Notes	Mark
9 (b) (ii)	water/H_2O carbon dioxide/CO_2		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
9 (c) (i)	correct bonds/numbers identified (2 x 412 + 1 x 837 + 2 x 431) 2523 *correct answer = 2. cq on 1 error in calculation for max 1*		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
9 (c) (ii)	correct bonds/numbers identified (4 x 412 + 1 x 348 + 2 x 338) 2672 *correct answer = 2. cq on 1 error in calculation for max 1*		**1** **1** **(2)**

Question Number	Correct Answer	Notes	Mark
9 (c) (iii)	Cq |(c)(i)| – |(c)(ii)| -149		**(1)**

(Total 12 marks)

Question Number	Correct Answer	Notes	Mark
10 (a)	giant / macromolecular	Reject ionic	**(1)**

Question Number	Correct Answer	Notes	Mark
10 (b)	• break covalent bonds (between atoms) • covalent bonds strong • need lots of energy to overcome/break	If ionic / hydrogen bonds /vdw forces / delocalised electrons / molecules = 0	**(3)**

Question Number	Correct Answer	Notes	Mark
10 (c)	• **weak** forces between layer • slide/slip		**(2)**

Question Number	Correct Answer	Notes	Mark
10 (d) (i)	• weak forces between molecules • little energy to overcome • no (covalent) bonds broken / in diamond (covalent) bonds broken		**(3)**

Question Number	Correct Answer	Notes	Mark

10 (d) (ii)	if yes:
	any two from
	• (molecules) round/balls/football shaped
	• weak forces between molecules
	• roll
	
	if no:
	• (strong) covalent bonds
	• hold atoms in place/need lots of energy to break (dependent on M1)
			(2)

(Total 11 marks)