

# Mark Scheme (Results) November 2010

IGCSE

## IGCSE Science (Double Award) (4437) Paper 2F

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SECTION A

Question		Mark	Acceptable answers	Notes	Total
1	a	M1	2		1
	b	M1	argon / Ar / calcium / Ca		1
	c	M1	oxygen / sulphur / selenium / tellurium / polonium		1
	d	M1	He / Ne / Ar / Kr / Xe / Rn		1
	e	M1	tin / Sn		1
	f	M1	1 / 2	Accept 0	1

Question		Mark	Acceptable answers	Notes	Total
2	a	M1	neutrons		1
	b	M1	nucleus		1
	c	M1	negative		1
	d	M1	protons and neutrons	Accept in either order	1
	e	M1	neutrons		1
	f	M1	identical		1
	g	M1	electrons		

Question			Mark	Acceptable answers	Notes	Total
3	a	i	M1	carbon + oxygen → carbon dioxide		1
		ii	M1	carbon dioxide		1
	b	i	M1	cross in box 3		1
			M2	cross in box 5		1
		ii	M1	painting / galvanising / coating with zinc		1
	c		M1 M2	aircraft bodies / cooking pans / overhead power cables	Uses: Any two for 1 mark each	2
			M3 M4	aircraft bodies → low density cooking pans → good conductor of heat overhead power cables → good conductor of electricity	Properties: Any two for 1 mark each Property must match use	2

Question		Mark	Acceptable answers	Notes	Total	
4	a		M1	cross in box 1		1
	b	i	M1	cross in box A / F		1
		ii	M1	cross in box F		1
		iii	M1	cross in box F		1
		iv	M1	cross in box B		1
	c		M1	car/vehicle (fuel)		1
			M2	kerosene / paraffin		1
			M3	roads / roofs		1
	d	i	M1	oxygen		1
			M2	water / steam		1
		ii	M1	cross in box 3		1

Question			Mark	Acceptable answers	Notes	Total
5	a	i	M1	melting		1
		ii	M1	Z		1
		iii	M1	heat / energy		1
	b		M1	solid / ice		1
	c	i	M1	H <sub>2</sub> O(s)		1
		ii	M1	H <sub>2</sub> O(g)		1
	d	i	M1	aq		1
		ii	M1	evaporation / V	Accept boiling / liquid → gas	1
			M2	condensation / W	Accept gas/vapour → liquid / liquefaction	1
	e	i	M1	sodium		1
		ii	M1	(squeaky) pop / explosion		1
		iii	M1	blue / purple		1

## SECTION B

Question		Mark	Acceptable answers	Notes	Total
6	a	M1	350 - 550 °C	Units required	1
		M2	100 - 300 (atm(ospheres))	Units not required	1
		M3	iron / Fe (catalyst)	Ignore iron oxide Ignore oxidation states	1
	b	M1	condensation / liquefaction / gas → liquid		1
	c	i	M1 $\text{NH}_3 + \text{HNO}_3 \rightarrow \text{NH}_4\text{NO}_3$	Reactants = 1 Products = 1 Award 1 if both reactant and product formulae correct but unbalanced	2
		ii	M1 fertiliser / explosives		1



Question		Mark	Acceptable answers	Notes	Total
7	a	M1	copper less reactive than iron / iron more reactive than copper	Do not accept iron(II) in place of iron or copper(II) in place of copper Accept negative (copper is not more reactive than...) Accept iron is a better oxidising agent than copper / copper ions are a better reducing agent than iron ions.	1
	b	M1	Copper(II) / $\text{Cu}^{2+}$ / $\text{Cu}(\text{H}_2\text{O})_6^{2+}$ / hexa aqua copper(II)		1
	c	M1	copper / Cu		1
	d	M1	iron is formed/ iron displaced by zinc		1
	e	M1	zinc / Zn		1
	f	M1	green precipitate	Ignore qualifiers such as dark/light/sludge Reject all other colours Accept solid / suspension	1
		M2	iron(II) hydroxide / $\text{Fe}(\text{OH})_2$	Accept ferrous hydroxide or formula of complex ion	1

Question			Mark	Acceptable answers	Notes	Total
8	a	i	M1	alkane		1
		ii	M1	$C_nH_{2n+2}$	Accept any other symbol in place of "n" n and 2n+2 must be clearly smaller than C and H.	1
		iii	M1	Similar/same chemical properties/ same functional group	Any two for 1 each	2
			M2	gradation in physical properties (or specified physical property - such as "increase in boiling point")		
			M3	neighbouring members (formulae) differ by $CH_2$		
	c		M1	<pre> H H H       H-C-C-C-H       H H H </pre>	All bonds/atoms must be shown.	1
	d	i	M1	(compounds with) same molecular formula	Reject atoms/elements/ions	1
			M2	(but) different structures/structural formulae/displayed formulae		1
		ii	M1	butane OR (2-)methylpropane		1
			M2	<pre> H H H H         H-C-C-C-C-H         H H H H </pre> OR <pre> H H H       H-C-C-C-H       H   H   H-C-H   H </pre>		1
	e		M1 M2	methane + oxygen → carbon dioxide + water/steam	Reactants = 1 Products = 1	2
					If air given in place of oxygen, products mark can still be awarded Award M1 and M2 independently	

Question			Mark	Acceptable answers	Notes	Total
9	a	i	M1	electron transfer		1
			M2	from magnesium to fluorine		1
			M3	magnesium loses 2 electrons and (each) fluorine gains 1 electron		1
					Ignore covalent Electron sharing = 0	
		ii	M1	$\text{Mg}^{2+}$	Accept answers in either order	1
			M2	$\text{F}^-$		1

PAPER TOTAL: 75 MARKS

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