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IGCSE Chemistry 4437 / 5H
Mark Scheme (Final)
November 2007

IGCSE

IGCSE Chemistry (4437/5H)

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Question Number	Question		
1	**(a)**		
	Acceptable Answers	Reject	Mark
	(i) C / F **(ii)** A **and** B **(iii)** E **Notes**		**(1)** **(1)** **(1)**

Question Number	Question		
1	**(b)**		
	Acceptable Answers	Reject	Mark
	Poly(()ethene()). Accept polythene/Polyethylene correct repeat unit H | —C— | H Or any multiple length (2 + carbons) continuation bonds ___ ____ or ….. ….. (only if first mark awarded) **Notes** Ignore 'brackets' and 'n' or other subscripts		**(1)** **(1)** **(1)**

Total 6 marks

Question Number	Question		
2	**(a)**		
	Acceptable Answers	Reject	Mark
	<table><tr><th>Particle</th><th>Relative mass</th><th>Relative charge</th></tr><tr><td>Electron</td><td>$\frac{1}{1840}$ $\frac{1}{2000}$ $\frac{1}{1850}$ $\frac{1}{1836}$</td><td>-1</td></tr><tr><td>Neutron</td><td></td><td>0 / nil</td></tr><tr><td>Proton</td><td>1</td><td></td></tr></table> **Notes** Ignore negligible	0 for mass	**(4)**

Question Number	Question		
2	**(b)**		
	Acceptable Answers	Reject	Mark
	(i) helium /carbon / nitrogen / oxygen / neon / magnesium / silicon / sulphur / calcium (ii) silicon (iii) hydrogen **Notes** Max penalty 1 if give symbols for all 3 rather than names		**(1)** **(1)** **(1)**

Question Number	Question		
2	**(c)**		
	Acceptable Answers	Reject	Mark
	7 **Notes**		**(1)**

Question Number	Question		
2	**(d)**		
	Acceptable Answers	Reject	Mark
	(i) full / complete ignore saturated (ii) unreactive/inert/do not undergo reactions **Notes**		**(1)** **(1)**

Total 10 marks

Question Number	Question		
3	**(a)**		
	Acceptable Answers	Reject	Mark
	zinc is less reactive than magnesium Magnesium is more reactive than Zinc **Notes** Or correct reference to positions in reactivity series	It is more reactive	**(1)**

Question Number	Question		
3	**(b)**		
	Acceptable Answers	Reject	Mark
	(i) $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ reagents products **Notes** incorrect balancing = **-1** be generous with cases **(ii)** (dark) grey **(1)** to pink-brown **(1)** blue **(1)** to green **(1)** **Notes** Ignore additional information		**(1)** **(1)** **(2)** **(2)**

Question Number	Question		
3	**(c)**		
	Acceptable Answers	Reject	Mark
	hydrogen more reactive than copper hydrogen less reactive than iron **Notes** Hydrogen between Fe + Cu for both marks	Iron(II) or Copper (II)	**(1)** **(1)**

Total 9 marks

Question Number	Question		
4	**(a)**		
	Acceptable Answers	Reject	Mark
	(i) shared electron pair all other electrons correct (ignore inner shells even if wrong) **(ii)** bottom box crossed **Notes**		**(1)** **(1)** **(1)**

Question Number	Question		
4	**(b)**		
	Acceptable Answers	Reject	Mark
	same number of electrons / same electronic configurations 'Same protons' negates **Notes**		**(1)**

Question Number	Question		
4	**(c)**		
	Acceptable Answers	Reject	Mark
	add sodium hydroxide (solution)/ammonia solution/ ammonium hydroxide green ppt/solid/suspension Orange/brown/orange-brown/foxy brown/rusty brown/red-brown ppt/ solid/suspension **Notes** If miss out ppt then give 1 mark for 2 correct colours result marks only given if test correct	Powder/crystals/bits Orange/rusty/red	**(1)** **(1)** **(1)**

Total 7 marks

Question Number	Question		
5	**(a)**		
	Acceptable Answers	Reject	Mark
	(X) chlorine / Cl_2 (Y) sodium / Na (Z) aluminium / Al **Notes**		**(1)** **(1)** **(1)**

Question Number	Question		
5	**(b)**		
	Acceptable Answers	Reject	Mark
	Y and Z / Na and Al **Notes**		**(1)**

Question Number	Question		
5	**(c)**		
	Acceptable Answers	Reject	Mark
	yellow **Notes**		**(1)**

Question Number	Question		
5	**(d)**		
	Acceptable Answers	Reject	Mark
	burns with a squeaky pop **Notes**		**(1)**

Question Number	Question		
5	**(e)**		
	Acceptable Answers	Reject	Mark
	(products) $Z_2(SO_4)_3$ + H_2O (balancing) - 3 - 3 **Notes**		**(1)** **(1)**

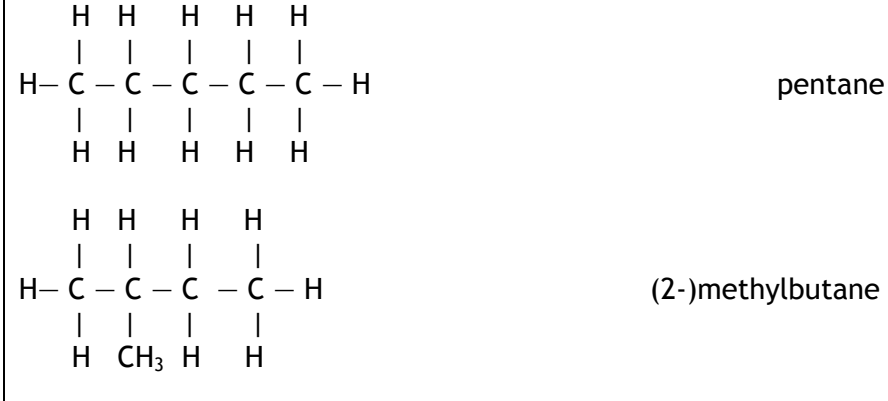
Total 8 marks

Question Number	Question		
6	**(a)**		
	Acceptable Answers	Reject	Mark
	C_nH_{2n+2} **Notes**		**(1)**

Question Number	Question		
6	**(b)**		
	Acceptable Answers	Reject	Mark
	similar chemical properties / same functional group gradation in physical properties neighbouring members differ by CH_2 **Notes** Max 2		**(2)**

Question Number	Question		
6	**(c)**		
	Acceptable Answers	Reject	Mark
	no double bonds / only single bonds **Notes**		**(1)**

Question Number	Question		
6	**(d)**		
	Acceptable Answers	Reject	Mark
	contains oxygen / not just carbon and hydrogen **Notes**		**(1)**

Question Number	Question		
6	**(e)**		
	Acceptable Answers		Mark
	 pentane (2-)methylbutane  (2,2-)dimethylpropane **Notes** (any two structures and matching names for 1 each)		**(4)**

Total 9 marks

Question Number	Question		
7	**(a)**		
	Acceptable Answers	Reject	Mark
	ammonia hydrogen chloride **Notes**		**(1)** **(1)**

Question Number	Question		
7	**(b)**		
	Acceptable Answers	Reject	Mark
	(i) ammonia **(ii)** NH_4^+ **(iii)** $NH_4Cl + NaOH \rightarrow NaCl + H_2O + NH_3$ reactants products **Notes**		**(1)** **(1)** **(1)** **(1)**

Question Number	Question		
7	**(c)**		
	Acceptable Answers	Reject	Mark
	(i) silver chloride **(ii)** Cl^- **(iii)** (products) $AgCl + NH_4NO_3$ (state symbols) aq aq s aq **Notes**		**(1)** **(1)** **(1)** **(1)**

Total 10 marks

Question Number	Question		
8	**(a)**		
	Acceptable Answers	Reject	Mark
	2,7 2.8 **Notes**		**(1)** **(1)**

Question Number	Question		
8	**(b)**		
	Acceptable Answers	Reject	Mark
	(ion) 2 and 8 • or × shown on diagram 2+ shown **Notes**		**(1)** **(1)**

Question Number	Question		
8	**(c)**		
	Acceptable Answers	Reject	Mark
	F_2 / fluorine gains electrons **Notes**		**(1)** **(1)**

Question Number	Question		
8	**(d)**		
	Acceptable Answers	Reject	Mark
	positive and negative ions / oppositely charged ions **Notes**		**(1)**

Question Number	Question		
8	**(e)**		
	Acceptable Answers	Reject	Mark
	fluorine (molecules) attracted by (weak) intermolecular forces which are (much) weaker than ionic bonds/bonds in MgF_2 **Notes**		**(1)** **(1)**

Question Number	Question		
8	**(f)**		
	Acceptable Answers	Reject	Mark
	(i) 100 – (78.6 + 10.1) = 11.3 **(ii)** (24 × 0.786) + (25 × 0.101) + (26 × .113) = 24.3 **Notes**		**(1)** **(1)** **(1)**

Total 12 marks

Question Number	Question			
9	**(a)**			
	Acceptable Answers		Reject	Mark
	decreases increases **Notes**	increases no change		**(4)**

Question Number	Question		
9	**(b)**		
	Acceptable Answers	Reject	Mark
	rate increases (reactant) particles closer together/more particles in given volume molecules/particles collide more frequently/ more collisions per second **Notes** If no mention of particles/molecules max 1 for explanation	Rate same/rate decreases = 0/3 atoms	**(1)** **(1)** **(1)**

Question Number	Question		
9	**(c)**		
	Acceptable Answers	Reject	Mark
	recycled / put back into reactor **Notes**	Used again	**(1)**

Question Number	Question		
9	**(d)**		
	Acceptable Answers	Reject	Mark
	(i) oxidation / redox/ accept exothermic **(ii)** $2NO + O_2 \rightarrow 2NO_2$ all formulae correct balancing **Notes**		**(1)** **(1)** **(1)**

Question Number	Question		
9	**(e)**		
	Acceptable Answers	Reject	Mark
	NH_4NO_3 **Notes**		**(1)**

Question Number	Question		
9	**(f)**		
	Acceptable Answers	Reject	Mark
	phosphorus potassium **Notes**	Phosphate	**(1)** **(1)**

Total 14 marks

Question Number	Question		
10	**(a)**		
	Acceptable Answers	Reject	Mark
	nitric acid $KOH + HNO_3 \rightarrow KNO_3 + H_2O$ **Notes**		**(1)** **(1)**

Question Number	Question		
10	**(b)**		
	Acceptable Answers	Reject	Mark
	(i) (K_2O) $M_r = 94$ (KOH) $M_r = 56$ **(ii)** ($18.8 \div 94 = 0.20$ mol $(0.20 \times 2 \times 56 =) 22(.4)$ (g) (answer of 11(.2) scores 1) **Notes**		**(1)** **(1)** **(1)** **(1)**

Question Number	Question		
10	**(c)**		
	Acceptable Answers	Reject	Mark
	$RbOH + HCl \rightarrow RbCl + H_2O$ **Notes**		**(1)**

Total 7 marks

Paper total 90 marks