



JABchem



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Past Papers

Standard Grade

General

Chemistry

2007

Marking Scheme

2007 General	KU		PS	
	/30	%	/30	%
3	19+	63%	21+	70%
4	14+	47%	16+	53%
5	12+	40%	14+	47%
7	<12	<40%	<14	<47%

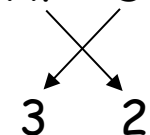
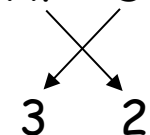
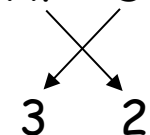
2007 Standard Grade Chemistry General Marking Scheme

Question	Answer	Chemistry Covered						
1a	E	Answer	A	B	C	D	E	F
		Element	Copper	Magnesium	Iron	Nitrogen	Potassium	Fluorine
1b	B	Date of Discovery	ancient	1808	ancient	1772	1807	1886
		Group	Transition metals	Group 2	Transition metals	Group 5	Group 1	Group 7
1c	D+F Both for 1 mark	Type of Element	metal	metal	metal	non-metal	metal	non-metal
2a	B	Only unreactive metals are found uncombined in Earth's crust e.g. silver, gold and platinum						
2b	C	Iron is made in a blast furnace: $\text{Fe}_2\text{O}_3 + 3\text{CO} \longrightarrow 2\text{Fe} + 3\text{CO}_2$						
2c	C	Iron is the catalyst in the Haber Process: $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$						
3a	B	Answer	A	B	C	D	E	F
		Hydrocarbon	methane	hexane	pentane	ethene	butene	propane
3b	D+E Both for 1 mark	Formula	CH ₄	C ₆ H ₁₄	C ₅ H ₁₂	C ₂ H ₄	C ₄ H ₈	C ₃ H ₈
		Homologous Series	alkane	alkane	alkane	alkene	alkene	alkane
4a	B	Fertilisers are soluble compounds containing at least one of the following elements: Nitrogen, Phosphorus or Potassium						
4b	C	Metal	Copper	Potassium	Sodium	Calcium		
		Flame Colour	blue-green	lilac	yellow	orange-red		
4c	A+B Both for 1 mark	-ide	Compound contains the two named elements					
		-ate	Compound contains 3 elements (two named elements + oxygen)					
		-ite	Compound contains 3 elements (two named elements + oxygen)					
5	D	At least one new substance is formed in every chemical reaction shown by: solid (precipitate) gas is produced colour change energy change being formed						
6a	F	The spark in an engine provides the energy for $\text{N}_2 + 2\text{O}_2 \longrightarrow \text{NO}_2$						
6b	C	potassium is found in Group 1 of Periodic Table:						
		Group 1	Group 7	Group 7	Block Between Groups 2-3			
		alkali metals	halogens	noble gases	transition metals			
6c	F	Both sulphur dioxide SO ₂ and nitrogen dioxide NO ₂ dissolve in rain water to form acid rain.						
7a	A	<input checked="" type="checkbox"/> A Water has pH=7 but dilute hydrochloric acid has pH less than 7						
		<input checked="" type="checkbox"/> B Neither water or dilute hydrochloric acid react with silver						
		<input checked="" type="checkbox"/> C Water does not conduct electricity but dilute hydrochloric acid does.						
		<input checked="" type="checkbox"/> D Water does not produce chlorine when electrolysed but HCl does.						
7b	C	<input checked="" type="checkbox"/> A Neither have a pH=7 as both have pH less than 7						
		<input checked="" type="checkbox"/> B Neither dilute hydrochloric acid or dilute sulphuric acid react with silver						
		<input checked="" type="checkbox"/> C Both conduct electricity as both contain ions.						
		<input checked="" type="checkbox"/> D dilute sulphuric acid does not produce chlorine gas when electrolysed						
8a	A+F Both for 1 mark	Substance	Argon	Crude Oil	Sodium	Air	Carbon Dioxide	Silicon
		Type of Substance	non-metal element	mixture of compounds	metal element	mixture of elements	compound	non-metal element
8b	B,D 1 mark each	Pure or Mixture	pure element	mixture of hydrocarbons	pure element	mixture of N ₂ and O ₂	pure compound	pure element



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9a	Carbon and Hydrogen	Hydrocarbon: compounds which contain carbon and hydrogen only																												
9b(i)	Oxygen	All combustion/burning reactions require oxygen as a reactant																												
9b(ii)	Carbon dioxide	<table border="1"> <tr> <td>Gas</td> <td>Hydrogen</td> <td>Oxygen</td> <td>Carbon Dioxide</td> </tr> <tr> <td>Gas Test</td> <td>burns with a pop</td> <td>relights glowing splint</td> <td>turns lime water milky</td> </tr> </table>	Gas	Hydrogen	Oxygen	Carbon Dioxide	Gas Test	burns with a pop	relights glowing splint	turns lime water milky																				
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10a	chlorine catalyst chamber cracking vinyl chloride	Problem Solving: Information in written passage → flow chart																												
10b	Table showing:	<table border="1"> <tr> <td>Plastic</td> <td>Use</td> </tr> <tr> <td>Poly(vinyl chloride)</td> <td>Clothes</td> </tr> <tr> <td>Poly(tetrafluoroethene)</td> <td>Non-stick coating</td> </tr> <tr> <td>Poly(ethene)</td> <td>Plastic bags</td> </tr> <tr> <td>Poly(propene)</td> <td>Washing Up Bowls</td> </tr> </table>	Plastic	Use	Poly(vinyl chloride)	Clothes	Poly(tetrafluoroethene)	Non-stick coating	Poly(ethene)	Plastic bags	Poly(propene)	Washing Up Bowls																		
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10c	ethene	<table border="1"> <tr> <td>Polymer</td> <td>poly(ethene)</td> <td>poly(propene)</td> <td>poly(chloroethene)</td> <td>poly(styrene)</td> </tr> <tr> <td>Monomer</td> <td>ethene</td> <td>propene</td> <td>chloroethene</td> <td>styrene</td> </tr> </table>	Polymer	poly(ethene)	poly(propene)	poly(chloroethene)	poly(styrene)	Monomer	ethene	propene	chloroethene	styrene																		
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10d	increases	Production of plastics increases from 5 million tonnes in 1960 to 80 million tonnes in 2000																												
11a	bar chart containing:	<table border="1"> <tr> <td>$\frac{1}{2}$ mark vertical scale</td> <td>$\frac{1}{2}$ mark correct labelling of bars</td> <td>1 mark bars drawn correctly</td> </tr> </table>	$\frac{1}{2}$ mark vertical scale	$\frac{1}{2}$ mark correct labelling of bars	1 mark bars drawn correctly																									
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11b	$C_2H_4O_2$	Ethanoic acid has 2 carbon atoms, 4 hydrogen atoms and 2 oxygen atoms within its molecules.																												
11c	$\frac{1}{2}$ mark: Add indicator/pH paper $\frac{1}{2}$ mark: Check colour against chart	The colour achieved with universal indicator/pH paper should be matched against the colour chart and the closest match is the pH number of the solution.																												
11d	Increase	pH of acids is below 7. Dilution of acids with water makes pH increase to 7.																												
11e	Hydrogen ion or H^+ ion	Acids contain more of the hydrogen ion (H^+) Alkalis contain more of the hydroxide ion (OH^-)																												
12a	Prevents air/water getting to steel	Painting, greasing and coating in plastic are all barriers to rusting/corrosion as they stop air/water getting to the metal underneath																												
12b	Any one from:	<table border="1"> <tr> <td>oiling/greasing/wax coating</td> <td>metal plating or electroplating</td> <td rowspan="2">cathodic protection/ attach to negative terminal</td> </tr> <tr> <td>coating in plastic</td> <td>galvanising, attach zinc or magnesium</td> </tr> </table>	oiling/greasing/wax coating	metal plating or electroplating	cathodic protection/ attach to negative terminal	coating in plastic	galvanising, attach zinc or magnesium																							
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12c(i)	Mixture of metals	Alloys are a mixture of metals or a mixture of metals with non-metals																												
12c(ii)	280-310	<table border="1"> <tr> <td>Carbon Present (%)</td> <td>0.1</td> <td>0.2</td> <td>0.3</td> <td>0.4</td> <td>0.5</td> <td>0.6</td> </tr> <tr> <td>Hardness (units)</td> <td>123</td> <td>157</td> <td>190</td> <td>220</td> <td>260</td> <td>-</td> </tr> <tr> <td>Difference:</td> <td></td> <td>34</td> <td>33</td> <td>30</td> <td>40</td> <td>(average) (34)</td> </tr> <tr> <td>Prediction:</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>294</td> </tr> </table>	Carbon Present (%)	0.1	0.2	0.3	0.4	0.5	0.6	Hardness (units)	123	157	190	220	260	-	Difference:		34	33	30	40	(average) (34)	Prediction:	-	-	-	-	-	294
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13a	magnesium-zinc-lead	Most reactive has most bubbles ∴ magnesium is most reactive Least reactive has least bubbles ∴ lead is least reactive																												
13b	hydrogen	ACID + METAL → SALT + HYDROGEN																												
13c	Increases	Methods to increase rate of chemical reaction: <table border="1"> <tr> <td>increase concentration</td> <td>increase temperature</td> <td>decrease particle size</td> </tr> </table>	increase concentration	increase temperature	decrease particle size																									
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14a	Diagram showing:	$ \begin{array}{cccccccc} H & H & H & H & H & H & H & H \\ & & & & & & & \\ H-C & -C & -C & -C & -C & -C & -C & -C-H \\ & & & & & & & \\ H & H & H & H & H & H & H & H \end{array} $																												



14b(i)	C_2H_4	Same number of each element must be present on both sides of reaction: $C_{10}H_{22} \rightarrow C_8H_{18} + C_2H_4$								
14b(ii)	Contains C=C double bond or unsaturated	Unsaturated C=C double bonds decolourise bromine solution quickly								
14c(i)	0.1g	Catalysts are chemically unchanged during reactions \therefore same mass of catalyst at start and end of reaction								
14c(ii)	Al_2O_3	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">Write down Valency below each element's symbol</td> <td style="width: 33%; text-align: center;">Put in Cross-over Arrows</td> <td style="width: 33%; text-align: center;">Follow arrows to get formula</td> </tr> <tr> <td style="text-align: center;"> $Al \quad O$ $3 \quad 2$ </td> <td style="text-align: center;"> $Al \quad O$  $3 \quad 2$ </td> <td style="text-align: center;"> Al_2O_3 </td> </tr> </table>	Write down Valency below each element's symbol	Put in Cross-over Arrows	Follow arrows to get formula	$Al \quad O$ $3 \quad 2$	$Al \quad O$  $3 \quad 2$	Al_2O_3		
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$Al \quad O$ $3 \quad 2$	$Al \quad O$  $3 \quad 2$	Al_2O_3								
15a(i)	portable or safer or low voltage	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Advantages of Batteries</th> <th style="width: 50%;">Advantages of Mains</th> </tr> </thead> <tbody> <tr> <td>Portable</td> <td>will run out/need replaced</td> </tr> <tr> <td>Low voltage</td> <td>High voltages available</td> </tr> <tr> <td>Safer</td> <td></td> </tr> </tbody> </table>	Advantages of Batteries	Advantages of Mains	Portable	will run out/need replaced	Low voltage	High voltages available	Safer	
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15a(ii)	chemicals run out	Electricity is produced in a cell by a chemical reaction. All chemical reaction run out of reactants unless they are replaced.								
15b(i)	right to left ← (Zinc to Nickel)	Electrons flow through the wires from the higher up metal to the lower down metal in the electrochemical series (p10 of data booklet)								
15b(ii)	higher voltage	Replacing nickel with copper makes the difference between zinc and copper greater on the electrochemical series (p10 of data booklet)								
16a	$\frac{1}{2}$ mark: Add iodine solution $\frac{1}{2}$ mark: Turns blue/black	Test for Starch: Iodine turns blue/black								
16b	polymerisation or condensation	$glucose \longrightarrow starch + water$ $nC_6H_{12}O_6 \longrightarrow (C_6H_{10}O_5)_n + nH_2O$								
16c(i)	sucrose	The final temperature is proportional to the amount of heat energy released. Sucrose raised the temperature to $52^\circ C$ Starch raised the temperature to $38^\circ C$.								
16c(ii)	any one from:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Same mass of carbohydrate</td> <td style="width: 25%;">Same distance from carbohydrate in spoon to test tube</td> <td style="width: 25%;">Same test tube</td> <td style="width: 25%;">Same carbohydrate particle size</td> </tr> </table>	Same mass of carbohydrate	Same distance from carbohydrate in spoon to test tube	Same test tube	Same carbohydrate particle size				
Same mass of carbohydrate	Same distance from carbohydrate in spoon to test tube	Same test tube	Same carbohydrate particle size							
16d	respiration	$glucose + oxygen \longrightarrow carbon\ dioxide + water$ $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$								
17a(i)	battery or d.c. power supply	The power supply must be a d.c. power supply so that the electrode maintain the same positive and negative electrodes.								
17a(ii)	lead iodide ↓ lead + iodine	lead iodide \longrightarrow lead + iodine								
17b	Ions cannot move when solid	In solid ionic compounds, ions are tightly held in ionic lattice and are unable to move \therefore ionic solids do not conduct electricity Melting or dissolving ionic compounds breaks up the ionic lattice and allows the ions to move \therefore ionic liquids/solutions conduct electricity								
17c	Carbon or graphite	Graphite, a form of carbon, is the only non-metal conductor of electricity and is suitable for use as an electrode								

