Past Papers

Standard Grade

Credit

Chemistry

2006

Marking Scheme

2006 Credit	KU		PS	
	/30	%	/30	%
1	22+	73%	24+	80%
2	16+	53%	17+	57%
See General Paper	<16	<53%	<17	<57%

2006 Standard Grade Chemistry Credit Marking Scheme

Question 1a — Answer: B

$$NH_3 + O_2 \xrightarrow[\text{catalyst}]{Pt} NO_2 + H_2O$$

Question 1b — Answer: C

Iron metal made in a Blast furnace

Question 1c — Answer: E

From page 7 of the data booklet:

Element	Potassium	Platinum	Iron	Tin	Copper	Magnesium
Density (g/cm^3)	0.89	21.5	7.87	7.26	8.96 (8.92 in old data booklet)	1.74

Question 2a — Answer: E+F (Both for 1 mark)

Question 2b — Answer: B

Answer	A	B	C	D	E	F
Name	2,2-dimethylpropane	cyclopropane	propane	butane	but-1-ene	cyclobutane
Formula	C_5H_{12}	C_3H_6	C_3H_8	C_4H_{10}	**C_4H_8**	**C_4H_8**
Homologous Series	Alkane	Cycloalkane	Alkane	Alkane	Alkene	Cycloalkane
Member of Homologous Series	5^{th} Member	**1^{st} Member**	3^{rd} Member	4^{th} Member	3^{rd} Member	2^{nd} Member

Question 3a — Answer: C

Incomplete combustion due to not enough oxygen to form CO_2

Question 3b — Answer: E

High energy in lightning needed to split N≡N bond, NO_2 formed

Question 3c — Answer: B

Nitrogen + Hydrogen $\xrightarrow{\text{iron}}$ Ammonia

Question 4a — Answer: A+B (Both for 1 mark)

Answer	A	B	C	D	E	F
Oxide Compound	sodium oxide	potassium oxide	copper(II) oxide	carbon dioxide	zinc oxide	sulphur dioxide
Type	metal oxide	metal oxide	metal oxide	non-metal oxide	metal oxide	non-metal oxide
pH in water	**alkaline**	**alkaline**	(insoluble)	acidic	(insoluble)	acidic

Question 4b — Answer: D+F (Both for 1 mark)

Answer	A	B	C	D	E	F
Compound	sodium oxide	potassium oxide	copper(II) oxide	carbon dioxide	zinc oxide	sulphur dioxide
Type of Elements	metal + non-metal	metal + non-metal	metal + non-metal	non-metals only	metal + non-metal	non-metals only
Type of Bonding	ionic	ionic	ionic	**covalent**	ionic	**covalent**

Question 5a — Answer: B+E (Both for 1 mark)

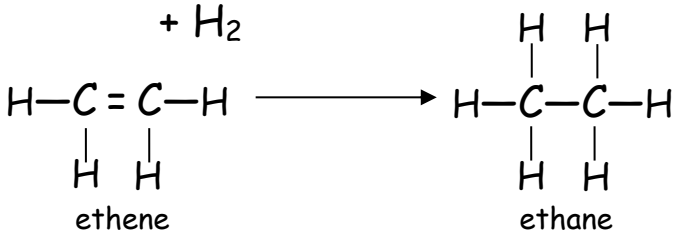
Answer	A	B	C	D	E	F
Element	oxygen	calcium	aluminium	sodium	magnesium	fluorine
Group	Group 6	**Group 2**	Group 3	Group 1	**Group 2**	Group 7

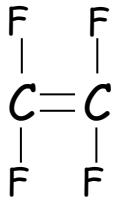
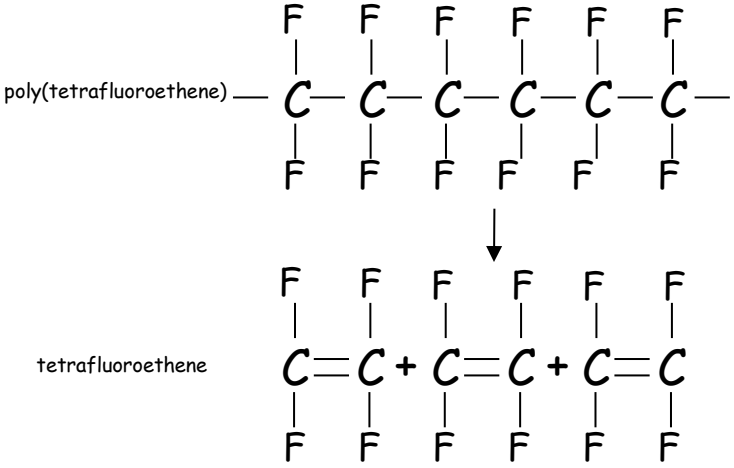
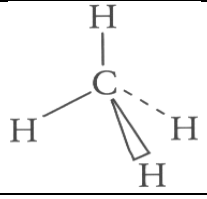
Question 5b — Answer: B

Answer	A	B	C	D	E	F
Element	oxygen	calcium	aluminium	sodium	magnesium	fluorine
Atom Electron Configuration	2,6	2,8,8,2	2,8,3	2,8,1	2,8,2	2,7
Ion	O^{2-}	Ca^{2+}	Al^{3+}	Na^{+}	Mg^{2+}	F^{-}
Ion Electron Configuration	2,8	2,8,8	2,8	2,8	2,8	2,8

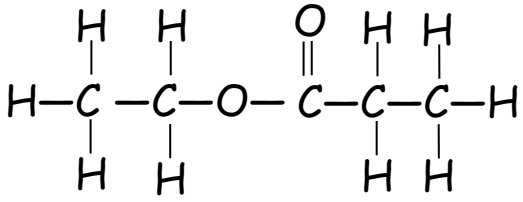
Question 5c — Answer: C+F (Both for 1 mark)

Write down Formulae	Write Down Reverse of Cross Over Rule	Follow arrows to get formula
XY_3	X Y 3 1	Valency of X=3 Metal X = aluminium Valency of Y=1 Non-Metal = fluorine

6a	F	 Addition reactions occurs when a molecule adds across a C=C double bond
6b	C	When metals become positive ions, the metal atoms lose electrons to become positively charged. Loss of electrons is oxidation.
6c	A,D 1 mark each	☑A solid $Ba^{2+}SO_4^{2-}(s)$ formed as insoluble precipitate ☑D acid is neutralised to form neutral salt plus water
7a	D	$C_5H_{12} + 8O_2 \longrightarrow 5CO_2 + 6H_2O$
7b	C,F 1 mark each	☑C – Copper not reactive enough to displace sodium ions ☑F – Silver metal not reactive enough react with acid

Question	Answer	Chemistry Covered
8a		
8b	thermoplastic	Type / Definition: thermoplastic – melt on heating; thermosetting – do not melt on heating
9a(i)	Isotopes	Isotopes: Same atomic number but different mass number; Same number of protons but different number of neutrons
9a(ii)	1	1.1 is nearer 1 than 2 so more ^1H present than ^2H
9a(iii)	Atom / protons / neutrons: ^1_1H – 1 – 0; ^2_1H – 1 – 1	no of protons = atomic number (bottom number) no. of neutrons = mass number – atomic number
9b		tetrahedral shape
10a	Arrow pointing from Left (X) to Right (Y)	In question Fe^{3+} ions (at electrode Y) are accepting electrons so electrons must be moving from Left (X) to Right (Y)

10b	Reduction	Fe^{3+} ions are gaining electrons ∴ reduction
10c	blue	Ferroxyl indicator turns blue in the presence of Fe^{2+} ions Ferroxyl indicator turns pink in the presence of OH^- ions
11a	water **and** air/water	both water and oxygen are required for corrosion/rusting
11b	90.7%	gfm Pb_3O_4 = (3x207) + (4x16) = 621 + 64 = 685g $\%Pb = \frac{\text{mass of Pb}}{\text{gfm}} \times 100 = \frac{621}{685} \times 100 = 90.7\%$
11c	Cr_2O_3	Write down Valency below each element's symbol: Cr O / 3 2 — Put in Cross-over Arrows: Cr O / 3 2 — Follow arrows and cancel down if necessary to get formula: Cr_2O_3
12a	Line graph showing:	½mark labelling axes; ½mark correct scales; ½mark plotting points; ½mark drawing line
12b	31-32	extrapolate up x-axis at 20 and read off value on y-axis
12c	36-40	value must be higher than 35 but not higher than maximum volume of 40
13a	Fructose	Carbohydrate: fructose | glucose | maltose | sucrose | starch Formula: $C_6H_{12}O_6$ | $C_6H_{12}O_6$ | $C_{12}H_{22}O_{11}$ | $C_{12}H_{22}O_{11}$ | $(C_6H_{10}O_5)_n$ Type: monosaccharide | monosaccharide | disaccharide | disaccharide | polysaccharide
13b	Condensation	Glucose molecules join together to form long chain starch with water molecules being removed at the joins between glucoses
13c(i)	ethanol	glucose $\xrightarrow[\text{(no air)}]{\text{yeast enzymes}}$ ethanol + carbon dioxide $C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2$
13c(ii)	red/orange/yellow	Acidic pH formed as CO_2 dissolves in water to make carbonic acid
14a	Air or water	both air and water contain oxygen which could be extracted
14b	no poisonous gases, acid rain or carbon dioxide produced	CO produced by petrol engines is poisonous SO_2 and nitrogen oxides form acid rain CO_2 contributes to Greenhouse effect
14c	$H_2 \rightarrow 2H^+ + 2e^-$	reverse of equation on page 7 of date booklet
15a	8g	1mol N_2O = (2x14) + (1x16) = 28 + 16 = 44g no. of mol = $\frac{\text{mass}}{\text{gfm}} = \frac{22g}{44g\ mol^{-1}} = 0.5mol$ $2N_2O \longrightarrow 2N_2 + O_2$ 2mol 0.5mol — 1mol 0.25mol 1mol O_2 = 32g mass = no. of mol x gfm = 0.25mol x 32g mol^{-1} = 8g
15b	longer	more O_2 in jar makes candle burn longer
16a	$Ba(OH)_2 + 2NH_4Cl$ ↓ $2NH_3 + BaCl_2 + 2H_2O$	$Ba(OH)_2 + 2NH_4Cl \longrightarrow 2NH_3 + BaCl_2 + 2H_2O$
16b	Ammonia gas turns	Test for Ammonia: turns moist pH paper blue indicating alkali formed

	moist pH paper Blue	
16c	Water may freeze	Freezing point of pure water is 0°C
17a	Electrolysis	Electrolysis is the process where electricity splits an ionic compound to form elements
17b(i)	hydrochloric acid	hydrochloric acid is the only substance present which would electrolyse to produce two gases (hydrogen at the –ve electrode and chlorine at the +ve electrode)
17b(ii)	covalent	covalent compounds do not conduct electricity
17b(iii)	gas bubbles formed	chlorine gas produced as solution Y is copper chloride solution
18a	15.6	NB: Rough titre is ignored for averaging $\text{average titre} = \frac{15.5 + 15.7}{2} = \frac{31.2}{2} = 15.6\text{cm}^3$
18b	0.156	**n**o. of mol = **v**olume x **c**oncentration = 0.0156litres x 0.2 mol l^{-1} = 0.00312mol $\underset{\substack{1\text{mol} \\ 0.00312\text{mol}}}{KOH} + \underset{\substack{1\text{mol} \\ 0.00312\text{mol}}}{HCl} \longrightarrow H_2O + KCl$ $\textbf{c}\text{oncentration} = \frac{\textbf{n}\text{o. of mol}}{\textbf{v}\text{olume}} = \frac{0.00312\text{mol}}{0.02\text{litres}} = 0.156 \text{ mol } l^{-1}$
18c	evaporate water leaving solid KCl	Using evaporation basin and Bunsen burner would be quicker than natural evaporation
19a	Diagram showing:	
19b	hydrolysis	Hydrolysis is the opposite of condensation (condensation forms esters)