

## **NOVEMBER 2002**

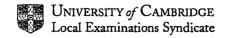
## **INTERNATIONAL GCSE**

## MARKSGHEME

MAXIMUM MARK : 80

SYLLABUS/COMPONENT: 0620/3

CHEMISTRY (EXTENDED)



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In the mark scheme if a word or phrase is underlined it(or an equivalent) is required for the award of the mark.

(.....) is used to denote material that is not specifically required.

OR designates alternative and independent ways of gaining the marks for the question.

or indicates different ways of gaining the same mark.

**COND** indicates that the award of this mark is conditional upon a previous mark being gained.

- Unusual responses which include correct Chemistry that answers the question should always be rewarded-even if they are not mentioned in the marking scheme.
- (a) (i) vanadium(V) oxide as catalyst ignore oxidation state 1 and accept no oxidation state temperature 300 to 600 °C pressure up to 10 atmos, accept atmospheric pressure volume ratio of gases either 2:1 or slight excess of oxygen ANY three (ii) decrease [1] COND back reaction is endothermic or same argument based on forward reaction is exothermic [1]or increase in temp favours back reaction (iii) dissolve in (conc) sulphuric acid NOT dilute [1] add water or dilute [1] (b) sodium hydroxide or carbonate or hydrogencarbonate [1] zinc oxide or hydroxide or carbonate [1] **NOT** zinc barium nitrate or chloride or hydroxide or barium ions [1]
  - (c) (i) copper sulphate or anhydrous copper sulphate [1] accept "unhydrated" NOT formula

neutralisation NOT acid/base

(ii) goes blue or becomes hot or steam [1]

[1]

(iii) copper oxide [1]

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(iv) 5/250 = 0.02 moles  Mr = 80  80 x 0.02 = 1.6 g  NB (iv) to be marked conseq to (iii)  Correct answer no working ONLY [1]	[1] [1] [1]
TOTAL = 17	
2 (a) (i) high densities high fixed points mp or bp coloured compounds hardness complex ions	
ANY three	[3]
(ii) 13	[1]
(b) (i) manganese chloride water	[1] [1]
(ii) manganese(III) and (IV) oxides	[1]
(c) (i) rate decreases or becomes zero do NOT accept rate increases then decreases COND concentration decreases hydrogen peroxide used up ONLY [1]	[1] [2]
(ii) steeper initial gradient double final volume	[1] [1]
(iii) initial gradient less final volume the same must relate to shape of graph	[1] [1]
TOTAL = 14	
3 (a) (i) number of outer electrons increases or number of electrons more than complete energy le or number of electrons to be lost or accept clear examples NOT just different groups or valencies	[1] vel
(ii) gain electrons number of electrons to be gained is less across period or number of outer electrons increases	[1] [1]

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(b	)	$Al_2S_3$ $Si_3P_4$	[1] [1]
(c	(i)	silicon	[1]
	(ii)	sodium	[1]
	(iii)	sulphur or chlorine	[1]
(d	)	unreactive or inert or does not react	[1]
(e)	)	3Na to 1P COND next two marks	[1]
		correct charges 8e around P If covalent then only one mark for 3Na to 1P	[1] [1]
(f)	(i)	11.5/23 = 0.5	[1]
	(ii)	0.25 conseq to (i)	[1]
	(iii)	$0.25 \times 32 = 8 g$ conseq	[1]
	(iv)	2.0 g only <b>conseq</b> to (iii) if answer to (iii) is less than 10	[1]
		NB If (ii) is 0.3(125), no excess is possible, (iv) ZERO	
TOTA	L = 1	6	
4 (a	) (i)	wiring NOT good conductor pipes utensils roofs electroplating lightning conductor bi-metallic strips NOT coinage metal or any other use than involves an all	

NOT coinage metal or any other use than involves an alloy

[2]

TWO from above

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		(ii)	regular array different sizes	[1] [1]
			delocalised or mobile or free electrons	[1]
	(b)	(i)	copper deposited or mass increases	[1]
		(ii)	copper goes into solution or mass decreases	[1]
		(iii)	$Cu^{2+} + 2e \Longrightarrow Cu$	[1]
		(iv)	oxygen sulphuric acid accept hydrogen sulphate	[1] [1]
	(c)	(ii)	cells produce electricity or exothermic or change chemical energy into electrical energy	[1]
			electrolysis uses it <b>or</b> endothermic <b>or</b> change electrical energy into chemical energy	[1]
	(d)	(i)	$CuO + C \Longrightarrow Cu + CO$ or $2CuO + C \Longrightarrow 2 Cu + CO_2$ or any other correct reductant – hydrogen or metal	[1]
		(ii)	Copper(II) hydroxide = copper oxide + water accept symbols	
		(iii)	2Cu(NO <sub>3</sub> ) <sub>2</sub> ==. 2CuO + 4NO <sub>2</sub> + O <sub>2</sub> unbalanced ONLY [1] <b>NOT</b> word equation	[2]
TO	ΓAL	= 1	•	
5	(a)		molecular formula  Must be able to give isomers, need not be alkenes	[1]
			two corresponding isomers  If do not correspond then MAX [2] out of [3]	[2]
	(b)	(i)	ethanol structure	[1] [1]
		(ii)	ethane structure	[1] [1]
	(c)	(i)	many simple molecules or monomers form one large one or macromolecule or chain	[1] [1]

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	(ii)	addition polymer only one product- the polymer condensation - polymer and water etc	[1] [1]
	(iii)	correct unit	[1]
		COND evidence of polymer in structure eg shows continuation such as terminal bonds	[1]
(d)	(i)	water proof or impervious or flexible or good adhesion or non-biodegradable or unreactive	[1]
	(ii)	steel in contact with water or air	[1]
	(iii)	zinc more reactive oxygen /water reacts with zinc not iron sacrificial protection zinc anodic steel receives electrons from zinc zinc forms cations	
		cell TWO valid points	[3]

TOTAL = 17