

**June 2003**

**INTERNATIONAL GCSE**

**MARKING SCHEME**

**MAXIMUM MARK: 80**

**SYLLABUS/COMPONENT: 0620/02**

**CHEMISTRY**

**(Core Paper 2)**



Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – June 2003	0620	2

- 1 (a) (i) Fe/Cu ALLOW Zn [1]  
(ii) C/N/S/F/C/Br [1]  
(iii) O/S [1]  
(iv) C [1]  
(v) Li/Na/K ALLOW F [1]  
(vi) CU/Zn/Br/Kr [1]
- (b) argon - light bulbs;  
chlorine - kills bacteria;  
carbon - as lubricant;  
helium - in balloons [4]
- (c) (i) covalent [1]  
(ii) BrF<sub>5</sub> ALLOW F<sub>5</sub>Br [1]  
(iii) ions/charged particles;  
NOT: particles  
not free to move in solid/free to move in molten/liquid state [2]
- 2 (a) drop small tube in acid/loosen string/idea of mixing zinc and acid/let go of cotton  
ALLOW: cut the string [1]  
NOT: heat (the acid)  
NOT: pull the string
- (b) (i) correct plotting including 0-0 point (- 1 per omission or error) [2]  
(ii) best curve drawn and to go through origin [1]  
(iii) no more gas produced/reaction finished;  
all zinc reacted/used up [2]
- (c) graph drawn with faster initial rate and starting at 0-0;  
ALLOW: straight line as initial rate  
ends up at 55 cm<sup>3</sup> [2]
- (d) (i) 2 (HCl) [1]  
(ii) zinc chloride [1]  
(iii) 136 [1]  
IGNORE units
- (e) substance containing only one type of atom/substance which cannot be broken down to any other substance by chemical means [1]  
NOT 'can't be split' alone  
NOT is a pure substance
- 3 (a) (i) evaporation/vaporisation/boiling [1]  
(ii) freezing/solidification [1]  
NOT: fusion  
(iii) condensing/condensation/liquefaction [1]
- (b) 2<sup>nd</sup> box ticked [1]
- (c) A;  
energy needed to overcome forces between molecules/idea of energy input/  
taking in heat [2]
- (d) (i) chlorine [1]  
(ii) bromine [1]  
(iii) sodium chloride [1]

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – June 2003	0620	2

- (e) (i) diffusion [1]  
NOT: Brownian motion
- (ii) ammonium chloride [1]  
NOT: ammonia chloride
- (iii) ammonia diffuses or moves faster/HCl diffuses or moves slower/ammonia has lower mass/HCl higher mass/molecules of HCl and ammonia move at different speeds [1]  
NOT: ammonia evaporates faster/HCl evaporates more slowly
- (f) neutralisation/acid base [1]  
NOT: exothermic  
NOT: addition
- (g) (i) thermometer [1]  
(ii) reference to the solid or melting point of the solid is needed for the mark. boiling point of water too low to get solid to melt/boiling water cannot get to 155°C [1]  
NOT: boiling point of water is only 100°C/boiling point of water too low.  
NOT: water boils off first
- (iii) so that the liquid is the same temperature throughout/no hot or cold spots/so the tube is the same temperature as the thermometer/so heat can circulate in all places [1]  
ALLOW: so that temperature of liquid is balanced  
NOT: to keep temperature constant
- 4 (a) (i) breaking down of molecules substances using heat [1]  
(ii) substance which speeds up a reaction [1]  
NOT: alters/changes rate of reaction  
NOT: speeds up and slows down rate
- (b) ethene/ethylene [1]  
NOT: formula
- (c) (i) paraffin [1]  
(ii) 4000g/4kg [1]  
(correct unit needed)
- (iii) C<sub>2</sub>H<sub>4</sub>; H<sub>2</sub> [2]
- (d) (i) two units polymerised with continuation bonds at either end and hydrogen atoms drawn [1]  
ALLOW: -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-  
ALLOW: -[-CH<sub>2</sub>CH<sub>2</sub>-]<sub>n</sub>  
ALLOW: -[-CH<sub>2</sub>-]<sub>n</sub>
- (ii) addition (polymerisation) [1]
- 5 (a) (sodium) hydroxide/ammonia; → green/grey green; [2]  
silver nitrate; → yellow; [2]  
ALLOW: lead nitrate NOT: cream  
ALLOW: bubble chlorine → grey/black (precipitate)  
silver nitrate; → white; [2]  
barium chloride/nitrate; → white; [2]  
ALLOW: lead acetate

Page 3	Mark Scheme	Syllabus	Paper
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- (b) filtration/filtering or diagram of correct apparatus for filtration (filter paper must be present on diagram)  
 NOT: decanting  
 sodium chloride through filter paper/shown on diagram;  
 NOT: filtrate through filter paper  
 evaporate off water from sodium chloride/suitable diagram [3]  
 ALLOW: distilling off water
- (c) different atoms/elements  
 (chemically) joined/bonded/combined (both points needed)  
 (reference to mixtures = 0 unless qualified enough in time frame e.g. a mixture of elements which are then chemically combined) [1]
- (d) (i) chlorine/ $Cl_2$  [1]  
 (ii) sodium/Na [1]
- 6 (a) potassium/magnesium/aluminium [1]
- (b) they did not have electricity/did not know about electrolysis/did not know the metal existed [1]  
 NOT: did not have the right technology
- (c) (i) indication that bubbles produced rapidly or quickly/slower than magnesium but faster than zinc [1]  
 OR number of bubbles produced intermediate between magnesium and zinc; uranium dissolved slower than magnesium but faster than zinc/dissolves at medium rate etc. [1]  
 (ii) atoms of same element with different mass number/different number of neutrons/different nucleon number [1]  
 NOT: compounds/molecules with different mass number  
 (iii) indication of use for energy – nuclear power stations/nuclear energy [1]  
 ALLOW: atomic/nuclear bombs  
 NOT: curing cancer/medical uses  
 NOT: 'for fuel'
- (d) magnesium oxide [1]  
 ALLOW: MgO
- (e) (i) idea of mixture of (different) metals [1]  
 (ii) alloys harder/stronger/decreased malleability/increased toughness/increased corrosion resistance/heat or electrical resistance increased [1]  
 NOT: increase in melting point  
 NOT: cheaper  
 NOT: improving properties
- (f) removes oxygen from zinc oxide [1]  
 ALLOW: definition of reduction involving oxidation numbers/electron transfer
- (g) (i) reversible reaction [1]  
 ALLOW: equilibrium  
 (ii) 76-80% [1]
- (h) (i) correct electronic structure of Mg (2.8.2) on diagram [1]  
 (ii) loses two electrons/loses its valence electrons = 2  
 forms  $Mg^{2+}$  ion = 1  
 loses electron(s) = 1 [2]  
 forms  $Mg^{2+}$  ion by losing electrons = 2