June 2004

# INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

**SYLLABUS/COMPONENT: 0620/02**

**CHEMISTRY**

UNIVERSITY of CAMBRIDGE
International Examinations

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| | Chemistry - June 2004 | 0620 | 02 |

**1 (a)** B, C, F (all needed); [1]
Only contain one type of atom [1]
NOT: contain one kind of molecule
NOT: cannot be split using chemical means

**(b)** C [1]

**(c) (i)** B [1]

**(ii)** any gas with diatomic molecules e.g. chlorine, hydrogen, hydrogen chloride [1]

**(d) (i)** F [1]

**(ii)** pencil 'leads'/in pencils/lubricant/in electrical conductors/for electrodes/ in tennis racquets/in golf clubs/hockey sticks etc [1]

**(e) (i)** substance containing 2 or more different atoms combined/bonded/joined (both parts needed for mark) [1]
ALLOW: elements (chemically) combined

**(ii)** methane [1]

**(f) (i)** 8 electrons round chlorine and bonded pair with dot and cross = 2 [2]
ALLOW: all dots or all crosses
Correct number of electrons but bonded pair not clearly on overlap = 1
NOT: molecules other than hydrogen chloride

**(ii)** covalent [1]

**(iii)** blue litmus; [1]
(litmus) turns red [1]

**(iv)** pH2 [1]

**(v)** 2 [1]

**(vi)** magnesium chloride [1]
NOT: formula

**Total = 17**

**2 (a)** insoluble particles/solids/dirt trapped/caught on stones; [1]
NOT: filter reacts with insoluble impurities
NOT: impurities unqualified
Water passes through/filtered OWTTE [1]

**(b) (i)** kill bacteria/germs, disinfect water OWTTE [1]

**(ii)** neutralises acidity/water [1]
ALLOW: reacts with acids in water

**(iii)** calcium hydroxide [1]
NOT: formula

**(iv)** neutralising acid soils/neutralising acidic (industrial) waste/making bleaching powder/removing acidic gases/in Solvay process/in recovery of ammonia/making limewater/in water softening/for making plaster/for making mortar/controlling soil acidity [1]
NOT: neutralising acids unqualified
NOT: making cement

**(c)** **(i)** 100; [1]
°C (conditional on 100) [1]

**(ii)** anhydrous cobalt chloride/anhydrous copper sulphate (or correct colours); [1]
NOT: cobalt chloride/copper sulphate unqualified
Turns pink/blue (respectively) [1]

**(iii)** any suitable e.g. washing/cleaning/drinking/cooking [1]

**(d)** B [1]

**(e)** ethanol [1]
NOT: alcohol

**(f)** potassium hydroxide; hydrogen [1]
NOT: symbols

**Total = 15**

**3** **(a)** means of measuring gas volume e.g. gas syringe/measuring cylinder (must be graduated); [1]
flask/test tube/vessel with calcium carbonate + acid leading to syringe etc
IGNORE: lack of reference to closed system (unless drawing incorrect) [1]
record volume on gas syringe/measuring cylinder/measure how much carbon dioxide given off [1]
at various time intervals/at a particular time [1]
OR
flask/vessel with calcium carbonate and hydrochloric acid in flask (1)
measure its mass at beginning of experiment (1)
measure mass of flask and contents during reaction (1)
at specific time(s) (1)

**(b)** **(i)** faster/greater/speeds up [1]

**(ii)** slower/less [1]

**(iii)** faster/greater/speeds up [1]

**(c)** **(i)** add aqueous sodium hydroxide; [1]
white precipitate; [1]
insoluble in excess [1]
(incorrect reagent = 0)
ALLOW: flame test - brick red

**(d)** **(i)** high in the reactivity series/very reactive [1]

**(ii)** 2 electrons in outer shell; [1]
inner shells correct as 2.8.8 [1]

**Total = 13**

**4** **(a)** ethanol - solvent
ethene - polymer
bitumen - roads [3]

**(b)** ethanol [1]

**(c)** **(i)** C [1]

**(ii)** A [1]

**(iii)** B [1]

**(iv)** D [1]

**(d)** **(i)** (compound) containing only carbon and hydrogen [1]
NOT: it contains carbon and hydrogen

**(ii)** has only single bonds/ has general formula $C_nH_{2n+2}$ [1]
NOT: it is saturated

**Total = 10**

**5** **(a)** chlorine, argon, potassium, bromine, iodine [1]
ALLOW: symbols

**(b)** chlorine, potassium, argon, bromine, iodine [1]
ALLOW: symbols

**(c)** 2nd box down ticked [1]

**(d)** chlorine, bromine, iodine (all 3 needed) [1]
ALLOW: symbols

**(e)** **(i)** potassium/K [1]

**(ii)** argon/Ar [1]

**(f)** 1st and 4th boxes ticked (1 mark each) [2]

**(g)** **(i)** high (boiling point) [1]

**(ii)** conducts/is high [1]

**(h)** potassium loses an/one electron/loses outer shell [1]
chlorine gains an/one electron/outer shell becomes complete [1]
ALLOW: (for 1 mark) potassium loses two electrons + chlorine gains two electrons
ALLOW: e.g. 2.8.8.1 → 2.8.8 for first mark
Any indication of sharing electrons = 0

**Total = 12**

**6 (a)** carbon monoxide [1]

**(b)** iron oxide loses oxygen/it loses oxygen/oxidation number of iron decreases [1]
ALLOW: iron gains electrons
Answer must refer to the iron/iron oxide - therefore:
NOT: carbon monoxide gains oxygen
NOT: oxygen lost in the reaction
NOT: iron loses oxygen

**(c)** 3; 2 (one mark each) [2]

**(d) (i)** oxidise the impurities/oxidise Si or P or C/burn off the impurities [1]
NOT: get rid of impurities
NOT: slag formation

**(ii)** exothermic [1]

**(iii)** is/floats above the molten iron [1]

**(iv)** calcium oxide [1]

**(v)** stronger/harder/not brittle/less easily corroded ORA e.g. iron rusts [1]
NOT: less corrosive

**(e)** any 3 of:
high melting/boiling points;
have coloured compounds (NOT: they are coloured);
have high densities;
form complex ions;
elements/compounds are good catalysts;
form ions with different charges/variable oxidation states [3]

**(f)** alloys [1]

**Total = 13**

**Grand Total = 80**