UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the November 2005 question paper

0620 CHEMISTRY

0620/02 Paper 2 (Core Theory)

Maximum mark 80

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

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1 **(a)** **(i)** N [1]

(ii) N/O/F/Cl/Br [1]

(iii) Br [1]

(iv) He/Ne/Ar/Kr **[1]**

(v) C **[1]**

(vi) He/C/N/O **[1]**

(vii) N **[1]**

(b) **(i)** light bulbs/lamps/other suitable uses **[1]**

(ii) balloons/other suitable uses **[1]**

(iii) in oxygen tents in hospitals/oxyacetylene welding/other suitable uses **[1]**

(c) **(i)** 8 electrons in outer shell;
all other electrons correct i.e. 2,8 **[2]**

(ii) full outer shell/outer shell cannot gain or lose electrons/stable electronic configuration with 8 electrons in outer shell **[1]**

TOTAL 13

2 **(a)** NaCl **[1]**

(b) evaporation of the water **[1]**

(c) 3rd box down ticked **[1]**

(d) (aqueous) silver nitrate; white precipitate **[2]**

(e) **(i)** calcium sulphate **[1]**

(ii) 136 **[1]**

(iii) $2H_2O$ **[1]**

(iv) hydration **[1]**

(v) H_2SO_4; 2 **[2]**

(vi) heat (constantly) given out when anhydrite reacts with water **[1]**

(f) 4th box ticked **[1]**

TOTAL 13

3 **(a)** suitable graduated apparatus for gas collection;
flask + reactants + closed system;
correct labels (at least 2)

(b) **(i)** substance which speeds up the rate of a reaction **[1]**

(ii) X;
slope or gradient greatest/produced most gas in named time interval below 70s **[2]**

(iii) same amount of hydrogen peroxide used/all conditions kept the same **[1]**

(iv) very high melting or boiling points/high densities/form coloured compounds/form ions with different charges owtte **[2]**

(c) particles (of hydrogen peroxide) move faster;
greater frequency of collisions **[2]**

(d) **(i)** enzymes are from living things/enzymes can be denatured/enzymes specific for one reaction/enzymes are proteins **[1]**

(ii) D **[1]**

TOTAL 13

4 **(a)** 2 from calcium/magnesium/sodium;
they are metal oxides/oxides of (reactive) metals are basic **[2]**

(b) **(i)** nitrogen dioxide; sulphur dioxide **[2]**

(ii) nitrogen dioxide: from car exhausts;
sulphur dioxide: from burning fossil fuels **[2]**

(c) **(i)** carbon dioxide **[1]**

(ii) high temperature (ALLOW: heat)
NOT: catalysis on its own **[1]**

(d) **(i)** too reactive/above C in reactivity series owtte **[1]**

(ii) 2; CO_2 **[2]**

(iii) removal of oxygen from a compound/addition of electrons
ALLOW: addition of hydrogen **[1]**

TOTAL 12

5 **(a)** methane

(b) A and B

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

(ii) correct displayed formula = 2
correct displayed formula but not O – H bond = 1 **[2]**

(iii) heated with steam; suitable catalyst **[2]**

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

(ii) bromine (water); decolourised **[2]**

(e) **(i)** ethanoic acid **[1]**

(ii) litmus; goes red/pH paper or meter; below7/bubbles of gas when added to a carbonate **[2]**

TOTAL 13

6 **(a)** aluminium oxide **[1]**

(b) ions must be free to move **[1]**

(c) **(i)** graphite/carbon **[1]**

(ii) to the cathode/negative electrode;
A*l* ions are positive/positive ions are attracted to negative electrode **[2]**

(d) decreased; cryolite; electrical **[3]**

(e) **(i)** aluminum has a low density **[1]**

(ii) low(er) electrical conductivity **[1]**

(iii) it is stronger (than aluminum) **[1]**

(iv) ceramic **[1]**

(f) **(i)** lightweight **[1]**

(ii) add sodium hydroxide; white ppt; soluble in excess **[3]**
OR
add aqueous ammonia; white ppt; insoluble in excess

TOTAL 16

GRAND TOTAL 80