UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2006 question paper

0620 CHEMISTRY

0620/02 Paper 2, maximum raw mark 80

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do 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.

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1 **(a)** Substance containing only 1 type of atom/substance which cannot be broken down to any other substance by chemical means **[1]**

(b) B **[1]**

(c) A + D (both needed) **[1]**

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

(ii) carbon **[1]**

(iii) drill bits/ for cutting OWTTE **[1]**

(e) Any 3 of:
conducts heat/conducts electricity/malleable/ductile/sonorous/shiny
NOT: silvery/high melting OR boiling points **[3]**

(f) **(i)** alloy(s) **[1]**

(ii) mild steel → car bodies;
stainless steel → chemical plant;
aluminium → aircraft ALLOW car bodies;
copper → electrical wiring **[4]**

[Total: 14]

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

(b) **(i)** CH_4; O_2 (1 mark each) **[2]**

(ii) fuel OWTTE **[1]**

(iii) arrangement: random/not regularly arranged/not ordered/widely spaced OWTTE;
motion: moving/random; **[2]**

(iv) alkane(s) **[1]**

(v) C_2H_6 box – 2nd from left ticked **[1]**

(c) C **[1]**

(d) **(i)** the bacteria NOT: living things/plants/animals **[1]**

(ii) speeding up of a chemical reaction by a specific substance **[1]**

(e) phosphorus; nitrogen (1 each) **[2]**

[Total: 13]

3 **(a)** **(i)** D **[1]**

(ii) A + C (both needed) **[1]**

(iii) B **[1]**

(iv) E **[1]**

(v) C **[1]**

(b) sharing; chlorine; low; diamond; strong **[5]**

(c) **(i)** 2 electrons paired and two atoms shown **[1]**

(ii) lighted splint; pops/explodes OWTTE **[2]**

[Total 13]

4 **(a)** **(i)** hydrogen; **[1]**

(ii) ethene **[1]**

(iii) carbon dioxide **[1]**

(b) (add) bromine water/aqueous bromine ALLOW: bromine:
with ethene – decolourises OWTTE;
with methane – no reaction/remains orange/brown OWTTE **[3]**

(c) **(i)** (addition) polymerisation **[1]**

(ii) 4th box from left (last one) ticked **[1]**

(d) cracking ALLOW thermal decomposition **[1]**

(e) **(i)** test: add (red) litmus paper;
goes blue **[2]**

(ii) 17 **[1]**

(f) sulphur dioxide formed;
harmful effect of sulphur dioxide e.g. acid rain/breathing difficulties/
kills fish/leaf drop on trees etc **[2]**
ALLOW: carbon dioxide; global warming
ALLOW: carbon monoxide; poisonous

[Total: 14]

5 **(a)** **(i)** filtration/description of filtration **[1]**

(ii) weakly acidic/2nd box down ticked **[1]**

(b) **(i)** from the limestone/ from the underlying rocks **[1]**

(ii) carbon dioxide; water (1 each) **[2]**

(c) **(i)** carbonate/CO_3^{2-} **[1]**

(ii) 20 mg (unit must be present) **[1]**

(iii) nitrate/NO_3^- **[1]**

(iv) (aqueous) sodium hydroxide/other suitable hydroxide/ammonia;
red-brown/ brown;
precipitate **[3]**
IF: 'soluble in excess' minus 1 mark

(d) carbon dioxide higher (in soil air);
nitrogen higher (in soil air);
oxygen lower (in soil air); **[3]**

(e) correct formula with all atoms and bonds **[1]**

[Total: 15]

6 **(a)** haematite; ALLOW other correct named ores **[1]**

(b) **(i)** 2:2 **[1]**

(ii) poisonous ALLOW: answers related to reducing oxygen carrying capacity of blood/effect on haem etc **[1]**

(c) **(i)** iron oxide + carbon monoxide → iron + carbon dioxide **[1]**
(wrong oxidation number(s) = 0)

(ii) reduction **[1]**

(d) **(i)** (thermal) decomposition **[1]**

(ii) any suitable e.g. making cement **[1]**

(iii) slag **[1]**

(e) **(i)** manganese **[1]**

(ii) acidic **[1]**

(iii) 6% **[1]**

[Total: 11]