UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0620 CHEMISTRY

0620/02 Paper 2 (Core Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

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.

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

CIE is publishing the mark schemes for the October/November 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 **(a)** sulphur dioxide [1]
ALLOW: SO_2/sulphur/S

(b) carbon dioxide [1]
ALLOW: CO_2

(c) carbon monoxide [1]
ALLOW: CO

(d) water [1]
ALLOW: H_2O

(e) calcium oxide [1]
ALLOW: CaO/calcium/Ca

(f) calcium oxide and sodium oxide [1]
ALLOW: correct formulae or calcium and sodium

(g) both bonds shown by dot and cross [1]
ALLOW: dot and cross anywhere along the bonding line

(h) P_2O_3 [1]
ALLOW: $2P_2O_3$

2 **(a)** **(i)** monomers [1]

(ii) alkenes [1]

(iii) contains (carbon-carbon) double bonds [1]
ALLOW: can add on extra hydrogen
substance containing hydrogen and carbon only [1]

(iv) bromine water/acidified potassium permanganate [1]
no reaction/stays orange/nothing [1]
(bromine) decolourised/goes colourless [1]

(b) addition/additional [1]
ALLOW: ethene/alkene

(c) **(i)** any two of:
chloride/hydrogencarbonate/nitrate/sulphate [1]
ALLOW: correct formulae

(ii) calcium/Ca^{2+}/Ca [1]

(iii) 40 (mg) [1]

(iv) chloride/Cl^- [1]

(v) nitrate/NO_3^- [1]

(vi) e^-/e [1]

(d) 2nd box down ticked [1]

(e) **(i)** condenser/condensing tube [1]

(ii) beaker [1]

(iii) it is different/boiling point (in flask) is higher/pure water is lower [1]

(f) any two of:
bacteria or soil particles are larger than gaps in limestone/
water particles are smaller than gaps in limestone/
particles/bacteria or soil (particles) are larger than water molecules
idea of bacterial or soil particles trapped above the limestone/
idea of filtration [2]
ALLOW: particles/bacteria or soil (particles) are larger than water molecules

3 **(a)** aluminium – aircraft bodies;
potassium – very soft;
platinum – electrodes;
iron – extracted from haematite; [4]

(b) any two of:
fizzing or bubbles/
iron disappears or dissolves/
solution becomes coloured/green [2]
NOT: gets warm/iron changes colour/precipitate formed

(c) **(i)** mixture;
iron;
harder/stronger/more brittle or other suitable comment [3]
ALLOW: hard/strong

(ii) any alloy e.g. brass/bronze [1]

(iii) any two methods e.g.
galvanising/painting/covering with oil/sacrificial protection (or description)/
plating with another metal [2]
NOT: unspecified 'coating'

4 **(a)** increases (at first) ALLOW: becomes acidic;
then decreases/becomes less acidic [2]
NOT: reference to pH values/ends up alkaline

(b) **(i)** any two of:
sweet is acidic/
saliva only produced gradually or saliva not present at first (so pH goes down at first)/
saliva neutralises the acid ALLOW: neutralises the sweet/
as more saliva produced more acid neutralised/ [2]

(ii) neutralisation [1]

(c) **(i)** -OH group circled [1]

(ii) carboxylic (acid) [1]

(iii) CH_3CO_2H/CH_3COOH/correct displayed formula [1]
ALLOW: $C_2H_4O_2$

(d) **(i)** gas given off/carbon dioxide given off [1]
IGNORE: wrong gas

(ii) filter funnel and filter paper;
ALLOW: just filter paper cone
calcium citrate/precipitate shown in funnel and filtrate below [2]
(if no labels max 1 mark)

(iii) to remove (excess) lemon juice [1]
ALLOW: to remove impurities

(iv) evaporate (off water)/boil off some of the water and leave [1]
ALLOW: leave solution in warm place/on the windowsill
NOT: 'heat' without suitable qualification

(v) microorganisms [1]

5 **(a)** **(i)** removal of oxygen from compound/electron gain/decrease in oxidation number [1]
ALLOW: addition of hydrogen

(ii) copper [1]

(iii) idea of electric circuit;
bulb lights/meter gives reading [2]
NOT: electrolysis/melt the substance to see if it conducts

(b) **(i)** hydrocarbons (in coal)/the coal [1]
ALLOW: from the damp cotton wool

(ii) close together/randomly arranged
NOT: further apart than in a solid
moving (from place to place/randomly)/random movement [2]

6 **(a)** proton number/atomic number/number of + charges in nucleus [1]

(b) they have the same (relative) atomic mass [1]

(c) noble gases/group 0/group 8/group 18/rare gases [1]

(d) any 3 differences e.g.
no atomic numbers shown/
no relative atomic masses shown/
(Newlands') groups are horizontal or periods are vertical/
no block for transition elements/
Co and Ni appear to be in with halogens or other similar discrepancies/
some elements not in correct order of molar masses/
more elements in modern table/
no man made elements/
any other suitable difference [3]

(e) **(i)** layers slide over each other/layers flake off easily/forces between layers weak [1]
NOT: weak forces between carbon atoms (without any further details)

(ii) no weak bonds/only strong bonds [1]
ALLOW: giant structure/lattice of covalent bonds

7 **(a)** methane
water
copper [1]

(b) silver – conducts/yes;
sodium chloride – soluble;
sulphur – insoluble;
copper sulphate – no; [4]

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

(ii) chlorine/Cl_2 NOT Cl;
hydrogen/H_2 NOT H [2]
ALLOW: 1 mark for chlorine and hydrogen at incorrect electrodes

(iii) anode [1]

(iv) in solid ions cannot move/fixed in place;
in aqueous solution ions move [2]