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

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International Examinations

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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'

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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]