UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2006 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 students, 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.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

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International Examinations

1 (a) C **[1]**

(b) (i) 2;2 (both needed) **[1]**

(ii) 2 from:
floats on water/on surface; moves (on surface); forms a ball/melts;
disappears/dissolves
ALLOW: spits/explodes (at end of reaction) **[2]**
NOT: reacts violently

(iii) blue;
solution is alkaline/sodium hydroxide/ (NaOH) is alkaline **[2]**
ALLOW: (solution) is basic/is a base

(iv) 2nd and 3rd boxes ticked (1 each) **[2]**

(c) faster/more reactive OWTTE (than potassium) **[1]**

(d) (i) atoms of same element/same number of protons with different number of neutrons/different mass numbers **[1]**
NOT: elements/compounds with different mass numbers

(ii) 11 **[1]**

(iii) 19 **[1]**

(iv) energy/nuclear fuel/nuclear power plants
NOT: nuclear weapons/unqualified fuel **[1]**

[Total: 13]

2 (a) CO_2 **[1]**

(b) (i) reduced;
metal;
endothermic **[3]**

(ii) carbon **[1]**

(iii) limewater;
turns cloudy/milky/goes white **[2]**

(c) add(aqueous) sodium hydroxide;
light blue ppt;
insoluble in excess **[3]**
OR
add aqueous ammonia;
light blue ppt;
soluble in excess/giving dark blue solution

(d) (i) correct diagram (2,4) **[1]**

(ii) (period) 2 **[1]**

(e) (i) alkane(s) **[1]**

(ii) ethane **[1]**

[Total: 14]

3 (a) ring around OH group only **[1]**

(b) unsaturated because it contains (C=C) double bonds (both points needed) **[1]**

(c) carbon dioxide; water **[2]**

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

(ii) $100^{o}C$ (unit needed) **[1]**

(iii) it is above the water/floats on water **[1]**

(e) (i) on the origin line and directly below the spots **[1]**

(ii) 4 **[1]**

(iii) beaker with paper placed correctly and solvent level below the origin line and both solvent and origin line labelled **[1]**

(iv) random movement of molecules/molecules move anywhere **[1]**
NOT: molecules move from higher to lower concentration

(v) correct formula for ethanol showing all atoms and bonds
ALLOW: OH group shown without bond **[1]**

(vi) 2^{nd} and 4^{th} boxes ticked **[1]**

[Total: 13]

4 (a) substance containing different atoms bonded/ joined etc **[1]**

(b) treating acid soils/making plaster/any other specific reasonable use
NaCl;
$CaCO_3$; in blast furnace/for making iron/making lime/any other specific reasonable use;
ammonium nitrate; N = 2, H = 4, O = 3; **[6]**

(c) 80 **[1]**

[Total: 8]

5 (a) it is (very) reactive/near top of reactivity series **[1]**

(b) gives off bubbles rapidly;
dissolves quickly; **[2]**

(c) for cutting/welding/for oxyacetylene blow torch **[1]**

(d) (i) $2H_2O$ **[1]**

(ii) neutralization **[1]**

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

(ii) starts alkaline/stated alkaline pH;
pH decreases/to stated lower pH **[2]**
NOT: becomes more acid

[Total: 9]

6 (a) $PbBr_2$ **[1]**

(b) giant; ionic **[2]**

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

(ii) platinum **[1]**

(iii) ions can move/so it can conduct electricity
NOT: ions are free **[1]**

(iv) bromine;
lead **[2]**

(d) (i) Br_2 **[1]**

(ii) orange/brown/red-brown: NOT yellow **[1]**

(iii) bromine is more reactive than iodine/bromine is higher in the activity series than iodine (must be comparison)
ALLOW: ideas about stronger bonding in NaBr **[1]**

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

(ii) **D** **[1]**

[Total: 13]

7 (a) **A** + **D** (both needed);
reason: high melting point/coloured chlorides/coloured compounds **[2]**
NOT: properties of transition elements not shown in the table

(b) iron sulphate **[1]**

(c) idea of measuring volume of gas/amount of gas;
in measuring cylinder/tube;
idea of measuring (volume of gas) with time/time intervals; **[3]**

(d) (i) doubling concentration doubles rate/rate proportional to concentration = 2
increasing concentration increases rate/speed = 1 **[2]**

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

(iii) slower/decreases **[1]**

[Total: 10]

[TOTAL: 80]