

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

November 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0620/02

CHEMISTRY
Core



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- 1 (a) (i) B [1]
- (ii) A [1]
- (iii) C [1]
- (iv) D [1]
- (b) (i) distillation [1]
ALLOW: fractional distillation
- (ii) chromatography [1]
- (c) (i) fuel gas [1]
- (ii) paraffin: any one of: [1]
oil stoves/heaters/for heating; aircraft fuel;
ALLOW: for lamps/for lighting/for cooking
bitumen: any one of: [1]
road surfaces; ALLOW: for roads
roofing tar; NOT: 'tar' without qualification
in/for electrical cables; NOT: electrical cables
- (d) hydrocarbons [1]
- (e) correct structure with correct pairings of dots and crosses [2]
(correct structure with only dots or only crosses/random dots/crosses = 1)
IGNORE: lack of inner electron shell of carbon
- (f) alkane(s) [1]
- Total = 13**
- 2 (a) respiration [1]
- (b) (i) lighted splint/put mouth of test tube of hydrogen in flame; [2]
pops/explosion
- (ii) makes explosive mixture [1]
- (iii) (red) litmus paper/universal indicator paper/pH paper; [2]
turns blue
ALLOW: HCl gas/HCl on glass rod; white fumes
- (c) correct displayed/geometric formula for ethanoic acid [1]
(all bonds must be shown)
- (d) (i) 2H₂ [1]
- (ii) fuel/making ethyne/making carbon black/making synthesis gas/ [1]
making methanol
NOT: natural gas
NOT: cooking

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- (iii) 1st and 3rd boxes ticked [2]
1 box correct = 1 mark
- (e) (i) zinc [1]
- (ii) iron/nickel [1]
ALLOW: zinc
- (iii) lead [1]
- (iv) calcium carbonate [1]
- (v) aluminium [1]

Total = 16

- 3 (a) In iron making
ALLOW: in blast furnace/for neutralising acid soils or acidic lakes etc./for building/making cement OR concrete/hard core/road foundations [1]
NOT: removing impurities from iron ore
NOT: purification of water
- (b) $C + O_2 \rightarrow CO_2$
correct formula for oxygen;
correct formula for carbon dioxide [2]
(-1 per other error)
ALLOW: $2C + O_2 \rightarrow 2CO$ (2 marks)
- (c) exothermic [1]
NOT: combustion
- (d) calcium oxide;
carbon dioxide [2]
NOT: symbols
- (e) (i) 2 (HCl) [1]
- (ii) limewater;
turns milky/cloudy [2]
- (f) (i) oxidation;
the carbon has gained oxygen/oxidation number of carbon has increased/carbon has lost electrons [2]
(the answer must refer to the carbon)
NOT: carbon gets oxidised
- (ii) blowtorches/welding/cutting metals [1]
ALLOW: to make (monomers for) neoprene/synthetic rubber
NOT: other organic syntheses

Total = 12

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- 4 (a) halogen(s) [1]
- (b) (i) (atoms with same atomic number) but different mass number/different numbers of neutrons/different nucleon number [1]
NOT: atoms with different atomic masses
- (ii) 35 + 35 [1]
44; 46 [2]
35 + 35 [1]
- (c) (i) chlorine more reactive (than bromine)/higher in the reactivity series (than bromine) (or reverse argument) [1]
ALLOW: it is more reactive
NOT: chlorine higher in the table
- (ii) potassium bromide + chlorine → potassium chloride + bromine [1]
ALLOW: completely correct symbol equation
- (d) (i) 3.5 [1]
ALLOW: 3.3- 3.5
- (ii) pH 3 [1]
- (iii) pH 7 [1]
- (e) bromine (water) decolourised/goes from red-brown/orange/brown to colourless [1]
ALLOW: it is decolourised
NOT: incorrect colours to colourless

Total = 12

- 5 (a) 5 (O₂) [1]
- (b) anhydrous/white copper sulphate; [2]
turns blue
OR
anhydrous/blue cobalt chloride;
turns pink
NOT: boiling point 100°C
- (c) 1st and 2nd boxes ticked [2]
- (d) (i) carbon monoxide [1]
- (ii) incomplete combustion of the fuel/gas/burning in limited amount of oxygen/air [1]
NOT: incomplete burning
NOT: lack of air
- (e) (i) gas [1]

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- (ii) coal [1]
- (iii) any two of:
 erodes buildings containing (calcium) carbonate OR erodes/corrodes metals in buildings;
 NOT: corrodes (calcium) carbonate
 kills (small) animals in water OWTTE/kills pond life;
 (NOT: kills animals)
 damages trees/plants/causes leaf burn/damages plant roots; [2]
 ALLOW: kills plants
 NOT: causes breathing difficulties
 NOT: destroys buildings/wildlife/plants/animals
- (iv) white;
 precipitate/solid [2]
- Total = 13**
- 6 (a) aluminium high in reactivity series/too reactive [1]
 ALLOW: aluminium higher in reactivity series than carbon
 ALLOW: carbon will not reduce aluminium oxide
- (b) electrical heating [1]
 NOT: heating
- (c) conducts electricity/ [1]
 ALLOW: good conductor
 NOT: has high melting point/inert/unreactive
- (d) cathode [1]
- (e) saves energy/too much energy required to melt aluminium oxide;
 ALLOW: too much heat required/electricity OR heat is expensive
 NOT: unqualified 'expensive':
 will not melt the steel casing [2]
 ALLOW: melting point is higher than steel
 NOT: melting point too high
- (f) any two of :
 oxygen reacts with the carbon/graphite/(positive) electrode/anode gets oxidised;
 carbon dioxide formed;
 carbon electrodes/anodes decrease in size/get eroded away [2]
 ALLOW: anodes get eaten away/wear away
 NOT: anodes dissolve
- (g) $3 e^-$ [1]
 ALLOW $3e$
- (h) positive ions attracted to negative electrode/positive charges attracted to negative/aluminium has oppositely charged ions to the negative electrode;
 ALLOW: aluminium ions are positive [1]

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(i) 60% [1]

(ii) 3 from:
malleable;
ductile;
sonorous;
shiny;
conduct heat;
conduct electricity [3]
ALLOW: flexible/bendy
NOT: high melting/boiling points/high densities

Total = 14