

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 80

SYLLABUS/COMPONENT : 0620/3

**CHEMISTRY
(EXTENDED)**



UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

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- When the name of a chemical is demanded by the question, a **correct** formula is usually acceptable. When the formula is asked for, the name is not acceptable.
- When a word equation is required a **correct** symbol equation is usually acceptable. If an equation is requested then a word equation is not usually acceptable.
- An incorrectly written symbol, e.g. NA or CL, should be penalised once in a question.

In the mark scheme if a word or phrase is underlined it(or an equivalent) is required for the award of the mark.

(.....) is used to denote material that is not specifically required.

OR designates alternative and independent ways of gaining the marks for the question.

or indicates different ways of gaining the same mark.

COND indicates that the award of this mark is conditional upon a previous mark being gained.

- Unusual responses which include correct Chemistry that answers the question should always be rewarded-even if they are not mentioned in the marking scheme.
- All the candidate's work must show evidence of being marked by the examiner.

- 1 (a) (i) Any metal above aluminium Na, K, Ca, Mg etc [1]
- (ii) If (i) is correct then word equation [1]
- (iii) **conseq** to (i) symbol equation [2]
If not balanced **ONLY** [1]
- (b) (i) $\text{Al}^{3+} + 3\text{e} \rightleftharpoons \text{Al}$ [2]
For Al^{3+} **ONLY** [1] anywhere in equation
- (ii) bauxite [1]
- (iii) molten **or** liquid **or** fused **or** homogeneous [1]
cryolite [1]
- (iv) oxygen from oxide **or** formed at anode **or** implied it is formed [1]
carbon (anode) to form carbon dioxide [1]
- (c) (i) packaging of food **or** window frames **or** roofs [1]
accept "cans"
NOT aircraft cars etc
- (ii) low density [1]
light alloys for aircraft [1]
or electrical cables
good conductor
or foil
malleable
or cooling utensils

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good conductor of heat

If use repeated with different properties then 2/3

(d) (i) protected by oxide layer or temperature/energy
heat low [1]

(ii) removal of oxide layer [1]
temperature/energy/heat increases [1]

NB comments must relate to this reaction

TOTAL = 17

2 (a) (i) limestone or quicklime or calcium oxide [1]
or marble or chalk or calcium carbonate
NOT just lime

(ii) Ca^{2+} and SO_4^{2-} [2]

(iii) blue precipitate accept light blue precipitate
then blue solution [1]
dissolves or solution [1]
deep blue [1]

(b) light
chlorophyll
water and carbon dioxide
react to form (glucose) and oxygen [4]
or equation [2]

(c) (i) provides enzymes or named enzyme or catalyst or anaerobic
respiration of yeast cells [1]

(ii) oxidises alcohol [1]
to ethanoic acid or acetic acid or vinegar [1]
accept anaerobic [1] and respiration [1] if not credited in (i)

(iii) above “kills” or denatures yeast
lower slows reaction
most efficient/best/suitable temperature for enzymes
any TWO [2]
NOT repeat optimum

(d) butanoic acid [1]
propanol [1]
names only

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TOTAL = 17

- 3 (a) (i) amide amino acids [2]
or peptide
- ester carboxylic acid or salts or glycerol [2]
or soap or fatty acids
- sugar or glucose or named sugar [1]
- (ii) nylon(s) or polyamide [1]
polyesters or terylene or dacron [1]
- (iii) bromine (water or in organic solvent) [1]
remains brown/orange red/orange/yellow [1]
NOT stays the same
goes colourless [1]
OR potassium manganate(VII)
- (b) (i) catalytic converter [1]
- (ii) combustion [1]
incomplete or insufficient oxygen [1]
- (iii) no carbon compounds or carbon monoxide formed
or reduced oxides of nitrogen
or no unburnt hydrocarbons
or only forms water
or water is not a pollutant
ANY ONE [1]
- (c) (steam) and alkane [1]
heat or catalyst or details of chemistry – forms carbon monoxide/dioxide
and (hydrogen) [1]
- OR electrolysis [1]
brine or acidified water
or hydrogen forms at cathode [1]
- OR carbon/coke [1]
heat or details of chemistry – forms carbon monoxide/dioxide and
(hydrogen) [1]

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TOTAL = 16

- 4 (a) (i) fluorine [1]
(ii) iodine and astatine [1]
- (b) (i) $\text{Cl}_2 + 2\text{Br}^- \Rightarrow 2\text{Cl}^- + \text{Br}_2$ [2]
not balanced **ONLY** [1]
(ii) because it has lost electron(s) (Must be electron transfer) [1]
Not conseq because it took electrons from the bromide [1]
or chlorine gained electrons
or because chlorine was reduced
- (iii) Iodide or metals or iron(II) etc [1]
not iodine accept iodine ions or alkene
- (c) P and 3Br [1]
COND upon first mark being awarded
3bp and 1nbp around phosphorus [1]
8e around each bromine [1]
if charges then first mark only
- (d) (i) balanced [1]
(ii) pH [1]
phosphorous acid has higher pH [1]
OR electrical conductivity [1]
phosphorous acid poorer [1]
OR reaction with named metal or carbonate [1]
hydrobromic faster [1]
OR pH indicator [1]
correct colours [1]
- (e) (i) proton or hydrogen ion [1]
(ii) base or proton acceptor or electron pair donor [1]

TOTAL = 15