بسم الله الرحمن الرحيم

مقابل هذا المجهود ارجو منكم الدعاء لي بالمغفرة ولابنائي الهداية والنجاح والتوفيق

أرجو ان يساعد هذا المجهود على مساعدة ابنائنا طلبة ال IGCSE الثانوية البريطانية وتحصيلهم على افضل واحسن واعلى الدرجات انشاء الله.
وهذه الملفات موضوعة بصيغة ال PDF للكروبات فتعمل على جميع انواع الاجهزة ونظم الكمبيوتر وصيغة ال TIF لتعمل على اوفيس مايكروسوفت بحيث يتم القص واللصق بصيغة ال TIF بسهولة ويسر وطباعة صفحات محددة فقط حسب الطلب.

ابو احمد

للاستفسار والمساعدة اكتب لي على العنوان البريدي التالي :-
العنوان البريدي : jedeaaa@hotmail.com

In the name of god

Pry for me and my sons to success, mitigating and proselyting

This is a free past papers exams an answers scanned file's for our IGCSE sun's and daughters. The only thing I need you to do is "pry for me so GOD bless me and pry for my sons to success, mitigating and proselyting.

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If you need any help contact me at: jedeaaa@hotmail.com

IGCSE

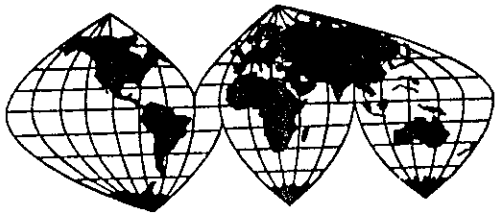
O.L Chemistry

MARK SCHEME for the question papers

Good luck

June 2001 - June 2003

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATION SYNDICATE
INTERNATIONAL EXAMINATIONS



IGCSE

O.L Chemistry

MARK SCHEME for the June 2001 question papers

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATION SYNDICATE
INTERNATIONAL EXAMINATIONS

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 40

SYLLABUS/COMPONENT : 0620/1

CHEMISTRY
(Multiple Choice)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 1	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2001	0620	1

Item	Correct Answer	Item	Correct Answer
1	B	21	A
2	A	22	B
3	C	23	A
4	A	24	B
5	A	25	B
6	C	26	D
7	B	27	D
8	C	28	B
9	C	29	B
10	D	30	D
11	D	31	D
12	D	32	D
13	A	33	B
14	C	34	A
15	D	35	C
16	B	36	A
17	A	37	C
18	D	38	B
19	B	39	C
20	C	40	A

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 80

SYLLABUS/COMPONENT : 0620/2

CHEMISTRY
(CORE)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2001	0620	2

1 (a) (Experiment) 4 **[1]**

(b) (i) 3 or 4 **[1]**

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

(c) (i) B and R/S **[1]**
(Allow BR + BS; NOT numbers)

(ii) A and R/S **[1]**
(Allow AR + AS; NOT numbers)

(d) Ring around OH group **[1]**
(NOT C-O-H)

(e) (i) $NaCl$ *(case must be correct for all letters)* **[1]**

(ii) Carbon dioxide **[1]**
(NOT CO_2)

2 (a) Correct answer = 16 **[2]**
(incorrect answer but 12 + 4 in working = 1 mark)

(b) 4 electrons in outer shell of carbon;
1 electron in outer shell of each hydrogen;
correct pairing of electrons **[3]**
(if not methane = 0)

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

(ii) any 2 distinct alkanes e.g. propane + ethane **[2]**
e.g. butane + isobutane = 1
two correct formulae = 1

(d) (i) carbon monoxide **[1]**

(ii) incomplete combustion/shortage of oxygen when fuel burnt, etc **[1]**
ACCEPT: shortage of air
NOT: lack of oxygen/lack of air

(e) (i) 2 (hydrogen sulphides); 3 (oxygens) **[2]**

(ii) idea of sulphur dioxide being acidic/dissolving in rainwater to form acid/forms acid rain; **[1]**

stated effect on environment e.g. corrosion of metals/buildings/breathing difficulties/removal of minerals from soil causing root poisoning/too acid for plants to grow **[1]**

ALLOW: harmful/poisonous to animals/fish
ALLOW: destroys vegetation/water plants
NOT: pollutant/harms the environment
NOT: destroys buildings/destroys animals
NOT: greenhouse gas/harms ozone layer

(f) (i) any suitable e.g. balloons OR airships/providing inert atmosphere (for chemical processes/to inflate aircraft tyres/for divers/in welding reactive metals/(inert atmosphere for) growing crystals of semiconductors (Ge, Si)/for pressurising rockets [1]

ALLOW: for low temperature work
NOT: for advertising signs
NOT: for treating eye/brain tumours

(ii) noble gases [1]
ALLOW: inert gases/rare gases
NOT: group 0/group 8

(iii) 2 [1]

3 (a) (i) copper; silver [2]
(if >2 elements apply +1 –1 rule)

(ii) (put spots) on (origin) line/on starting line; [1]
ALLOW:spot drawn on the diagram

(iii) idea of substance which dissolves another [1]
NOT: substance dissolving

(iv) solvent moves up paper;
different metals/ions/substances move at different rates/are absorbed better or worse by the paper/different Rf values/solubility differences; [2]
NOT: differences in density/size/charge

(b) zinc chloride; hydrogen [2]
NOT: formulae

(c) white;
NOT: creamy-white
precipitate/solid formed [2]

(d) (i) anode [1]

(ii) (allow) electrical conduction through solution/provide ions for conduction [1]
ALLOW: (it's an) electrolyte
ALLOW: ideas of moving ions
mention of ions + electrons moving = 1 maximum

(iii) 1 decreases in size/gets smaller/loses mass/dissolves etc;
NOT: processes or things which can't be seen

2 increases in size/gets bigger/ gains mass/silver deposited on it/gets plated with silver/turns silver [2]
NOT: processes or things which can't be seen

(iv) (relatively) unreactive/shiny/makes them look nice or expensive, etc [1]
ALLOW: does not rust/corrode

Page 3 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2001	0620	2

4 (a) (i) any two of: fuel gas; petrol; diesel oil [2]

(ii) any two of: naphtha; kerosene; fuel oil [2]

(b) (i) Bunsen burner/source of heating [1]
NOT: heat

(ii) larger surface area;
ALLOW: larger S/A
faster rate of reaction [2]
ALLOW: suitable kinetic theory explanations
NOT: fast reaction
NOT: allow gas through the gaps

(iii) insoluble [1]

(c) (i) cracking [1]

(ii) 1 breaking down/decomposing using heat [1]
(both idea breaking down and heat needed)
NOT: breaking down alone
NOT: breaking down using heat and catalyst

2 substance which speeds up a reaction [1]
NOT: changes rate of reaction
NOT: helps reaction
NOT: enzyme which speeds up reaction

(iii) Any two of:
not enough petrol/correct fractions from distillation of petroleum/too much of non-petrol fractions;
can make more money/higher profits;
can produce other suitable named chemicals [2]
NOT: removes unwanted materials/impurities
NOT: better fuel for cars/good quality oil

(d) 2 [1]

(e) correct displayed or graphical formula for ethene [1]
ACCEPT: correct electronic diagram

(f) (i) Any two of:
ethane has only single bonds/C-C bond;
ethene has (C=C) double bond [2]
comparison of number of hydrogen atoms e.g. ethane has 2 more H's
NOT: unsaturated/saturated
(compounds must be specified e.g. it has a double bond = 0)

(ii) lighted splint/expose to flame;
pops OWTTE (not consequential) [2]
NOT: glowing splint

5 (a) protons = 95; neutrons = 146 [2]

(b) 2 electrons round outside;
ALLOW: e for electron
2 protons in centre;
ALLOW: p for proton
2 neutrons in centre;
ALLOW: n for neutron
nucleus labelled [4]
ALLOW: nucleus (drawn) of 2 protons and 2 neutrons (written)

(c) opposite charges attract/+ moves to - [1]
ALLOW: plate A is negative

6 (a) limestone (*ALLOW chalk*) [1]
NOT: marble

(b) heating/high temperature/heat/raised temperature [1]
ALLOW: temperatures above 500°C
NOT: high temperature + high pressure
NOT: high temperature + oxygen

(c) carbon dioxide [1]
ALLOW: CO_2

(d) neutralising acids/putting on soil/in making cement, mortar, slaked lime, etc/drying gases or organic liquids/making fertilizers/decomposing dead animals [1]
NOT: neutralise alone
NOT: making quicklime
NOT: in blast furnace
NOT: in construction industry

(e) basic (oxide) [1]
ALLOW: metal (oxide)
ALLOW: ionic (oxide)

(f) calcium hydroxide [1]
ALLOW: calcium hydroxide + heat
NOT: symbols
NOT: slaked lime

(g) (i) (s) = solid;
(aq) = aqueous (solution)/solution (in water) [2]
ALLOW: in water
ALLOW: dissolved
ALLOW: aqueous $\Rightarrow$ *liquid*

(ii) measure (decrease in) mass/measure weight/weigh/observe balance reading
NOT: amount
at certain time intervals/at various times [2]
NOT: measure rate
ALLOW: change in mass with time (=2)

(iii) Any 2 of:
temperature;
size of calcium carbonate lumps
mass of calcium carbonate used [2]
ALLOW: amount of calcium carbonate
IGNORE: volume/amount of acid

(iv) boxes 1 and 4 ticked = 2 marks [2]
1 correct + 1 incorrect box ticked = 1
>2 boxes ticked = 0

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 80

SYLLABUS/COMPONENT : 0620/3

CHEMISTRY
(EXTENDED)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2001	0620	3

1 (a) Aluminium or Devarda's alloy [1]
NOT just foil
sodium hydroxide [1]
ammonia (evolved) [1]
smell or litmus goes blue [1]
Mark all four points independently

OR brown ring test [1]
iron (II) sulphate [1]
in dilute sulphuric acid [1]
conc sulphuric acid [1]

(b) (i) add acid [1]
limewater **not conseq** to acid [1]
goes milky **conseq** to limewater [1]

(ii) correct word equation [1]
glucose → carbon dioxide + ethanol
Accept balanced symbol equation
Ignore "enzymes" in equation
not alcohol, not sugar

(c).(i) endothermic favoured by high temp or energy supplied
or increases yield [1]
or moves equilibrium to right

exothermic favoured by low temp or energy removed
or increases the yield [1]
or moves equilibrium to right

endo takes in heat/energy and exo gives out heat/energy with no reference to equilibrium [1] only

(ii) high temperature increases the rate [1]
or fast enough already

(d) (i) amide or polyamide or peptide or polypeptide [1]

(ii) correct linkage [1]
COND correct chain [1]
At least one of each monomer with CH_2 groups shown or identified by a key
Chain must not be terminated by carboxylic acid or amino groups

2 (a) (i) higher [1]

(ii) increases down group [1]

(iii) $2Li + 2H_2O \rightarrow 2LiOH + H_2$ [2]
"2" missing ONLY [1]
NOT word equation

(b) (i) ions can move in liquid [1]
cannot in solid **or** only vibrate [1]

(ii) electrons move [1]
ions move [1]

(iii) hydrogen [1]
chlorine [1]
lithium hydroxide [1]
ignore references to anode and cathode

(c) (i) repeat with same volumes [1]
no indicator [1]
evaporate [1]

full credit for carbon method to remove indicator
add carbon [1]
filter [1]
evaporate [1]

(ii) 25/1000 x 1.0 = 0.025 [1]
0.025 **conseq** [1]
0.025 x1000/20 **conseq** [1]
1.25 **conseq** [1]

Working not essential 1.25 mol/dm^3 [2]

3 (a) (i) layers can slip **or** move past each other [1]
~~weak bonds~~ **or** ~~intermolecular forces~~ **or** Van der Waals forces between layers [1]

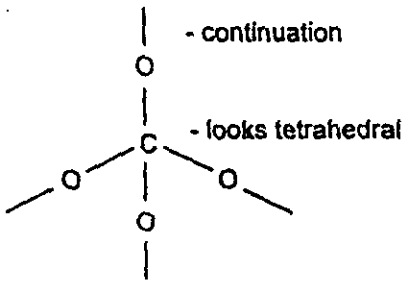
(ii) strong bonds [1]
each atom held in place **or** between all atoms **or** 4 bonds on each carbon
or tetrahedral [1]

(b) OCO [1]
4e in bonds [1]
all atoms 8e [1]

(c) close — far apart
ordered **or** lattice etc — random
vibrational — fast
or move about fixed position — random if not given above [6]
NOT free to move in any direction
NOT forces

(d) Diagram showing 1C to 4O [1]
show continuation or described as tetrahedral or looks tetrahedral [1]

If only error is silicon instead of carbon then max [1]



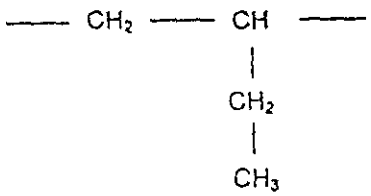
4 (a) (i) name of any other butene [1]
accept methylpropene

structure [1]
If structure and name not for same alkene max [1]

(ii) propanoic [1]
methanoic [1]

(b) (i) poly(butene) [1]
correct linkage [1]
accept carbon – carbon single bonds only in chain
any number of C's ≥ 2
and correct number of hydrogen atoms on all carbon atoms

correct repeat unit [1]



(ii) buckets/bowls/fibres /textiles/pipes insulation packaging/film(cling) etc [1]
Accept any sensible use of a plastic but NOT making plastic

(c) (i) 58(g) [1]

(ii) endothermic [1]
exothermic and exothermic [1]
C--H [1]

(iii) exothermic [1]
exo terms greater than endo [1]
Any attempt at a calculation does not have to be correct provided exo greater than endo

(d) (i) diffusion (can be credited if in (ii)) [1]
(ii) diffuse at different rates [1]
because different Mr [1]
NOT just lighter lighter molecules acceptable

Page 4 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2001	0620	3

5 (a) (i) U or Pu [1]
235 239 [1]

(ii) number of neutrons or 6 neutrons more or 4 neutrons more [1]
ONLY acceptable answers

(iii) Xenon [1]
full outer shell or 8e or stable electron configuration/distribution/structure [1]

(b) (i) K, Na, Mg or Zn or SO_2 or NaOH etc [1]

(ii) Cl_2 or Br_2 or Fe^{3+} or dichromate or manganate(VII) etc [1]

(iii) equation from either **above** [1]

(iv) 4 and 1 [1]
TiI_4 conseq [1]

(c) starch used up/broken down [1]
hydrolysis or reacts with water [1]
catalysed by acid [1]
all applied to - starch used up or hydrolysed [1]
forms glucose [1]
formula of glucose [1]
MAX [4]

(d) (i) electron loss [1]

(ii) steel gains electrons [1]
(do not be concerned about the source of electrons)
iron/steel cannot be oxidised [1]

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CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 60

SYLLABUS/COMPONENT : 0620/6

CHEMSTRY
(ALTERNATIVE TO PRACTICAL)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 3	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2001	0620	6

1 (a) Beaker [1]

(b) Ice [1]
Condenses/cools [1]

(c) White/anhydrous/dry copper sulphate/cobalt chloride [1]
Blue/pink [1]

(d) Suck gases through or similar [1]

2 (a) Acid – measuring cylinder/burette/pipette [1]
Zinc oxide – spatula [1]
(NOT balance)

(b) Use of indicator **or** Reference to colour/pH [1]

Reference to precipitate/solid of zinc oxide [1]
No more dissolves = 1

(c) Filtration [1]

(d) Heat/evaporate [1]
to crystallising point or similar [1]
(e.g *leave for a few days)*
Heat to dryness = 0

(e) No need to warm the mixture or similar/stop when bubbles stop [1]

3 Tables
Experiment 1 all correct [2]
(-1 for any incorrect)

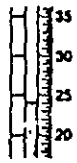
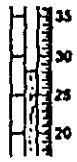
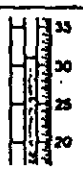
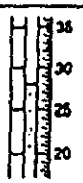
24
28
31
33
32
31
30
29
28

Experiment 2 all correct [2]
(-1 for any incorrect)

25
29
32
34
36
38
39
40
39

Table of results

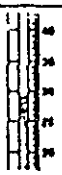
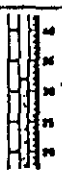
Experiment 1

Volume of sodium hydroxide added / cm^3	Thermometer diagram	Temperature of solution / °C
0		24
5		28
10		31
15		33
20		32
25		31
30		30
35		29
40		28

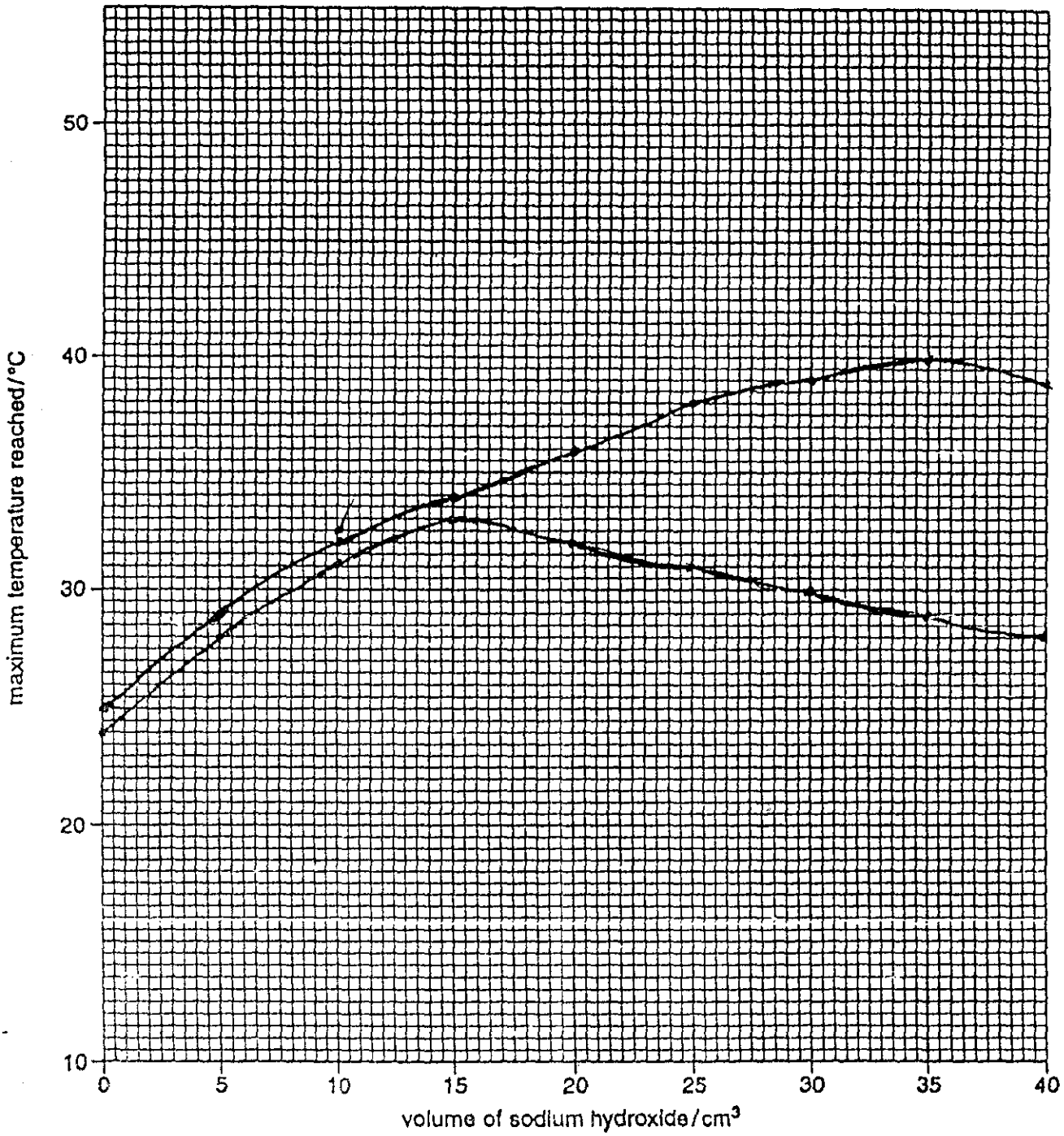
[2]

Table of results

Experiment 2

Volume of sodium hydroxide added / cm^3	Thermometer diagram	Temperature of solution / °C
0		25
5		29
10		32
15		34
20		36
25		38
30		39
35		40
40		39

[2]


maximum temperature reached/°C
50
40
30
20
10
0
5
10
15
20
25
30
35
40
volume of sodium hydroxide/cm³

(a) All points plotted correctly [3]
(-1 for any incorrect)

Two smooth line graphs [1]
Labelled [1]

(b) Temperature from graph (± 0.5°C) [1]
Indicated on graph [1]

(c) Neutralisation/exothermic [1]

(d) (i) Similarity – temperatures increase/rise [1]
Difference – greater increase in Experiment 2 [1]

(ii) The sulphuric acid was more concentrated than the hydrochloric acid/reference to H_2SO_4 being dibasic [1]
(More reactive/stronger = 0)

(e) 24, 25°C/room temperature [1]
→26°C reaction finished/loses heat to surroundings [1]
(NOT cools down)

(f) Use a burette/pipette to measure acid/lag/insulate apparatus [1]
(NOT more accurate/digital thermometer)

4 (a) Cream/yellow [1]
precipitate [1]

(b) Yellow [1]
precipitate [1]

(c) (ii) Fizz/bubbles [1]
Milky/white precipitate [1]

(d) (ii) Blue [1]
precipitate [1]
deep/royal blue [1]
solution/dissolves [1]
(NOT disappears)

(e) Carbon dioxide [1]

(f) Cu^{2+} [2]
(copper [1], II [1])

Page 3 of 3	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2001	0620	6

5 (a) Calibrated [1]
gas syringe [1]
(OR collection over water [1] in a graduated tube [1])
METHOD MUST WORK – otherwise = 0

(b) (i) Points plotted correctly [1]
Smooth line graph [1]

(ii) Result at 2 minutes [1]
not on curve [1]

(iii) Peroxide used up/reaction slowing down [1]

(c) (i) $150cm^3$ [1]

(ii) 6.8 →7 minutes [1]
Must have units. 150 and 7 = [1]

(d) Repeat the experiment/somebody else to do it [1]

6 Mass of iron nail(s) noted [1]
In equal volumes of sea and fresh water [1]
For set time interval [1]
(< 1 day, > 1 week = 0)
Same temperature [1]
Wash [1]
Dry [1]
Reweigh [1]
Compare = conclude (e.g. heavier nails mentioned) [1]

[MAX 5]

NB stop marking when method ceases to work
(No nails = 0)

IGCSE

O.L Chemistry

MARK SCHEME
for the
question papers

Nov. 2001

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATION SYNDICATE
INTERNATIONAL EXAMINATIONS

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 40

SYLLABUS/COMPONENT : 0620/1

CHEMISTRY
(Multiple Choice)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 1	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	1

Item	Correct Answer	Item	Correct Answer
1	A	21	A
2	B	22	A
3	A	23	D
4	B	24	B
5	B	25	A
6	D	26	C
7	B	27	B
8	A	28	A
9	D	29	C
10	C	30	B
11	B	31	D
12	B	32	A
13	B	33	A
14	A	34	D
15	C	35	B
16	D	36	C
17	C	37	C
18	B	38	C
19	D	39	A
20	B	40	C

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 80

SYLLABUS/COMPONENT : 0620/2

CHEMISTRY
(CORE)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	2

1 (a) Any two properties e.g. high melting point / boiling point / form coloured compounds / form complex ions / variable valency / hard / dense / (good) catalysts [2]
IGNORE (elements) are coloured

(b) (i) Universal / full range indicator paper / solution;
NOT: pH paper

indication of a (correct) colour change [2]
colour change without first point / universal indicator = 0
NOT: using pH meter / pH probe
NOT: litmus or its colour change

(ii) pH6 [1]

(iii) charged atom (or group of atoms) / charged particle [1]
ALLOW: atom with more / less electrons
NOT: element in its oxidised state
NOT: charge on element
NOT: imbalance in charge

(iv) 2 [1]

(c) magnesium, zinc, iron, nickel [1]

(d) add sodium hydroxide / aqueous ammonia;
white precipitate;
soluble in excess [3]
[Total 11]

2 (a) C [1]

(b) B [1]

(c) D [1]

(d) (i) D [1]

(ii) irregularly arranged / no fixed pattern / randomly arranged / scattered;
IGNORE: far apart, etc

moving randomly / rapidly / freely [2]

(e) two or more (different) elements / atoms chemically combined / bonded (both different atoms + 'bonded' or equivalent needed for 2 marks [2]
molecules formed by more than 1 type of atom bonded = 1
any reference to mixture = 0

(f) (i) sodium loses electron(s) (from outer shell);
chlorine gains electron(s) (in outer shell);
one electron gained by *Cl* / lost by sodium;
complete electron shells formed / 8 electrons in both ions OWTTE; [4]
an electron transfers from Na to *Cl* = 3

(ii) 58.5 (2 marks)
1 mark for correct extraction of data but incorrect answer [2]
IGNORE: units

[Total 14]

Page 2 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	2

3 (a) 5 [1]

(b) atomic / proton number [1]

(c) 6 [1]

(d) any element up to and including group 5 in this period:
ALLOW symbols [1]

(e) (i) 2 atoms (in molecule); [1]

several / a few / atoms / small clusters of atoms covalently bonded [2]
(both a few atoms and covalent bonding needed for 2)
several / a few atoms / small clusters of atoms bonded = 1
no mention of bonding = 0

(ii) 2 (Cl_2) [1]
[Total 8]

4 (a) carbon dioxide [1]

(b) catalyst / definition of catalyst;
from living organism / biological substance / protein [2]
NOT: natural substance / organic / an organism

(c) distillation / distilling;

some idea about process of distillation e.g. using a condenser / boiling and condensing;
NOT: heating and cooling

idea of one liquid coming off / condensing / evaporating first / more readily OR implication of different boiling points [3]

(d) correct displayed or graphical formula for ethanol including O-H bond [1]

(e) (i) addition [1]

(ii) speed up rate of reaction [1]
NOT: alters rate of reaction

(iii) ethene [1]

(iv) 100°C [2]
100 / 100° = 1 mark
< or > 100°C = 0
incorrect units = 0

(f) fuel / solvent / cleaning fluid / in (alcoholic) drinks / for making named organic substance (e.g. esters / carboxylic acids) / sterilizing agent / any other suitable use [1]

(g) carbon dioxide; water [2]
[Total 15]

Page 3 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	2

5 (a) element + contains only one sort of atom (BOTH NEEDED) [1]
ALLOW: contains only carbon
NOT: contains carbon

(b) covalent [1]

(c) (i) 25 [1]

(ii) $C_{13}H_{10}N_2$ [1]

(iii) 14 [1]

(d) diamond;
use of diamond e.g. cutting / drilling tools / jewellery;

graphite;
use of graphite e.g. pencil leads / lubricant / tennis racquets / golf clubs / as an electrode, etc [4]

(e) (i) carbon monoxide [1]

(ii) CO [1]
[Total 11]

6 (a) oxidised; reduced [2]

(b) (i) fizzing / bubbles / effervescence / iron dissolves / mixture gets warm / green solution formed [1]
NOT: gas given off

(ii) word filter or filtration needed somewhere (can be as filter funnel);

diagram of apparatus with filter funnel and filter paper (or stated in words);

aluminium oxide on filter paper;
NOT: residue

some indication that iron chloride solution goes through filter paper [4]
NOT: filtrate

(c) exothermic [1]

(d) welding / cutting metals [1]
NOT: to melt things

[Total 9]

Page 4 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	2

7 (a)	2.8%	[1]
(b)	evaporate some of the water NOT: heat the water	[1]
(c)	decreases	[1]
(d)	anode / positive (electrode) / carbon (electrode) / graphite (electrode)	[1]
(e)	conducts electricity NOT: inert	[1]
(f)	is a liquid	[1]
(g)	sodium hydroxide; hydrogen	[2]
(h)	1950-1960	[1]
(i) (I)	addition; polymerisation	[2]
(ii)	does not conduct electricity / non-conductor	[1]
		[Total 12]

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT : 0620/3

CHEMISTRY (EXTENDED)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	3

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 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) incomplete combustion or oxidation [1]
carbon [1]
or fuel
or named fuel that could be used in a vehicle - petrol, etc.

(ii) (carbon monoxide) reacts with oxide of nitrogen [1]
to form carbon dioxide or complete combustion [1]

OR equation of type below for both marks
$2NO + 2CO \Rightarrow 2CO_2 + N_2$

OR forms carbon dioxide
or uses carbon monoxide faster

(iii) reduction [1]
COND electron gain or decrease in oxidation number [1]

(iv) bromine (water) [1]
colourless NOT clear [1]

OR potassium manganate(VII)
pink or purple to colourless
OR pink to green

(b) (i) high temperature or heat [1]
back reaction endothermic or moves to left [1]

OR low pressure
left side has higher volume of gases or more moles of gas

OR remove carbon monoxide
reaction try to replace it

OR energy needed
bonds breaking or to decompose $Ni(CO)_4$

(ii) electrolysis [1]

(c) (i) saturated only single bonds or substitution reactions [1]
unsaturated contains double bonds or addition reactions [1]
accept examples

(ii) ester [1]

(iii) hydrolysis or saponification (1)
sodium hydroxide (solution) (1)
heat or form glycerol (and soap) (1)
ONLY allow heat if sodium hydroxide given [Max 2]
Any TWO

[Total 16]

Page 2 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	3

2 (a) (i) liquefaction or liquid air [1]
fractional distillation [1]

(ii) medical use or welding or cutting metals or diving or making steel etc [1]
NOT just respiration or breathing

(b) (i) carbon dioxide + water = glucose and oxygen [1]
Accept carbohydrate NOT starch
If all formulae are correct accept symbol equation

(ii) chlorophyll [1]

(iii) rate of photosynthesis depends [1]
on intensity or brightness of light [1]
more light more oxygen **ONLY** [1]

(iv) greater slope [1]
through origin [1]

(v) silver salt or Ag^+ [1]
reduction or decomposition or silver, Ag, forms [1]
any reference to photography [1]

OR plastics
biodegradable
prevent litter or more easily disposed
OR chlorine or bromine
alkane
to make chloroalkanes or bromoalkanes
OR solar panels to make electricity **ONLY** [2]

(c) *0.02 [1]
0.03 ***not conseq*** [1]
*0.06 **conseq to above** [1]
3 accept either as ratio or on *n* = [1]
Accept ratio conseq to answers designated by *

[Total 16]

3 (a) 5 [1]
25 [1]

(b) (i) correct equation [1]
$C_3H_8 + Cl_2 \rightarrow C_3H_7Cl + HCl$

(ii) substitution or chlorination or halogenation [1]
NOT exothermic

(c) (i) same molecular formula (C_3H_6O) [1]
THEN different structural formulae [1]
some detail about structure - functional group on different carbons [1]

(ii) different boiling points [1]

(iii) (acidified) potassium dichromate or potassium manganate [1]
ignore oxidation states

(iv) name of any ester [1]

COND correct structure must relate to name [2]
SF of any ester that does not relate to name only [1]
correct SF of any ester but name mark above not awarded [2]

Page 3 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	3

(d) (i) heat
catalyst (if specified must be correct)
cracking
details of chemistry forms shorter alkane and alkene
any **TWO** [2]

(ii) water / steam accept hydration but not hydrolysis [1]
COND catalyst (if specified must be correct) or heat [1]

OR bubble into conc sulphuric acid
add water

[Total 16]

4 (a) (i) heat (ignore air) or roast **NOT** burn [1]

(ii) zinc sulphide or roast or burn or sulphur dioxide formed [1]
zinc oxide [1]
reduce with carbon or dissolve zinc oxide in sulphuric acid and electrolyse [1]
NOT electrolysis of blende or oxide

(b) hydrochloric acid [1]
excess zinc oxide [1]
filter [1]

OR add hydrochloric acid forms (zinc chloride and) water

[Max 2]

(c) (i)	brass	bronze (2% zinc)	diecast alloy	[1]
(ii)	copper	copper	aluminium	[1]

(d) (i) zinc more reactive than iron [1]
oxygen / water [1]
zinc reacts first [1]

OR any coherent explanation of the type below that has three valid points:
zinc reacts in preference to iron
zinc loses electrons more easily
zinc forms ions more easily
protective layer of zinc oxide
it is more easily oxidised
forms a cell
electron flow from zinc to iron
steel cannot lose electrons
zinc is anodic
sacrificial protection

(e) (i) $Zn - 2e \Rightarrow Zn^{2+}$ [1]

(ii) Higher reactivity metal instead of Zn
or lower instead of iron or bigger difference in reactivity or increase concentration of acid [1]

(f) (i) hydroxide [1]

(ii) $O_2 + 2H_2O + 4e \Rightarrow 4OH^-$ [2]
unbalanced only [1]
$O_2 + 2H_2O + 2Fe \rightarrow 2Fe(OH)_2$ [2]

[Total 17]

Page 4 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	3

5 (a) (i) bleach [1]

(ii) kills bacteria or germs or micro organisms [1]

(b) (i) double [1]

(ii) both electrons from sulphur or equivalent [1]

(c) 2+ on Mg [1]
2- and 8e on sulphur [1]
1Mg : 1S [1]

(d) (i) completely ionized or good proton donor [2]
for explanation based on high concentration of H^+ or low pH or proton donor **ONLY** [1]

(ii) word equation correct [2]
water missing **ONLY** [1]
accept correct symbol equation

(iii) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$ [2]
unbalanced [1] **NOT** word equation
or $NaOH + H_2SO_4 \rightarrow NaHSO_4 + H_2O$

(iv) $Mg + 2H^+ \rightarrow Mg^{2+} + H_2$ [2]
molecular equation ONLY [1] **NOT** word equation

[Total 15]

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2001

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 60

SYLLABUS/COMPONENT : 0620/6

CHEMSTRY
(ALTERNATIVE TO PRACTICAL)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 2	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	6

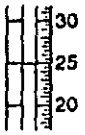
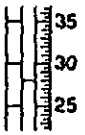
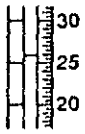
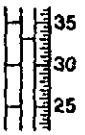
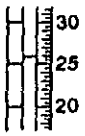
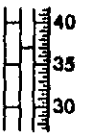
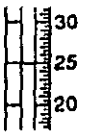
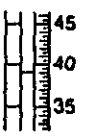
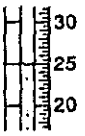
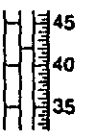
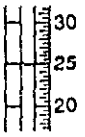
1 (a)	Boxes completed to show beaker (1), pipette (1), burette (1)	[3]
(b)	indicator (1), colour change (1)	[2]
(c)	repeat the experiment / pH meter	[1] **[Total 6]**
2 (a)	cathode / negative	[1]
(b)	silver	[1]
(c)	silver nitrate (1) solution (1) any silver salt **not** Cl^-, I^-	[2]
(d) (I)	silver will not coat / stick or similar	[1]
(II)	to give even coating / all of it gets coated	[1] **[Total 6]**
3 (a)	to increase ease of extraction / surface area, etc	[1]
(b)	if hot yeast is killed	[1]
(c)	spatula	[1]
(d)	best temperature for yeast (1) too cool does not multiply / yeast is killed > 40°C(1)	[2]
(e)	to prevent air (oxygen) / bacteria entering to allow CO_2 to escape	[1] [1]
(f) (I)	3 - 4 days (1) + (1) for unit	[2]
(II)	10 days	[1]
(III)	yeast dies (1) no sugar / solution too concentrated re alcohol / orange juice all used up (1)	[2] **(Total 12]**

Page 2 of 2	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2001	0620	6

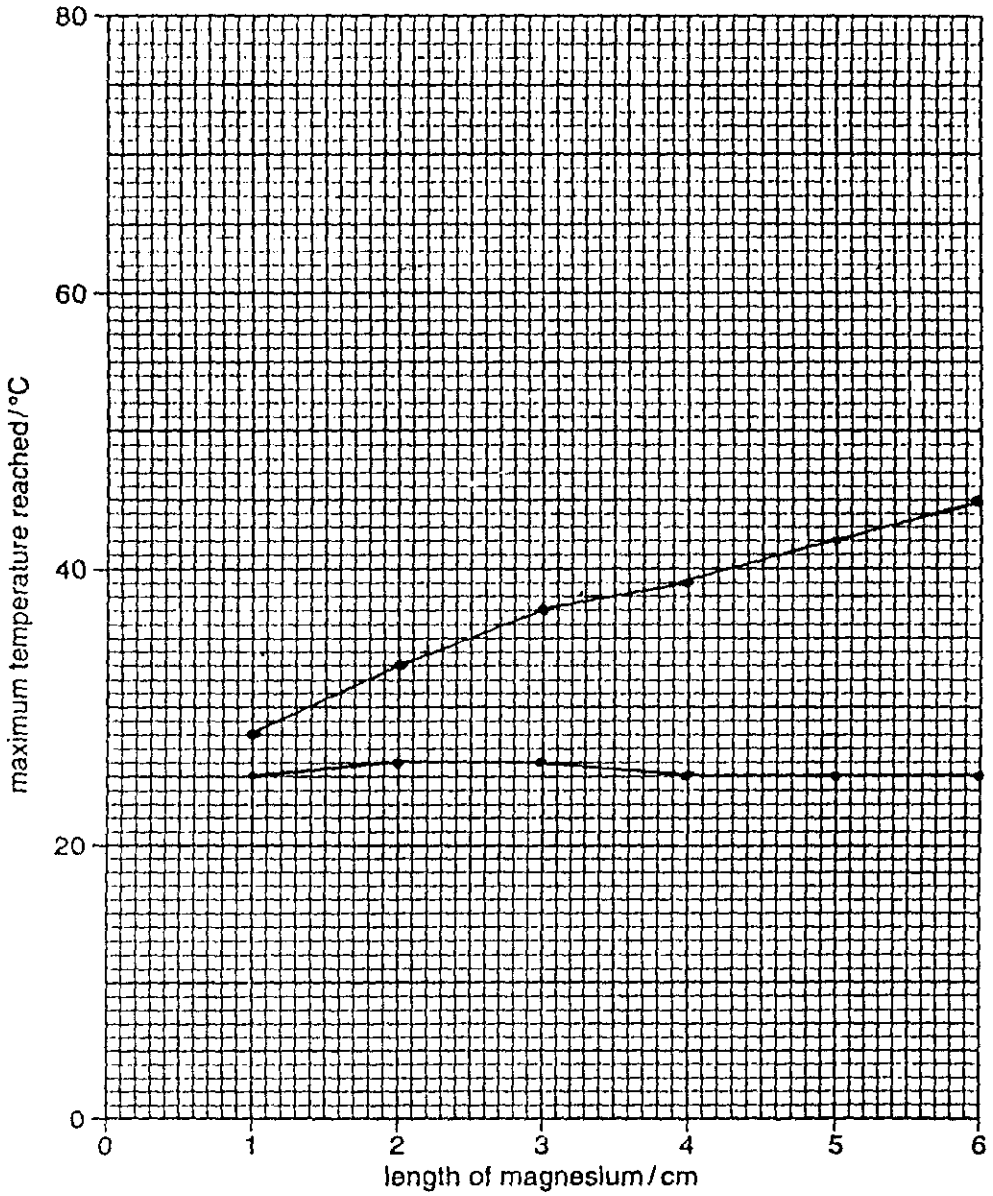
4 (a) pops [1]
hydrogen [1]

Table of Results
All readings correct (3) marks, (-1 for any incorrect) [3]

25	28
26	33
26	37
25	39
25	42
25	45

experiment	length of magnesium /cm	initial temperature of acid/°C		maximum temperature of acid/°C	
1	1		25		28
2	2.5		26		33
3	3		26		37
4	4		25		39
5	5		25		42
6	6		25		45

(b) all points plotted correctly [3]
(-1 for any incorrect)
straight line best fit [1]



[4]

(c) temperature from graph (± 1 °C) [1]
indication on grid [1]

(d) exothermic [1]

(e) (i) experiment 6 [1]

(ii) largest piece / greatest concentration Mg (1) ∴ more reaction / collisions with acid particles etc. (1) [2]

(f) use a burette instead of m. cylinder / insulate / lag apparatus (1)
more accurate / reduce heat losses (1)
repeat (1), average (1)
same initial temperatures (1) ∴ easy comparison (1) [max 2]
[Total 17]

5 (a) (i) green (1) precipitate (1) [max 2]

(b) red / brown (1) precipitate (1) [2]

(c) green (1) precipitate (1) [2]
brown (1) [1]

(e) ammonia [1]

(f) ammonium [1]

(g) sulphate [1]
[Total 10]

6 (a) Universal indicator solution / pH paper (1), read pH from chart (1) / use a pH meter (2)[max 2]

(b) chromatography (1) paper (1)
apply cola (1) separation with solvent (1) [max 3]

(c) can open under water to collect gas in graduated tube / m. cylinder (1)
filled with water (1), syringe = 0 (would not work) [2]

(d) limewater [1]
milky [1]
not lighted splint
[Total 9]

IGCSE

O.L Chemistry

MARK SCHEME
for the
question papers

June 2002

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATION SYNDICATE
INTERNATIONAL EXAMINATIONS

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 40

SYLLABUS/COMPONENT : 0620/1

CHEMISTRY
(Multiple Choice)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	1

Item	Correct Answer	Item	Correct Answer
1	B	21	D
2	C	22	A
3	B	23	D
4	B	24	B
5	A	25	C
6	D	26	B
7	B	27	C
8	C	28	A
9	D	29	C
10	B	30	B
11	A	31	C
12	B	32	B
13	D	33	C
14	D	34	A
15	A	35	B
16	C	36	D
17	A	37	A
18	C	38	C
19	B	39	D
20	A	40	C

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CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 80

SYLLABUS/COMPONENT : 0620/2

CHEMISTRY
(CORE)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	2

1 (a) splint relights/ glows brighter;
litmus paper bleaches/ goes white;
NOT: goes red
(bubble through) limewater.
ALLOW: calcium hydroxide [3]

(b)(i) A [1]
(ii) D [1]
(iii) carbon dioxide [1]
ALLOW: D

(c)(i) (diagram showing electrons as dots, crosses, dashes etc with)
2 electrons in inner shell + 8 electrons in middle shell;
7 electrons in outer shell [2]
(ii) 2 joined atoms with correct number of outer electrons;
1 pair of bonding electrons [2]

(d)(i) (melting point will be) high [1]
(ii) (boiling point will be)(very) low [1]
(iii) will conduct electricity [1]
ALLOW: good / high
NOT: poor/ bad conductor

2 (a)(i) copper [1]
ALLOW: zinc
ALLOW correct symbols
(ii) arsenic/ As [1]
(iii) 76 (%) [1]

(b) copper too soft (alone)/ alloying hardens or strengthens/ more resistant to corrosion [1]
NOT: heat resistant/ higher melting point/ don't conduct heat as well
NOT: reference to rusting

(c) C [1]

(d)(i) O_2 [1]
(ii) copper(II) chloride + water (1 mark each) [2]
ALLOW: copper chloride
NOT: steam
NOT: copper(I) chloride
(iii) reacting with an acid/ neutralising acid [1]
NOT: it is alkaline / metal oxides are basic
NOT: symbol equation

(e) (fractional) distillation [1]

(f)(i) ALLOW low level answer referring to only one of changes e.g
vibrate more/ move faster/ greater movement [1]
(ii) Any two of description of proximity of particles in any of (s), (l) or (g) but it must be made clear which state is being referred to e.g.
Solid: particles close together/ touching;
Liquid: particles close together
ALLOW: begin to spread/ (slightly) more spaced (than in solid);
Gas: particles far apart / (completely) spread out /spaced more (than in a liquid)[2]

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	2

(iii) Any two of description of arrangement of particles in any of (s), (l) or (g) but it must be made clear which state is being referred to e.g.
solid: regularly arranged;
ALLOW: particles lined up
NOT: close together
liquid: randomly arranged/ no fixed arrangement
NOT: looser
gas: randomly arranged/ no fixed arrangement
NOT: looser [2]

3 (a) 19; 20; 19 [3]

(b)(i) hydrogen / H_2 [1]
NOT: H
(ii) measure volume of gas (in syringe)/ take syringe readings/ how far syringe moves;
NOT: 'using the syringe'
NOT: releasing more gas
for (same) time period; (or same volume for different time);
some idea of keeping conditions the same/ same amounts of materials/ same temperature [3]
(iii) increases (down the group) [1]
ALLOW: more violent / greater/ faster
NOT: reaction gets stronger

(c)(i) neutralisation / acid-base [1]
ALLOW: exothermic
NOT: redox
(ii) base [1]
(iii) 3rd and 4th boxes ticked (1 each) [2]

4 (a) substance which releases energy when it burns/ combusts [1]
ALLOW: releases heat when it burns
NOT: it is flammable
NOT: substance which releases energy
NOT: substance that creates energy

(b)(i) glucose [1]
NOT: sugar/ sucrose/ fructose etc
NOT: $C_6H_{12}O_6$
(ii) catalysts/ definition of catalyst; from living things / proteins [2]
(biological catalyst = 2)
NOT: (enzyme) is a living thing/ bacteria etc

(c) distillation [1]
ALLOW: description of distillation e.g. boiling and condensing
NOT: heating/ evaporating and condensing UNLESS temperature of 79°C or above mentioned

(d) Any 2 reasons
e.g. less polluting OR less smell OR less fumes;
ALLOW: no sulphur dioxide
NOT: doesn't produce nitrogen oxides
conserve supplies of petrol;
petrol useful for other things e.g. making plastics;
alcohol can be made from renewable resources;
NOT: does not cause pollution
NOT: does not produce carbon monoxide
NOT: flammability comparison [2]

(e) hydrogen/ methane/ LPG/ DERV
ALLOW: natural gas
ALLOW: diesel
NOT: electricity
NOT: gas [1]

(f) nitrogen oxides: acid rain/ breathing difficulties etc;
NOT: kills/ pollution
lead compounds: damage to brain (in children) / damage to nervous system/ liver [2]
NOT: kills / pollution

5 (a) 1(g) [1]

(b)(i) correct displayed formula [2]
(correct displayed formula except –O – H shown as –OH = 1)
(ii) OH / alcohol(ic)/ hydroxyl [1]
NOT: OH^- / hydroxide / alcohols

(c) ring around COOH [1]

(d) carbon, hydrogen, sulphur, oxygen, sodium [2]
4 correct = 1
NOT: symbols

(e)(i) addition [1]
(ii) orange/ orange-red/ red/ brown;
NOT: yellow
to colourless / decolourized [2]
NOT: clear
(iii) has a double bond [1]
ALLOW: unsaturated
(iv) covalent; molecular [2]
(v) compounds; functional [2]

6 (a) $KMnO_4$ dissolves / idea of particles released from surface of crystals/ $KMnO_4$ soluble;
diffusion;
explanation of diffusion in terms of movement of water/ solute molecules [3]
ALLOW: potassium manganate particles spread out through water
NOT: bald 'potassium manganate particles spread out'
NOT: references to osmosis/ moving from strong to weak solutions

(b) evaporation [1]
ALLOW: crystallization
NOT: distillation

(c) 158 [1]

(d) 2 on left hand side [1]

(e) Any three of
high(er) melting/ boiling points;
greater density/ high density;
form coloured compounds NOT they are coloured;
variable oxidation numbers/ form several types of compounds with same elements/
variable valency/ more than one (positive) ion;
catalytic activity [3]

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	2

(f)(i) suitable workable apparatus e.g. test tube or other vessel with bung and delivery tube with source of heating;
NOT: open test tubes etc leading to delivery tube
NOT: completely closed apparatus
surface for cooling e.g.delivery tube/ condenser/ plate suitably placed;
receptacle for collecting water [3]

(ii) can be made to go in the opposite direction / can be made to go in either direction/ can go backwards or forwards/ products change back to reactants [1]
NOT: can be reversed

(iii) blue;
to white;
NOT: to colourless/ clear / decolourises [2]

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT : 0620/3

CHEMISTRY
(EXTENDED)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	3

- 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) $Al^{3+} + 3e \Longrightarrow Al$ [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

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

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]

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	3

TOTAL = 16

4 (a) (i) fluorine [1]

(ii) iodine and astatine [1]

(b) (i) $Cl_2 + 2Br^- \Longrightarrow 2Cl^- + Br_2$ [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

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CAMBRIDGE
INTERNATIONAL EXAMINATIONS

JUNE 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 60

SYLLABUS/COMPONENT : 0620/6

CHEMISTRY
(ALTERNATIVE TO PRACTICAL)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
1 (a)	A – (thistle) funnel (1)	
	B – (conical) flask (1)	
	C – gas jar (1)	3
(b)	→ into thistle funnel (1)	1
(c)	limewater (1) milky (1) /cloudy not splint test	2
2 (a)	(i) red /pink (1)	1
	(ii) colour of drink interferes or similar (1)	1
(b)	heat (1) condenses (1) / (fractional) distillation (2) /boil /evaporate	2
(c)	chromatography (1) drink applied to paper (1) solvent (1) /water /ethanol only two spots (1) max 3	3

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	6

Question Number	Question (Including any Source Details)	Part Mark
3 (a) (i)	to keep the magnesium out of contact with acid or similar (1)	1
(ii)	to measure volume of gas (1) not collect	1
(b)	shake the flask/let go cotton (1)	1
(c)	excess - more than enough to react (1)	1
(d)	Grid All points correctly plotted (2) (−1 for each incorrect) Smooth line graph (1)	3
(e) (i)	At 2 minutes (1) not on smooth curve (1)	2
(f) (i)	15 cm^3 (±1) (1), indication (1)	2
(g) (i)	curve on/below original graph levelling out at 40 cm^3 (1)	1
4 (a)	bubbles / fizz / water turns cloudy (1) (calcium smaller, not dissolve, /gets hot)	1
(b)	gas given off moves the pieces (1)	1
(c)	>7 (1)	1

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
5	Table completed: Experiment 1 — 24.9 cm³; Difference — 24.9 cm³ (1); Experiment 2 — 12.50 cm³; Difference — 12.50 cm³ (1)	2
(a)(i)	Experiment 1 (1)	1
(ii)	more in Experiment 1 (1), 2× as much / double volume for Expt 2 (1)	2
(iii)	Solution B 2× as concentrated as A	1
(iv)	25.0 (1) cm³ (1) e.c.f. for volume	2
(b)	iron (III) (1)	
	brown precipitate (with sodium hydroxide) (1)	2
(c)	use a burette / pipette to measure the iron(II) ions (1)	
	more accurate (1) not syringe	2

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
6 (d) (i)	blue (1) precipitate (1)	2
(ii)	blue precipitate (1) dissolves / soluble (1) / solution deep / royal blue (1)	3
(e)	oxygen (1) / O_2	1
(f)	chlorine (1) / Cl_2	1
(g)	catalyst / oxidising agent (1) transition metal / manganese (1) oxide max 2 MnO_2 = (2)	2
7 (a)	reagent (1) result (1) eg indicator red in acid, no change in NaCl(aq)	2
(b)	eg bromine (1) decolourise in propene, stays same in propane (1)	2
(c)	barium chloride (1) white precipitate in H_2SO_4 (1) no change in HNO_3	2

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – June 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
8	circuit set up (1) bulb (1) copper key cleaned with sandpaper/steel wool (1) copper key is ~~anode~~ cathode (+) (1) nickel rod is ~~cathode~~ anode (-) (1) } wrong way round = (1) solution of nickel sulphate in beaker (1) All marks could be obtained from a diagram. Max 5	6 5
	Total for paper (Written Marks)	60

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CAMBRIDGE
INTERNATIONAL EXAMINATIONS

November 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT : 0620/1

CHEMISTRY
(Multiple Choice)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

IGCSE

O.L Chemistry

MARK SCHEME for the question papers

Nov. 2002

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATION SYNDICATE
INTERNATIONAL EXAMINATIONS

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	1

Item	Correct answer	Item	Correct answer
1	C	21	D
2	B	22	D
3	C	23	B
4	D	24	A
5	A	25	A
6	C	26	D
7	B	27	D
8	A	28	B
9	B	29	C
10	B	30	D
11	B	31	B
12	A	32	D
13	A	33	A
14	D	34	A
15	D	35	A
16	B	36	C
17	A	37	A
18	B	38	B
19	C	39	B
20	D	40	C

60

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT : 0620/2

CHEMISTRY
(CORE)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	2

1 (a)(i) alkane [1]
(ii) correct formula showing all atoms and bonds [1]
ALLOW: correct dot and cross diagrams
(iii) natural gas [1]

(b)(i) 78% [1]
ALLOW: 77-79%
(ii) boron/ carbon/ oxygen/ fluorine/ neon [1]

(c)(i) speed up reaction/ lower activation energy etc [1]
NOT: starts the reaction/ alters the rate of the reaction
(ii) increases [1]

(d)(i) 2 (NH_3) [1]
(ii) reversible reaction/ reaction reaches equilibrium/ equilibrium reaction/ reaction can go backwards as well as forwards [1]

(e) molecules arranged randomly;
molecules close together
gas structure = 0 [2]

(f) (damp red) litmus paper/ universal indicator paper
turns blue
ALLOW: HCl vapour; white fumes [2]

(g)(i) increase growth of plants [1]
(ii) sulphuric acid [1]

2 (a) charged species/ charged atom/ charged group of atoms [1]

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

(c) 2 (in front of e^-) [1]

(d) any two of: calcium sulphate/ sodium chloride/ sodium hydrogencarbonate/ sodium sulphate
ALLOW: calcium hydrogencarbonate; calcium carbonate [2]

(e) $CaCl_2$ [1]

(f) √√×√
(2 if all correct 1 if one mistake) [2]

(g) filter paper in filter funnel;
receptacle underneath with water shown in it - labelled;
clay/ residue on filter paper -labelled [3]

3 (a) chlorine: yellow-green/ green;
NOT: yellow
iodine: black/ grey/ grey-black;
fluorine: gas
bromine: liquid [4]

(b) ALLOW: between 140 and 250(°C) (inclusive) [actual = 184°C] [1]

(c)(i) chlorine + potassium bromide → bromine + potassium chloride
(2 if all correct / -1 per error) [2]

(ii) chlorine
bromine
iodine [1]

(d) Any suitable use e.g. in swimming pools/ disinfection/ sterilizing water supplies etc/ killing bacteria / for bleaching/ in making insecticides/ making dry cleaning fluids/ making correct, named inorganic or organic chemical/ making matches/ making fireworks/ recovery of tin or aluminium from scrap metal [1]

(e) covalent [1]

4 (a) Substance containing carbon and hydrogen and perhaps other elements/ oxygen [1]

(b) B and C [1]
ALLOW: correct formulae/ names

(c) A [1]
ALLOW: correct formula/ name

(d) D [1]
ALLOW: correct formula/ name

(e) A [1]
ALLOW: correct formula/ name

(f)(i) gives out heat/ raises temperature of surroundings [1]
ALLOW: gives out energy

(ii) carbon dioxide; water [2]
ALLOW: correct symbols

(iii) carbon monoxide [1]
ALLOW: CO

(g) $C_4H_8O_2$ [1]

(h) 88 [1]

(i) chromatography [1]

5 (a) rock which contains a particular metal / rock from which metal can be extracted [1]
ALLOW: mineral (in place of rock)

(b) limestone [1]

(c)(i) iron oxide + carbon → iron + carbon monoxide [1]
ALLOW: iron(III) oxide
NOT: iron(II) oxide

(ii) removal of oxygen from compound / decrease in oxidation number / gain of electrons [1]
ALLOW: addition of hydrogen

(d)(i) the air [1]

(ii) absorbs heat / takes in heat from the atmosphere/ temperature of surroundings falls [1]
ALLOW: absorbs/ takes in energy

(e)(i) heated / made molten;
oxygen/ oxygen enriched air blasted through it [2]
(ii) car bodies/ machinery etc [1]
NOT: cutlery/ chemical plants

(f)(i) lower pH, the faster the corrosion [1]
NOT: more acidic, the faster the corrosion
(ii) higher temperature leads to greater corrosion; [1]
(acid/ air) particles moving faster at higher temperatures / particles have more energy at higher temperatures;
NOT: steel particles moving faster
NOT: vibrating faster
more collisions (with steel) [2]
(iii) sulphur dioxide / nitrogen oxides;
sulphur dioxide: burning fossil fuels/ power stations/ volcanoes etc
nitrogen oxides: car exhausts/ burning fossil fuels etc [2]

Page 4 of 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	2

6 (a) distillation [1]

(b) (round-bottomed) flask [1]

(c) cools down vapour / lowers temperature/ idea of cooling;
so that vapour is changed to liquid / so vapour condenses [2]

(d)(i) pH 7 [1]
(ii) 100°C [1]
NOT: 100

(e)(i) 24(g) [1]
(ii) calcium carbonate/ $CaCO_3$ [1]
(iii) magnesium chloride [1]
(iv) acidify with hydrochloric or nitric acid;
add barium chloride;
white precipitate. [3]

(f)(i) ions;
(free to) move [2]
(ii) anode: chlorine; cathode: sodium [2]
(iii) graphite/ carbon (allow Pt) [1]

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CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT : 0620/3

CHEMISTRY (EXTENDED)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1 of 5	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	3

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.

1 (a) (i) vanadium(V) oxide as catalyst - ignore oxidation state
and accept no oxidation state
temperature 300 to 600 ^{0}C
pressure up to 10 atmos, accept atmospheric pressure
volume ratio of gases either 2:1 **or** slight excess of oxygen
ANY three [3]

(ii) decrease [1]
COND back reaction is endothermic or same argument based on forward reaction is exothermic [1]
or increase in temp favours back reaction

(iii) dissolve in (conc) sulphuric acid **NOT** dilute [1]
add water **or** dilute [1]

(b) sodium hydroxide **or** carbonate or hydrogencarbonate [1]

zinc oxide **or** hydroxide **or** carbonate [1]
NOT zinc

barium nitrate **or** chloride **or** hydroxide **or** barium ions [1]

neutralisation **NOT** acid/base [1]

(c) (i) copper sulphate **or** anhydrous copper sulphate [1]
accept "unhydrated"
NOT formula

(ii) goes blue **or** becomes hot **or** steam [1]

(iii) copper oxide [1]

(b) Al_2S_3 [1]
Si_3P_4 [1]

(c) (i) silicon [1]

(ii) sodium [1]

(iii) sulphur or chlorine [1]

(d) unreactive **or** inert or does not react [1]

(e) 3Na to 1P [1]
COND next two marks
correct charges [1]
8e around P [1]
If covalent then only one mark for 3Na to 1P

(f) (i) 11.5/23 = 0.5 [1]

(ii) 0.25 [1]
conseq to (i)

(iii) 0.25 x 32 = 8 g [1]
conseq

(iv) 2.0 g [1]
only **conseq** to (iii) if answer to (iii) is less than 10

NB If (ii) is 0.3(125), no excess is possible, (iv) **ZERO**

TOTAL = 16

4 (a) (i) wiring **NOT** good conductor
pipes
utensils
roofs
electroplating
lightning conductor
bi-metallic strips
NOT coinage metal or any other use than involves an alloy
TWO from above [2]

(ii) regular array [1]
different sizes [1]
delocalised **or** mobile **or** free electrons [1]

(b) (i) copper deposited **or** mass increases [1]

(ii) copper goes into solution **or** mass decreases [1]

(iii) $Cu^{2+} + 2e^- \Longrightarrow Cu$ [1]

(iv) oxygen [1]
sulphuric acid accept hydrogen sulphate [1]

(c) (ii) cells produce electricity **or** exothermic **or** change chemical energy into electrical energy [1]

electrolysis uses it **or** endothermic **or** change electrical energy into chemical energy [1]

(d) (i) $CuO + C \Longrightarrow Cu + CO$
or $2CuO + C \Longrightarrow 2Cu + CO_2$
or any other correct reductant – hydrogen or metal [1]

(ii) Copper(II) hydroxide = copper oxide + water [1]
accept symbols

(iii) $2Cu(NO_3)_2 \Longrightarrow 2CuO + 4NO_2 + O_2$ [2]
unbalanced ONLY [1]
NOT word equation

TOTAL = 16

5 (a) molecular formula [1]
Must be able to give isomers, need not be alkenes
two corresponding isomers [2]
If do not correspond then MAX [2] out of [3]

(b) (i) ethanol [1]
structure [1]

(ii) ethane [1]
structure [1]

(c) (i) many simple molecules **or** monomers [1]
form one large one **or** macromolecule or chain [1]

(ii) addition polymer only one product- the polymer [1]
condensation - polymer and water etc [1]

(iii) correct unit [1]
COND evidence of polymer in structure eg shows continuation such as terminal bonds [1]

(d) (i) water proof **or** impervious **or** flexible **or** good adhesion **or** non-biodegradable **or** unreactive [1]

(ii) steel in contact with water **or** air [1]

(iii) zinc more reactive
oxygen /water reacts with zinc not iron
sacrificial protection
zinc anodic
steel receives electrons from zinc
zinc forms cations
cell
TWO valid points [3]

TOTAL = 17

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CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 60

SYLLABUS/COMPONENT : 0620/6

CHEMISTRY
(ALTERNATIVE TO PRACTICAL)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
1	(a) A – spatula only (1)	
	B – beaker only (1)	
	C – funnel (1) not filter	3
	(b) more than enough to react (1)	1
	residue	1
	(c) 6–7 (1)	
2	(a) top box – sulphuric acid (1)	
	bottom box – sodium chloride (1)	2
	(b) gas passed through water (1)	
	gas is soluble in water (1)	2
	gas collected by upward delivery (1)	
	gas is denser than air (1)	2
	mark independently	
	(c) fume cupboard / goggles (1)	1
	or well-ventilated room / gloves	

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
3 (a)	Points correctly plotted (2), −1 for each incorrect.	
	Smooth line graph, ignoring 3 minutes point (1)	3
(b)	Point at 3 minutes, 256.6g (1)	
	not on curve (1)	2
(c)	gas given off (1)	1
(d)	to prevent loss of acid (spray) (1) / only gas out	1
(e)	5 minutes (1)	1
(f)	Sketch graph below original graph (1)	
	levelling off at same mass (1)	2

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
4 (a)	Table of results.	
	Initial temperatures correct (2) −1 for any incorrect	
	18	
	21	
	19	
	22	
	Maximum temperature correct (2)	
	23	
	24	
	79	
	22	
	Differences correctly calculated (2) 5, 3, 60, 0	6
(a) (i)	magnesium (1)	1
(ii)	Greatest temperature rise (1)	
	Observation – gas given off rapidly (1) / fastest	2
(iii)	Hydrogen (1)	1
	Experiment 2	
	Initial temperature 21 (1)	
	maximum temperature 39 (1)	2

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
4(b)	temperature rise (1)	1
(c)	redox / displacement (1)	1
(d)	least copper iron zinc most magnesium (1)	1
5(c)	catches fire / ignites (1) yellow / blue flame (1) / smoky	2
(d)	yellow (1) precipitate (1)	2
(e)	cream / white (1) precipitate (1) / yellow	2
(f)	organic (1) hydrocarbon (1) / alkane / alkene (1) 2 max.	2

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
6 (a)	pipette / burette (1)	1
(b)	name (1) not Universal Indicator, litmus eg methyl orange / phenolphthalein.	1
	colour change (2) eg yellow to orange / pink (1) (1)	2
for litmus	blue (1) → purple / red (1) pink (1) to colourless (1)	
(c)	The acid (1) less needed to neutralise the KOH (1)	2
(d)	repeat experiment (1) without indicator (1) / charcoal evaporate solution (1) to crystallising point (1) max 3	3
	max indicator = max 2	

Page 6	Mark Scheme	Syllabus	Paper
	IGCSE Examinations – November 2002	0620	6

Question Number	Mark Scheme Details	Part Mark
7	Known mass of fertiliser (1) Add known volume of water (1) Warm to 30°C (1) Stir (1) Filter (1) / Evaporate to dryness Dry and weigh residue (1) Work out solubility (1) / Conclusion max 6	6
	Total	60

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IGCSE

O.L Chemistry

MARK SCHEME for the question papers

June 2003

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATION SYNDICATE
INTERNATIONAL EXAMINATIONS

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARKING SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 0620/01

CHEMISTRY

(Multiple Choice)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – June 2003	0620	1

Question Number	*Key*	*Question Number*	*Key*
1	C	21	B
2	B	22	D
3	A	23	A
4	D	24	B
5	A	25	D
6	C	26	B
7	A	27	D
8	A	28	D
9	B	29	D
10	C	30	B
11	B	31	D
12	D	32	D
13	C	33	A
14	D	34	A
15	B	35	B
16	C	36	A
17	A	37	A
18	C	38	B
19	A	39	C
20	C	40	C

TOTAL 40

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CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARKING SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0620/02

CHEMISTRY

(Core Paper 2)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

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	IGCSE EXAMINATIONS – June 2003	0620	2

1 (a) (i) Fe/Cu ALLOW Zn [1]
(ii) C/N/S/F/Cl/Br [1]
(iii) O/S [1]
(iv) C [1]
(v) Li/Na/K ALLOW F [1]
(vi) Cl/Zn/Br/Kr [1]

(b) argon - light bulbs;
chlorine - kills bacteria;
carbon - as lubricant;
helium - in balloons [4]

(c) (i) covalent [1]
(ii) BrF_5 ALLOW F_5Br [1]
(iii) ions/charged particles;
NOT: particles
not free to move in solid/free to move in molten/liquid state [2]

2 (a) drop small tube in acid/loosen string/idea of mixing zinc and acid/let go of cotton
ALLOW: cut the string [1]
NOT: heat (the acid)
NOT: pull the string

(b) (i) correct plotting including 0-0 point (- 1 per omission or error) [2]
(ii) best curve drawn and to go through origin [1]
(iii) no more gas produced/reaction finished;
all zinc reacted/used up [2]

(c) graph drawn with faster initial . . . and starting at 0-0;
ALLOW: straight line as initial rate
ends up at 55 cm^3 [2]

(d) (i) 2 (HCl) [1]
(ii) zinc chloride [1]
(iii) 136 [1]
IGNORE units

(e) substance containing only one type of atom/substance which cannot be broken down to any other substance by chemical means [1]
NOT 'can't be split' alone
NOT is a pure substance

3 (a) (i) evaporation/vaporisation/boiling [1]
(ii) freezing/solidification [1]
NOT: fusion
(iii) condensing/condensation/liquefaction [1]

(b) 2nd box ticked [1]

(c) A;
energy needed to overcome forces between molecules/idea of energy input/ taking in heat [2]

(d) (i) chlorine [1]
(ii) bromine [1]
(iii) sodium chloride [1]

(e) (i) diffusion [1]
NOT: Brownian motion

(ii) ammonium chloride [1]
NOT: ammonia chloride

(iii) ammonia diffuses or moves faster/HC*l* diffuses or moves slower/ammonia has lower mass/HC*l* higher mass/molecules of HC*l* and ammonia move at different speeds [1]
NOT: ammonia evaporates faster/HC*l* evaporates more slowly

(f) neutralisation/acid base [1]
NOT: exothermic
NOT: addition

(g) (i) thermometer [1]

(ii) reference to the solid or melting point of the solid is needed for the mark. boiling point of water too low to get solid to melt/boiling water cannot get to 155°C [1]
NOT: boiling point of water is only 100°C/boiling point of water too low.
NOT: water boils off first

(iii) so that the liquid is the same temperature throughout/no hot or cold spots/so the tube is the same temperature as the thermometer/so heat can circulate in all places [1]
ALLOW: so that temperature of liquid is balanced
NOT: to keep temperature constant

4 (a) (i) <u>breaking down</u> of molecules substances using <u>heat</u> [1]

(ii) substance which speeds up a reaction [1]
NOT: alters/changes rate of reaction
NOT: speeds up and slows down rate

(b) ethene/ethylene [1]
NOT: formula

(c) (i) paraffin [1]

(ii) 4000g/4kg [1]
(correct unit needed)

(iii) C_2H_4; H_2 [2]

(d) (i) two units polymerised with continuation bonds at either end and hydrogen atoms drawn [1]
ALLOW: $-CH_2CH_2CH_2CH_2-$
ALLOW: $-[-CH_2CH_2-]-_n$
ALLOW: $-[-CH_2-]-_n$

(ii) addition (polymerisation) [1]

5 (a) (sodium) hydroxide/ammonia; → green/grey green; [2]
silver nitrate; → yellow; [2]
ALLOW: lead nitrate NOT: cream
ALLOW: bubble chlorine → grey/black (precipitate)
silver nitrate; → white: [2]
barium chloride/nitrate; → white; [2]
ALLOW: lead acetate

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(b) filtration/filtering or diagram of correct apparatus for filtration (filter paper must be present on diagram)
NOT: decanting
sodium chloride through filter paper/shown on diagram;
NOT: filtrate through filter paper
evaporate off water from sodium chloride/suitable diagram [3]
ALLOW: distilling off water

(c) different atoms/elements
(chemically) joined/bonded/combined (both points needed)
(reference to mixtures = 0 unless qualified enough in time frame e.g. a mixture of elements which are then chemically combined) [1]

(d) (i) chlorine/Cl_2 [1]
(ii) sodium/Na [1]

6 (a) potassium/magnesium/aluminium [1]

(b) they did not have electricity/did not know about electrolysis/did not know the metal existed [1]
NOT: did not have the right technology

(c) (i) indication that bubbles produced rapidly or quickly/slower than magnesium but faster than zinc
OR number of bubbles produced intermediate between magnesium and zinc; [1]
uranium dissolved slower tha magnesium but faster than zinc/dissolves at medium rate etc. [1]
(ii) atoms of same element with different mass number/different number of neutrons/different nucleon number [1]
NOT: compounds/molecules with different mass number
(iii) indication of use for energy – nuclear power stations/nuclear energy [1]
ALLOW: atomic/nuclear bombs
NOT: curing cancer/medical uses
NOT: 'for fuel'

(d) magnesium oxide
ALLOW: MgO [1]

(e) (i) idea of mixture of (different) metals [1]
(ii) alloys harder/stronger/decreased malleability/increased toughness/increased corrosion resistance/heat or electrical resistance increased [1]
NOT: increase in melting point
NOT: cheaper
NOT: improving properties

(f) removes oxygen from zinc oxide [1]
ALLOW: definition of reduction involving oxidation numbers/electron transfer

(g) (i) reversible reaction [1]
ALLOW: equilibrium
(ii) 76-80% [1]

(h) (i) correct electronic structure of Mg (2.8.2) on diagram [1]
(ii) loses two electrons/loses its valence electrons = 2
forms Mg^{2+} ion = 1
loses electron(s) = 1 [2]
forms Mg^{2+} ion by losing electrons = 2

85

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARKING SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0620/03

CHEMISTRY

(Extended Paper 3)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

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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) A correct equation either CO or CO_2 as product
If not balanced but otherwise correct [1] ONLY **[2]**

(b) (i) $C + O_2 \rightarrow CO_2$ NOT word equation **[1]**

(ii) (higher in furnace) no oxygen left **[1]**
carbon dioxide reacts with carbon (to give carbon monoxide) **[1]**

OR incomplete combustion of carbon **[2]**

OR either equation gains both marks
$CO_2 + C = 2CO$ or $2C + O_2 = 2CO$

OR carbon dioxide reacts **[1]**
with carbon **[1]**

(c) limestone + sand → slag **[2]**
OR calcium carbonate + silicon (IV) oxide → calcium silicate (+ carbon dioxide)

For knowing that impurity is sand [1] ONLY

Accept calcium oxide and silicon oxide
Accept lime

(d) (i) Cutlery **or** chemical plant **or** watches **or** utensils **or** surgical instruments **or** cars **or** sinks **or** aircraft **or** garden tools **[1]**

(ii) nickel **or** chromium **or** molybdenum **or** niobium **or** titanium **[1]**

(iii) blow air/oxygen through
carbon becomes carbon dioxide
carbon dioxide escapes as gas
silicon and phosphorus become oxides
calcium oxide or calcium carbonate
forms slag
Any FOUR NOT blast furnace **[4]**

(e) anode tin NOT impure time **[1]**
cathode iron or steel **[1]**
tin salt **or** tin ions as electrolyte **[1]**
NOT oxide or hydroxide or carbonate

TOTAL = 16

Page 2	Mark Scheme	Syllabus	Paper
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2 (a) (i) 3 ignore any charges [1]

(ii) high melting **or** boiling point
hard
poor conductor of electricity **or** heat
brittle
Any TWO [2]
NOT insoluble, dull, or malleable

(iii) carbon, graphite diamond silicon, germanium [1]
silicon (IV) oxide **or** silica **or** silicon dioxide **or** silicon oxide
or sand **or** silicon carbide or named polymer [1]

(iv) four around one [1]
cond looks tetrahedral **or** shows continuation [1]
For graphite layers [1] weak bonds between layers [1]
Accept any macromolecule, no link with (iii)
For polymer repeat unit [1] continuation [1]

(b) (i) white precipitate [1]
COND upon a precipitate
dissolves in excess or forms solution [1]

(ii) blue precipitate [1]
COND upon a precipitate
does not dissolve in excess [1]

(c) (i) number of moles CO_2 = 0.24/24 = 0.01
conseq number of moles of $CaCO_3$ and $MgCO_3$ = 0.01
conseq number of moles of $CaCO_3$ = 0.005 [3]

(ii) Calculate the volume of hydrochloric acid, 1.0 mole/dm^3, needed to react with one tablet.
number of moles of $CaCO_3$ and $MgCO_3$ in one tablet = 0.01
Expect same as answer to (c)(i). NO marks to be awarded. Just mark consequentially to this response
conseq number of moles of HCl needed
to react with one tablet = 0.02 [1]

conseq volume of hydrochloric acid, 1.0 mole/dm^3, needed to react with one tablet = 0.02 dm^3 or 20 cm^3 [1]

TOTAL = 16

3 (a) (i) Correct equation [2]
For giving correct formula of alkane and alkene [1] only
Accept alkene and hydrogen

(ii) chlorine [1]
COND light **or** 200°C **or** heat or lead tetraethyl
or high temperature MAX 1000°C [1]
ignore comment 'catalyst'

(b) (i) same molecular formula [1]
different structures **or** structural formulae [1]

(ii) but-2-ene or cyclobutane [1]
corresponding structural formula [1]
NOT 2-butene

(c) butanol ignore numbers [1]
butane ignore numbers [1]
dibromobutane ignore numbers [1]

(d) (i) propene [1]

$CH_3—CH{=}{=}CH_2$ [1]

(ii) Correct structure of repeat unit [1]
ignore point of attachment of ester group
COND upon repeat unit
shows continuation [1]
If chain through ester group [0] out of [2]

(iii) do not decay or non-biodegradable
shortage of sites or amount of waste per year
visual pollution
forms methane
Any TWO [2]

(iv) form poisonous or toxic gases or named gas CO, HCl HCN [1]
NOT carbon dioxide, harmful, sulphur dioxide

TOTAL = 18

4 (a) (i) Correct equation [2]
not balanced [1] ONLY
$2Pb(NO_3)_2 = 2PbO + 4NO_2 + O_2$

$Pb(NO_3)_2 = PO + 2\ NO_2 + \frac{1}{2}\ O_2$

(ii) potassium nitrate → potassium nitrite + oxygen [1]

(b) (i) close or tightly packed [1]
ordered or lattice [1]
vibrational [1]
NOT forces

(ii) melting or freezing or fusion or solidification [1]

(c) (i) oxygen and nitrogen (in air) [1]
react at high temperatures (and high pressure) [1]
If nitrogen in fuel [0] out of [2]

(ii) catalytic converter
react with carbon monoxide or hydrocarbons
form nitrogen
ANY TWO [2]

(d) Add excess lead oxide to nitric acid [1]
can imply excess
filter NOT if residue is lead nitrate [1]
evaporate or heat solution [1]

TOTAL = 14

5 (a)

protons	2
electrons	2
neutrons	4

[3]

(b) (i) $La^{3+} + 3e^- = La$ [1]

(ii) hydrogen [1]
bromine NOT Bromide [1]
caesium hydroxide [1]
ignore any comments about electrodes

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(c) metal hydroxide or hydroxide ions [1]
hydrogen [1]

(d) correct formula 1Ba to 2Cl
charges correct
8e around the anion
All three points [2]
Two points ONLY [1]
If covalent [0] out [2]

(e) alternating (positive and negative) [1]
pattern [1]

(f) (i) barium - oxygen or ionic [1]
(ii) bond forming energy released/exothermic [1]
bond breaking energy taken in/endothermic [1]
more energy released [1]

TOTAL = 17

Total for Paper: 80

90

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARKING SCHEME

MAXIMUM MARK: 60

SYLLABUS/COMPONENT: 0620/06

CHEMISTRY

(Alternative to Practical)

UNIVERSITY of CAMBRIDGE
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1 (a) A = mortar (1)
B = stirrer/stirring rod (1) not thermometer
C = tripod (1)
D = Bunsen Burner (1) [4]

(b) filtration [1]

(c) D or description [1]

2 (a) because precipitate formed/goes cloudy (1)
sulphur (1)/turbid [2]

(b) reference to fair test/comparison/same depth [1]

(c) sodium thiosulphate/water 1st/2nd acid, last [1]

(d) (i) all points correct (3), -1 for any incorrect
smooth line (1)
label (1) [5]

(ii) line lower down (1)
does not touch other line (1) [2]

(e) times would be longer (1) because solution more spread out/reference to surface area/depth (1) [2]

3 Table of results
correct burette readings in table (3) or 17.2, 18.9, 26.5
i.e. 16.8, 17.1 and 25.5
Differences correctly completed (1) Difference 7.6
i.e. 8.4 [4]

(a) (i) Experiment 1 [1]

(ii) twice volume/more than twice as much [1]

(iii) Solution B was 2x (1) concentration of C (1) or similar
B more concentrated than C (1 only) [2]

(iv) volume A = 33.6 (1) cm^3 (1)/34.4cm^3
2x iodine produced (1) [3]

(b) reference to accuracy (1) indicator (1)/easier to see
not test for I_2 max 2 [2]

4 (c) effervescence/fizz/bubbles (1)
limewater milky (1)/blue solution [2]

(d) (ii) blue (1) precipitate (1)
royal/dark blue (1) solution (1) [4]

(e) (i) white (1) precipitate (1)
dissolves (1) [3]

(ii) white (1) precipitate (1)
dissolves (1) [3]

(f) Solid D is a sulphate (1) hydrated (1) [2]

(g) copper (1)/Cu^{2+} (2) [2]

Page 2	Mark Scheme	Syllabus	Paper
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5 (a) (i) Smooth line graph **[1]**

(ii) result at 5 minutes (1)
not on curve (1)/gas escapes, gone down **[2]**

(b) 0.8 g **[1]**

(c) reference to leak/loss of gas (1)
∴ volumes lower (1) **[2]**

6 Known mass of beach sand (1)
add excess (1) dilute hydrochloric acid (1)
filter (1) wash (1) dry (1) residue
and weigh sand (1) working out result (1)
max 6 of 8 **[6]**

[Total: 60]