OXFORD
INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL GCSE CHEMISTRY

9202/2

PAPER 2

Mark scheme

Specimen material

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Question 1

Question	Answers	Extra information	Mark
01.1	double bond between carbons		1
01.2	double bond breaks many molecules (of ethene) join together		1 1 1
01.3	oxidised		1
01.4	ethanol		1
01.5	add sodium carbonate solution compound A will fizz/produce CO_2		1 1
01.6	H_2O		1
01.7	ethyl ethanoate		1
01.8	perfume/solvent		1
Total			**11**

Question 2

Question	Answers	Extra information	Mark
02.1	line drawn in ink will bleed line under solvent all samples will dissolve in solvent		1 1 1 1
02.2	made up of three different colours A and E and an unknown colour		1 1
02.3	33mm 13mm		1 1
02.4	0.4	allow ecf allow 1 sig fig up to full calculator display correctly rounded	1
02.5	fast red	allow closest value to answer from 02.4	1
Total			**10**

Question	Answers	Extra information	Mark
03.1	because they are negatively charged	allow they are negative allow oppositely charged **or** opposites attract ignore they are attracted	1
03.2	lose one / an electron	allow fully balanced equation	1
03.3	hydrogen is less reactive than sodium		1
03.4	2, 2		1

03.5	Examiners should also refer to the information on page 3.			6
0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**	
No relevant content.	There are basic descriptions of advantages or disadvantages of the electrolysis cells.	There are clear descriptions of environmental or economic advantages or disadvantages of the electrolysis cells. Comparisons may be implied.	There are detailed descriptions of environmental and economic advantages and disadvantages, comparing the electrolysis cells.	
Examples of points made in the response: • mercury cell is more expensive to construct • mercury is recycled but membranes must be replaced • mercury is toxic but membrane/polymer is not • removing traces of mercury from waste is expensive • mercury cell uses more electricity • mercury cell produces chlorine that is purer • mercury cell produces higher concentration/better quality of sodium hydroxide (solution).				

Total			**8**

Question 4

Question	Answers	Extra information	Mark
04.1	all points plotted to ± one square		1
	sensible line of best fit	allow a curve if two lines drawn cannot gain this mark	1
04.2	line extrapolated		1
	as read from their graph ± one square		1
04.3	iodine and astatine	both required	1
04.4	Cl > Br > I **or** I < Br < Cl	allow reactivity decreases down the group	1
	Cl has 2 reactions, Br has 1 reaction, I doesn't react	allow Cl has most/more reactions and I has fewest /fewer reactions (must be clear about where Br fits in)	1
04.5	Br_2		1
Total			**8**

Question 5

Question	Answers	Extra information	Mark
05.1	red	ignore pink	1
05.2	add silver nitrate (solution) white precipitate	 ignore addition of another acid	1 1
05.3	suitable named alkali/sodium hydroxide in burette add alkali solution until (indicator) changes colour any **two** from: • wash/rinse equipment • add dropwise **or** slowly (near endpoint) • swirl/mix • read (meniscus) at eye level • white background • read start and final burette levels **or** calculate the volume needed • repeat.		1 1 2
05.4	does not ionise/dissociate completely	allow for acids of the same concentration weak acids have a higher pH or fewer hydrogen ions	1
05.5	ring around COOH		1
05.6	phenolpthalein changes colour when the acid is neutralised		1
Total			**10**

Question 6

Question	Answers	Extra information	Mark
06.1	ignite (a small sample of gas) loud bang **or** (squeaky) pop **or** explodes		1 1
06.2	M_r Al_2O_3 = 102 54/102 x 5100 2700g **OR** Moles of Al_2O_3 = 5100/102 = 50 moles (1) Mass of Al = 2 x (50 x 27) (1) 2700g (1)	allow 2700g with no working shown for **3** marks	1 1 1

06.3	Examiners should also refer to the information on page 3.			6
0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**	
No relevant content.	The student has written about some basic points from the table but has not added any extra knowledge. The student may have included advantages or disadvantages.	The student has attempted an evaluation using the points from the table and their own knowledge. The student has included advantages and disadvantages.	The student has given an evaluation that includes both advantages and disadvantages. The student has clearly linked points from the table with their own knowledge and uses appropriate scientific terminology.	

Examples of points made in the response:

Advantages of aluminium over lithium:

- aluminium is less reactive so safer/stored/used more easily
- aluminium is more abundant, so less likely to deplete natural resources
- aluminium is less expensive, so batteries will be cheaper.

Disadvantages of Aluminium

- aluminium batteries need to be replaced more often so might increase long term cost
- aluminium is denser so batteries are heavier.

Total			**11**

Question 7

Question	Answers	Extra information	Mark
07.1	any **two** from: • volume of copper sulfate • concentration of copper sulfate • area/size/length of metal object submerged • current/voltage of electricity supply **or** same battery.		2
07.2	both axes correctly labeled correct profile of graph – the line should slope from bottom left to top right and level off	time must be on x-axis	1 1
07.3	as time increases for first 5 minutes the mass deposited increases after 5 minutes the mass no longer increases the results support the hypothesis for the first 5 minutes but not after 5 minutes		1 1 1 1
07.4	any **two** from: • dry electrodes before weighing • dip electrodes in propanone • increase resolution of balance • change battery for power pack • simultaneously starting the current flow and stopwatch.		2

Question	Answers	Extra information	Mark
07.5	any **two** from: • zero the balance then repeat the readings • subtract 0.11 g from the readings obtained • change balance for one reading zero.		2
Total			**12**

Question 8

Question	Answers	Extra information	Mark
08.1	D		1
08.2	conical flask trough / beaker / water bath		1 1
08.3	(205 – 50) / 70 2.86 2.8	 (2 significant figures) allow 2.8 with no working shown for **3** marks allow 2.86 with no working shown for **2** marks	1 1 1
08.4	0/zero	ignore nothing	1
08.5	200 / 24000 8.3×10^{-3} **or** 0.0083	 allow 8.3×10^{-3} **or** 0.0083 with no working shown for **2** marks	1 1
08.6	0.0083 x 24 0.1992 0.20	 allow 0.20 with no working shown for **3** marks allow 0.1992 with no working shown for **2** marks	1 1 1
Total			**12**

Question 9

Question	Answers	Extra information	Mark
09.1	because the nitrogen from dry air contained noble/Group 0 gases **or** because the nitrogen from dry air contained argon/krypton/ xenon **and** three/some of these gases (argon, krypton, xenon) have a greater density than nitrogen **or** and argon/krypton/xenon has a greater density than nitrogen	ignore other gases ignore helium and neon ignore helium and neon	1 1
09.2	carbon dioxide would form **or** is a solid	allow carbon dioxide freezes or its freezing point is > –200 °C allow solid carbon dioxide would block pipes ignore melting point	1
09.3	helium and neon	both needed allow He and Ne	1
09.4	argon and oxygen because there is a difference of only 3 °C in their boiling points	allow Ar and O_2 allow because they have boiling points that are almost the same	1 1
Total			**6**