OXFORD
INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL GCSE
CHEMISTRY
9202/1
PAPER 1

Mark scheme
November 2018

Version 1.0 Final

18BY9202/1/MS

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.

Further copies of this mark scheme are available from aqa.org.uk

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.

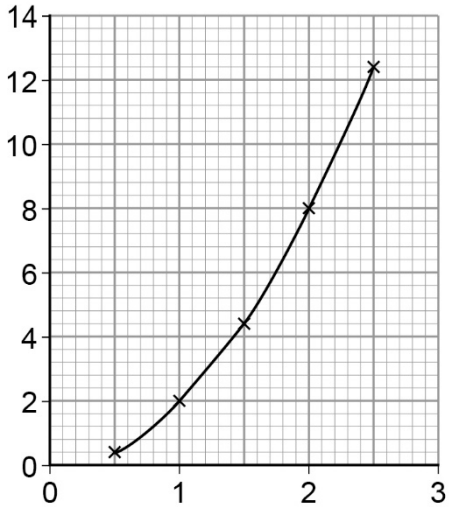
You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

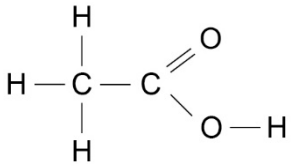
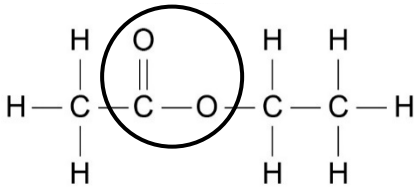
Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

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

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
01.1	nucleus		1	AO1 3.1.2c	G
01.2	protons		1	AO1 3.1.2d	G
01.3	isotopes		1	AO1 3.1.2g	G
01.4	$^{15}_{7}N$		1	AO2 3.1.2f 3.1.2h	A
01.5	electrons arranged 2 7		1	AO2 3.1.2.i	G
01.6	no shells of electrons no protons no neutrons	allow no positive particles if neither mp2 or mp3 awarded, allow one mark for no nucleus	1 1 1	AO2 3.1.2c	E
Total			**8**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
02.1	(s) (g) ZnO		1 1 1	AO2 3.3.1.2a 3.6.1b	E
02.2	decomposition		1	AO1 3.3.1.2a	A
02.3	carbon dioxide is lost/given off	allow gas is lost	1	AO3 3.3.1.2a	E
02.4	mass has stopped changing/is constant	allow last 2 readings at 23.5 g **or** mass constant after 4 mins	1	AO3 3.3.1.2a	E
02.5	because energy needed to break the bonds is greater than the energy released when bonds are formed		1 1	AO1 3.9.2g	E
02.6	mass stays constant (at 24.4) (because) temperature of Bunsen flame not hot enough **or** (because) most group 1 carbonates do not decompose	 allow sodium carbonate does not decompose (in this experiment)	1 1	AO3 3.3.1.2a	E
Total			**10**		

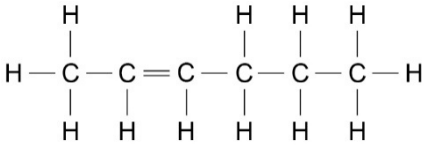
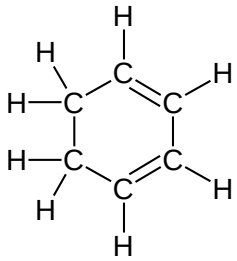
Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
03.1	55		1	AO2 3.3.1.1a	G
03.2	convert 1 minute to 60 seconds (90/60 =) 1.5 (cm^3/s)		1 1	AO2 3.8.1a	E
03.3	rate increases (because) bigger surface area (in powder) (so) increased frequency of collisions	allow time taken is shorter ignore time gets faster ignore more collisions	1 1 1	AO1 3.8.1f	E
03.4	rate increases as concentration increases if concentration is doubled rate goes up by 4 **Or** numbers quoted to show exponential relationship		1 1	AO3 3.8.1e	E
03.5	y-axis labelled rate of reaction in cm^3/s **and** suitable scale 5 correct points curve of best fit	 allow 1 mark for 3 or 4 correct points allow tolerance of +/- ½ square	1 2 1	AO2 3.8.1e	E
Total			**12**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
04.1	oxidation		1	AO1 3.10.3.1c	A
04.2			1	AO1 3.10.3.2a	A
04.3			1	AO1 3.10.3.3a	E
04.4	acid	allow named strong acid	1	AO1 3.10.3.2b	G
04.5	it has stronger intermolecular forces		1	AO2 3.2.2d	A
04.6	distillation	allow fractional distillation	1	AO1 3.4.1c	E
04.7	1 evaporation 2 condensation	allow boiling in place of evaporation ignore gas/liquid	1	AO2 3.10.1.1c 3.4.1c	E
04.8	(boil the liquid and) measure the boiling point exactly 78 °C if pure.		1 1	AO2 AO3 3.4.1a	E

04.9	**Level 3:** a detailed and coherent comparison is given, which demonstrates a broad knowledge and understanding of the key scientific ideas. The response makes logical links between the points raised and considers both sides of the argument. Student makes a conclusion.	5–6	AO1 /2 3.10.1.2f	E
	Level 2: a description is given which demonstrates a reasonable knowledge and understanding of the key scientific ideas. Comparisons are made but may not be fully articulated and / or precise.	3–4		
	Level 1: simple statements are made which demonstrate a basic knowledge of some of the relevant ideas. The response may fail to make comparisons between the points raised.	1–2		
	no relevant content	0		
	Indicative content **For sugar method** • sugar cane renewable resource • slow process • low temperature • low energy costs • batch process • higher labour costs • less pure product **For ethene method** • crude oil non-renewable resource • fast process • high temperature and pressure • high energy costs • continuous process • lower labour costs/greater automation • more pure product			

Total		**15**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
05.1	heat (to vaporise) pass over (hot) catalyst **or** mix with steam and heated (to a very high temperature)		1 1	AO1 3.10.1.3a	E
05.2	C_2H_4 + C_3H_6	any order	1	AO2 3.10.1.3a 3.6.1a	E
05.3	any **one** from: • to make polymers/plastic • to make alcohols	 allow named example of polymer do not allow named alcohol	1	AO1 3.10.2a 3.10.1.2f	E
05.4	any **one** from: • more flammable • more volatile • lower boiling point.	allow easier to ignite	1	AO2 3.10.1.2c	E
05.5	orange colourless		1 1	AO1 3.10.1.3d	G
05.6	(volume of bromine water = 60 × 0.1 =) 6 cm^3 (6 cm^3 = 6/1000 =) 0.006 dm^3 (number of moles of bromine = 0.006 × 0.2 =) 0.0012 (mol)	an answer of 0.0012 (mol) gains **3** marks	1 1 1	AO2/AO3 3.6.4a	E

05.7	A =  B = 		1	AO3 3.10.1.3c	G

Total			**11**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
06.1	copper	allow Cu^{2+}	1	AO1 3.4.3c	G
06.2	bromide		1	AO1 3.4.3e	A
06.3	white precipitate does mean sulfate ion is present (but) sulfuric acid contains sulfate ion (so) not possible to say if solution **D** contains sulfate ions		1 1 1	AO2/3 3.4.3f	E
06.4	filter the mixture wash the residue dry the filter paper weigh the precipitate/filter paper		1 1 1 1	AO4 3.4.3e 3.4.1c	E
06.5	(M_r(AgX) = 1.18/0.005 =) 236 (A_r(X) = 236 – 108 =) 128 iodide	 allow I^- do **not** accept iodine	1 1 1	AO2 3.6.1d 3.6.2a 3.6.3a	E
Total			**12**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
07.1	any **four** from: • strong electrostatic forces • in all directions • between oppositely charged ions • in a giant (ionic) structure/lattice • (therefore) large amounts of energy needed to break the (ionic) bonds/overcome (electrostatic) forces.	allow strong bonds	4	AO1 3.2.2a	E
07.2	ions are fixed in place/cannot move		1	AO2 3.2.2b	E
07.3	*M*r (KCl) = 39 + 35.5 = 74.5 (number of moles of KCl = 0.298/74.5=) 4×10^{-3} (number of ions = $4 \times 10^{-3} \times 6.02 \times 10^{23} \times 2$ =) 4.816×10^{21} (number of ions =) 4.82×10^{21} (to 3 s.f)	an answer of 4.82×10^{21} gains **4** marks	1 1 1 1	AO2 3.6.3a 3.6.3b	E
07.4	correct from sodium to caesium lithium does not fit trend/is anomalous		1 1	AO3 3.2.1c 3.2.1d	E
Total			**11**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
08.1	turns red then white	 allow bleaches litmus paper	1 1	AO1 3.4.2e	E
08.2	any one from • (production of) bleach • (production of) plastics • sterilising water		1	AO1 3.3.2j	E
08.3	$2Cl^- \rightarrow Cl_2 + 2e^-$ Cl^- on the left **and** $Cl_2 + e^-$ on the right correct balancing	Allow $2Cl^- - 2e^- \rightarrow Cl_2$	 1 1	AO1 3.3.2f	E
08.4	sodium more reactive than hydrogen		1	AO1 3.3.2g 3.3.2j	E
08.5	sodium hydroxide (solution)		1	AO1 3.3.2j	E
08.6	($M_r(MnO_2)$ = 55 + (2 × 16) =) 87 (number of moles of MnO_2 = 4.35/87 =) 0.05 (volume of Cl_2 =) 0.0500 × 24 × 1000 1200 (cm^3)	an answer of 1200 gains **4** marks	1 1 1 1	AO2 3.6.1d 3.6.4d	E
Total			**11**		