GCSE
CHEMISTRY

PAPER 1F

Mark scheme

Specimen 2018

Version 0.1

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

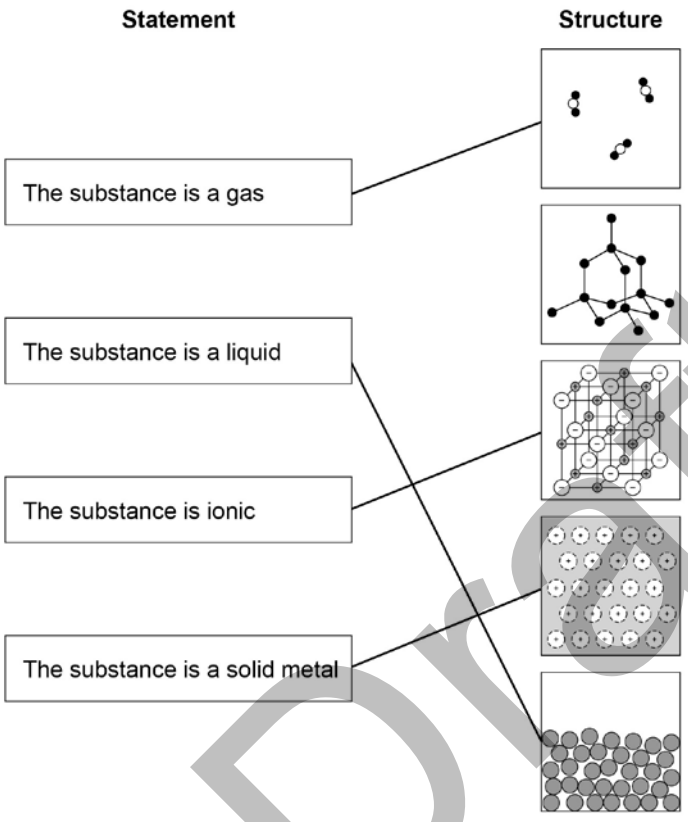
Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This 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.

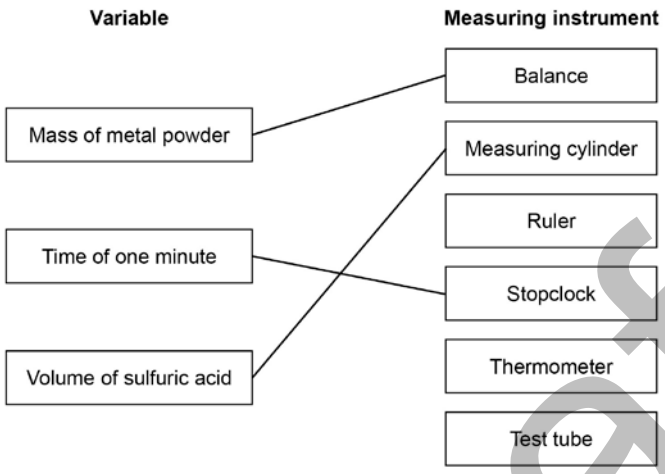
Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

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

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1			4	AO1/1 4.2.2.1 4.2.2.3 4.2.1.5
01.2	Carbon		1	AO1/1 4.2.3.2
01.3	It has delocalised electrons		1	AO1/1 4.2.3.2
01.4	the atoms/particles/ions are different sizes which prevents the rows/layers sliding	do **not** accept molecules accept the layers are disrupted	1 1	AO1/1 4.2.2.7
01.5	Mixture		1	AO1/1 4.1.1.2
Total			**9**	

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	Type of metal		1	AO2/2 4.4.1.2
02.2	 more than one line drawn from a variable negates the mark		1 1 1	AO2/2 4.4.1.2
2.3	(Most reactive) **Y** **Z** (Least reactive) **X**	must all be correct	1	AO3/2a 4.4.1.2
02.4	would not be safe **or** too reactive	allow too dangerous	1	AO2/2 4.4.1.2
02.5	sodium + oxygen → sodium oxide		1	AO2/1 4.4.1.1 4.1.1.1
02.6	Oxidation		1	AO1/1 4.4.1.1

Question 2 continues on the next page

Question 2 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.7	Gold		1	AO1/1 4.4.1.3
02.8	carbon		1	AO2/1 4.4.1.3
02.9	Loss of oxygen		1	AO1/1 4.4.1.3
Total			**11**	

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	Li_2CO_3 + **2** HCl → 2 LiCl + H_2O + CO_2	allow multiples	1	AO2/1 4.1.1.1
03.2	36		1	AO2/2 4.1.1.1
03.3	horizontal straight line drawn extended to other line		1 1	AO2/2 4.4.2.2
03.4	0.43 (g)	allow 0.42 – 0.43 g	1	AO3/2b 4.4.2.2
03.5	point at (0.3, 50) circled in **Figure 6**		1	AO3/1a 4.4.2.2
03.6	The bung was not pushed in firmly enough. The measuring cylinder was not completely over the delivery tube.		1 1	AO3/3a 4.4.2.2
03.7	as one goes up the other goes up (directly) proportional		2	AO3/1a 4.4.2.2

Question 3 continues on the next page

Question 3 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.8	A gas/carbon dioxide is produced.		1	AO2/1 4.4.2.2
03.9	any **one** from: • Potassium carbonate does not decompose to produce carbon dioxide / a gas. • Potassium carbonate does not decompose at the temperature of the Bunsen burner **or** the Bunsen burner is not hot enough to decompose potassium carbonate. • When potassium carbonate decomposes a gas is not formed.		1	AO3/2b 4.4.2.2
Total			**12**	

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	any **two** from: • temperature (of electrolyte) • concentration (or electrolyte) • distance between electrodes • surface area of electrodes	allow potassium nitrate solution for electrolyte allow potassium nitrate solution for electrolyte volume/depth electrodes inserted allow keep one electrode as magnesium	2	AO2/1 4.5.2.1
04.2	0.0 V wires not connected **or** break in circuit **or** both metals the same	allow Test 2 allow reason for break in circuit	1 1	AO3/1a AO3/3a 4.5.2.1
04.3	2.7 (V)		1	AO2/2 4.5.2.1
04.4	silver		1	AO3/2a 4.5.2.1
04.5	any value between 1.1<V<2.2		1	AO3/2a 4.5.2.1
Total			**7**	

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5.1	any **one** from: • there was a flame • energy was given out • a new substance was formed • the magnesium turned into a (white) powder	answers must be from **Figure 15**	1	AO2/1 4.1.1.1 4.5.1.1
5.2	Magnesium oxide		1	AO2/1 4.4.1.1
5.3	The reaction has a high activation energy		1	AO3/2b 4.5.1.2
5.4	9		1	AO1/2 4.4.2.5
5.5	They have a high surface area to volume ratio		1	AO1/1 4.2.4.1
5.6	any **one** from: • Better coverage • More protection from the Sun's ultra violet rays		1	AO1/1 4.2.4.2
05.7	any **one** from: • Potential cell damage to the body • Harmful effects on the environment		1	AO1/1 4.2.4.2
05.8	1000 ×		1	AO2/1 4.2.4.1
Total			**8**	

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	carbon dioxide		1	AO1/1 4.1.1.1 4.4.2.2, 3
06.2	s l	Answers **must** be in the correct order.	1 1	AO1/1 AO2/1 4.2.2.2 4.4.2.2, 3
06.3	A gas was lost from the flask.		1	AO2/2 4.3.1.3 4.4.2.2, 3
06.4	**Add excess (in step 2)** to ensure all acid reacted **Filter (in step 3)** to remove copper carbonate **Heat (in step 4)** to remove (some) water **Leave to cool (in step 5)** so crystals form		1 1 1 1	AO1/2 4.4.2.2, 3
06.5	72.0 (%)	correct answer scores 3 if not correct then score **1** mark, up to a maximum of 2, for each of: Total mass of products = 221.5 159.5 total mass of products	3	AO2/2 4.3.3.2

Question 6 continues on the next page

Question 6 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	any **one** from: • Important for sustainable development • Economic reasons • Waste products may be pollutants/greenhouse gases • CO_2/H_2O is/are greenhouse gas(es)		1	AO1/1 4.3.3.2
Total			**12**	

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	13 (protons) 14 (neutrons) 13 (electrons)	The answers must be in the correct order. if no other marks awarded, award **1** mark if number of protons and electrons are equal	1 1 1	AO2/1 4.1.1.4
07.2	they have the same number of electrons in outer energy level/shell	do **not** accept any number of electrons in outer energy level unless it is three	1	AO1/1 4.1.2.1

Question 7 continues on the next page

Question 7 continued

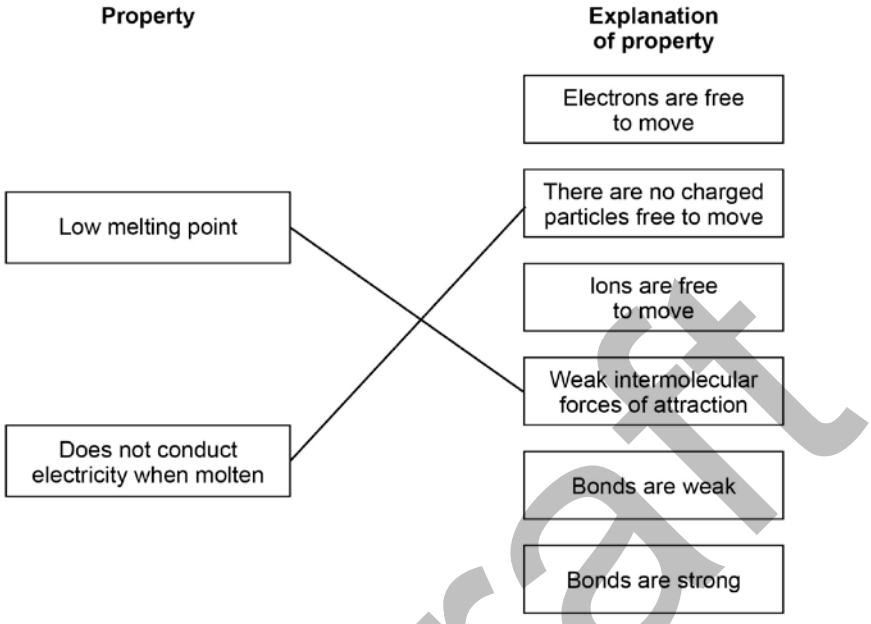
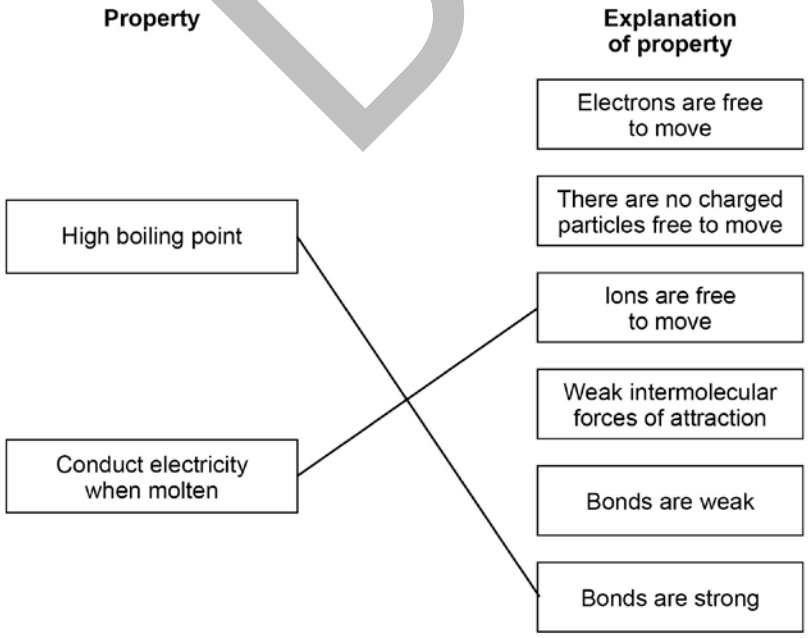
Question	Answers	Extra information	Mark	AO / Spec. Ref.
07	**Level 3:** A number of properties of transition metals and Group 1 metals have been listed. There has been at least one comparison of properties made.		5–6	AO1/1 4.1.2.5 4.1.3.1 4.1.3.2
	Level 2: A number of chemical and physical properties are considered.		3–4	
	Level 1: One or more physical or chemical properties of transition metals or Group 1 metals.		1–2	
	Nothing written worthy of credit.		0	
	Indicative content Physical Transition metals • high melting points • high densities • strong • hard Group 1 • low melting points • low densities • soft Chemical Transition metals • low reactivity/react slowly (with water or oxygen) • used as catalysts • ions with different charges • coloured compounds Group 1 • very reactive/react (quickly) with water/non-metals • not used as catalysts • white/colourless compounds • only forms a +1 ion			
Total			**10**	

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	electrons transferred from potassium to sulfur two potassium atoms each lose one electron forming K^+/1+ ions sulfur atoms gain 2 electrons forming S^{2-}/2- ions		5	AO2/1 AO1/1 AO2/1 AO1/1 AO2/1 4.2.1.2
08.2	there are not gaps between the ions **or** the ions are touching each other (in the ionic model)	ratio in model is not correct	1	AO1/1 4.2.1.3
08.3	seven		1	AO2/1 4.1.1.1
08.4	(two) shared pairs between H and S rest correct - no additional hydrogen electrons and two non- bonding pairs on sulfur	second mark dependent on first	1 1	AO2/1 4.2.1.4
08.5	34(g)	Ignore units even if incorrect	1	AO2/1 4.2.1.4

Question 8 continues on the next page

Question 8 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.6			2	AO1/1 4.2.2.4
08.7			2	AO1/1 4.2.2.3
Total			**14**	

Question 9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	any **one** from: • heat • stir		1	AO3/3b 4.1.1.2 4.4.2.3
09.2	filter	accept use a centrifuge accept leave longer (to settle)	1	AO3/3b 4.1.1.2 4.4.2.3
09.3	any **one** from: • wear safety spectacles • wear an apron		1	AO3/3b 4.1.1.2 4.4.2.3
09.4	Distillation		1	AO1/2 4.1.1.2 4.10.1.2
09.5	Evaporation	Allow boiling	1	AO2/2 4.2.2.1 4.10.1.2
09.6	Condensing / condensation		1	AO2/2 4.2.2.1 4.10.1.2
Total			**6**	

Question 10

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.1	**E**		1	AO2/1 4.1.1.4 4.1.2.1
10.2	**D**		1	AO2/1 4.1.2.1 4.1.2.6
10.3	**E**		1	AO2/1 4.1.2.1 4.1.2.6
10.4	**C**		1	AO2/1 4.1.2.4 4.1.2.6
10.5	**B**		1	AO2/1 4.1.1.5 4.1.2.6
10.6	It has a full outer shell **or** eight electrons in its outer shell **or** it has a stable arrangement (therefore) it does not need to lose/gain/share electrons (to get a full outer shell) **or** it does not need to form bonds (to get a full outer shell).		2	AO2/1 AO1/1 4.1.2.4
10.7	The outer shell electron in element **E** is further from the nucleus (therefore) less attracted to the nucleus		1 1	AO2/1 AO1/1 4.1.2.5
10.8	(the ion has) one more proton than electrons protons have a positive charge and electrons have a negative charge	allow reverse allow **1** mark for (Group 1) metals form positive ions if no other mark awarded	2	AO2/1 AO1/1 4.1.1.3 4.1.2.3 4.1.2.5
Total			**11**	