
**GCSE
CHEMISTRY**

PAPER 2F

Mark scheme

Specimen 2018

Version 0.1

Draft

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	Air		1	AO2/1
	Steel		1	AO1/1 4.1.1.2 4.8.1.2 4.9.1.1 4.10.3.2
01.2	<p>Context</p> <p>Pure substance in chemistry</p> <p>Pure substance in everyday life</p>	<p>Meaning</p> <p>A substance that has had nothing added to it</p> <p>A single element or a single compound</p> <p>A substance containing only atoms which have different numbers of protons</p> <p>A substance that can be separated by filtration</p> <p>A useful product made by mixing substances</p>	1 1	AO1/1 4.8.1.1, 2 4.1.1.3
	Allow 1 mark for the correct meanings linked context but incorrect way around			
01.3	Damp litmus paper turns white		1	AO1/1 4.8.2.4
01.4	Iron(III)		1	AO1/1 4.8.3.2
01.5	White		1	AO1/1 4.8.3.4
01.6	Fast method		1	AO1/1 4.8.3.6
Total			8	

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	reversible	allow equilibrium	1	AO1/1 4.6.2.1, 2
02.2	16 (°C)		1	AO2/2 4.6.2.2
02.3	blue pink	both needed in this order	1	AO2/1 4.6.2.2
02.4	Exothermic		1	AO1/1 4.6.2.2
Total			4	

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	3		1	AO3/1a 4.8.1.3
03.2	A		1	AO3/1a 4.8.1.3
03.3	<p>(distance moved by dye A) 40 (mm)</p> <p>(distance from start line to solvent front) 100 (mm)</p> <p>0.4</p>	allow values in range 39-41	1	AO2/2 4.8.1.3
		allow values in range 99-101	1	
		allow 1 mark for 40/100 or correct ecf calculation for their values of <u>distance moved by A</u> distance moved by solvent	1	
03.4	water level above the start line start line drawn in ink	allow water level too high	2	AO3/1a 4.8.1.3
Total			7	

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	75% gold 20% copper 5% silver	If no mark obtained allow 1 mark for naming 2 elements correctly or correctly stating percentages as 5 %, 20 %, 75 %	1 1 1	AO2/2 4.1.1.1 4.10.3.2
04.2	50		1	AO3/2a 4.10.3.2
04.3	any two from: <ul style="list-style-type: none"> cost (18 carat is cheaper) pure gold is soft or 24 carat gold is soft or 18 carat gold is harder can change the colour 	allow 18 carat gold is stronger allow gold is an alloy in 18 carat gold	2	AO1/1 4.2.2.7 4.10.3.2
Total			6	

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	conical flask	allow flask	1	AO1/2 4.6.1.2
05.2	measuring cylinder	allow pipette/burette	1	AO1/2 4.6.1.2
05.3	wear goggles/safety specs/(safety) gloves	allow pipette/burette	1	AO3/3a 4.6.1.2
5.4	To stop the acid spraying out		1	AO3/3a 4.6.1.2
05.5	all points correct	$\pm \frac{1}{2}$ small square ignore absence of plot at (0,0)	2	AO2/2
	best fit line	allow 1 mark if 4 or 5 of the points from 20 s to 100 s are correct	1	AO3/2a
	point at (60,2.9) circled	must not deviate towards anomalous point	1	AO2/2 4.6.1.1, 2
05.6	(mass) 4.0 (g)	allow ecf from drawn best fit line	1	AO2/2 4.6.1.1, 2
	(time) 100 (s)		1	

Question 5 continues on the next page

Question 5 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.7	0.048		1	AO2/2
	g/s		1	4.6.1.1, 2
05.8	surface area		1	AO1/1 4.6.1.1, 2, 3, 4
05.9	more collisions		1	
	(as) more particles or (collisions) occur more frequently		1	AO1/1 4.6.1.1, 2, 3, 4
Total			15	

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	Methane		1	AO1/1 4.9.2.1, 2
06.2	carbon dioxide concentration stayed constant from 1850 to 1900	allow values from 1965 - 1975	1	AO3/1a
	carbon dioxide concentration slowly increased from 1900		1	AO3/1a
	carbon dioxide concentration increased more rapidly from 1965		1	AO3/2b 4.9.2.1, 2
06.3	Burning of fossil fuels		1	AO1/1 4.9.2.2
06.4	Sea levels rising		1	AO1/1 4.9.2.2, 3
Total			6	

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	Butanol has the highest boiling point		1	AO2/1
	Propanol is a liquid at 20°C		1	4.2.2.1 4.2.2.4 4.7.2.3
07.2	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{O}-\text{H} \\ \\ \text{H} \end{array}$		1	AO2/1 4.2.1.4 4.7.2.3
07.3	ethene + water (→ ethanol)	allow answers in either order allow steam for water	1	AO2/1 4.1.1.1 4.7.2.2
07.4	goes back to reactor	allow is recycled	1	AO3/2a 4.7.2.2
07.5	air contains oxygen		1	AO1/1
	which oxidises ethanol	allow ethanol reacted with oxygen	1	AO2/1
	to produce ethanoic acid		1	AO1/1 4.7.2.3
Total			8	

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	fractional distillation	allow distillation allow fractionation ignore refining	1	AO1/1 4.7.1.1, 2
08.2	contains hydrogen and carbon (hydrogen and carbon) <u>only</u>		1 1	AO1/1 4.7.1.1
08.3	C ₅ H ₁₂		1	AO2/1 4.1.1.1 4.7.1.1
08.4	Alkanes		1	AO1/1 4.7.1.1
08.5	(3) CO ₂ (4) H ₂ O	allow for 1 mark 4 CO ₂ + 3 H ₂ O	1 1	AO2/1 4.1.1.1 4.7.1.3 4.9.3.1
08.6	(<i>diesel</i>) produces more oxides of nitrogen produces (more) particulate matter produces less carbon dioxide	allow converse answers in terms of petrol	1 1 1	AO2/1 4.7.1.3 4.9.3.1, 2

Question 8 continues on the next page

Question 8 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.7	<p style="text-align: center;">Pollutant</p> <p>Oxides of nitrogen</p> <p>Particulate matter</p>	<p style="text-align: center;">Environmental impact caused by the pollutant</p> <p>Acid rain</p> <p>Flooding</p> <p>Global dimming</p> <p>Global warming</p> <p>Photosynthesis</p>	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p>	<p style="text-align: center;">AO1/1 4.9.3.1, 2</p>
Total			12	

Question 9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	Potable		1	AO1/1 4.10.1.2
09.2	filter	ignore screening	1	AO1//1 4.10.1.2
	to remove solids	Ignore named solids/objects	1	
	use chlorine/ozone/uv light	allow sterilise for either of these	1	
	to kill microbes	2 marks but not both	1	
09.3	(conical) flask containing salt solution		1	AO1/2 4.1.1.2 4.10.1.2
	test tube with pure water		1	
	heat source		1	
09.4	determine boiling point		1	AO1/2 4.1.1.2 4.2.2.1 4.10.1.2
	should be 100°C		1	
09.5	high energy requirement		1	AO1/1 4.10.1.2
Total			11	

Question 10

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.1	(M) = 0.08 (g)		1	AO2/2 4.10.3.1
10.2	0.01 g		1	AO2/2 4.10.3.1
10.3	iron + oxygen + water	all three needed for 2 marks 2 correct = 1 mark	2	AO2/1 4.1.1.1 4.10.3.1
10.4	nails in test tubes 2 and 3 do not rust		1	AO2/2
	nail in test tube 4 does rust		1	AO2/2
	(test tube 2) the nail did not rust as no water present		1	AO2/2
	(test tube 3) the nail did not rust as the paint stopped oxygen and water reaching the iron	allow air for oxygen	1	AO3/1a
	(test tube 4) the scratch on the nail rusted as the scratch revealed iron which reacted with oxygen and water or (test tube 4) less nail exposed so less rusting than in test tube 1	allow air for oxygen	1	AO3/2b 4.10.3.1
10.5	covered with zinc		1	AO1/1 4.10.3.1
	zinc is more reactive than iron	allow sacrificial protection for 2 marks	1	
	so zinc reacts before the iron		1	
Total			12	

Question 11

Question	Answers	Extra information	Mark	AO / Spec. Ref.
11	Level 3: A clear description of the advantages and disadvantages of both types of hanger, with logical links.		5–6	AO2/2 x 1 AO3/1a x 2 AO3/1b x 1 AO3/2a x 2 4.10.2.1 4.10.2.2
	Level 2: A number of relevant points made, but not precisely. The logic is unclear.		3–4	
	Level 1: Fragmented points, with no logical structure.		1–2	
	Nothing written worthy of credit.		0	
	Indicative content			
	<ul style="list-style-type: none"> • Both processes use finite resources. • Steel has a higher energy requirement. • Plastic longer lasting. • (Plastic longer lasting) so plastic may use less finite resources • (Plastic may use less finite resources) and so plastic may have an even lower energy requirement. • Recycling steel lowers raw material usage. • Incineration of plastic can provide energy. • Incineration of plastic may cause pollution /CO₂ / CO emissions. 			
Total			6	

Question 12

Question	Answers	Extra information	Mark	AO / Spec. Ref.
12.1	as a catalyst or to speed up the reaction		1	AO1/1 4.6.1.5 4.10.4.1
12.2	as pressure increases percentage yield increases		1	AO2/2 4.10.4.1
12.3	28 (%)		1	AO2/2 4.3.3.1 4.10.4.1
12.4	any two from: <ul style="list-style-type: none"> known formulation fertilisers more widely available easier to use easier to provide amount of nitrogen required more food/crops can be grown doesn't smell 		2	AO3/2a 4.10.4.1
Total			5	