
GCSE COMBINED SCIENCE: SYNERGY

PAPER 1F

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

Draft

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	A		1	AO1/1 4.1.3.2
01.2	D		1	AO1/1 4.1.3.2
01.3	1000		1	AO2/2 4.1.3.1
01.4	B		1	AO1/1 4.1.4.2
01.5	2 / Two		1	AO2/1 4.1.4.2
01.6	Hertz / Hz metres / m	correct order only allow $\frac{1}{s}$ ignore prefixes	1 1	AO1/1 4.1.4.2
Total			7	

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	Photosynthesis		1	AO1/1 4.4.1.2
02.2	Respiration		1	AO1/1 4.4.1.2
02.3	C		1	AO2/1 4.4.1.2
02.4	(it will) rise		1	AO2/1 4.4.1.2
02.5	water vapour methane		1 1	AO1/1 4.4.1.3
02.6	Microorganism		1	AO1/1 4.4.1.2
Total			7	

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	because the mass of an electron is very small	do not accept has no mass	1	AO1/1 4.1.2.3
03.2	6 (because) protons = electrons = 5 (and) neutrons = 11 – 5	allow mass number – number of protons	1 1 1	AO2/1 AO2/1 AO2/1 4.1.2.3
03.3	54.55	if answer incorrect allow (6/11) x 100 or 55 for 1 mark allow ecf from 03.2	2	AO2/1 4.1.2.3
03.4	+5		1	AO2/1 4.1.2.3
Total			7	

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	any two from: <ul style="list-style-type: none"> • X-rays • ultraviolet • visible (light) • infrared • radio (waves) 		2	AO1/1 4.1.4.3
04.2	any one from: <ul style="list-style-type: none"> • satellite (communication) • cooking (food) 		1	AO1/1 4.1.4.3
04.3	uncontrolled malignant		1 1	AO1/1 4.3.2.7
04.4	A high-speed electron		1	AO1/1 4.3.2.2
04.5	(mass number) 231 (protons) 92 (neutrons) 141		1 1 1	AO2/1 4.3.2.2
04.6	2 / two hours (because) count rate halves in that time		1 1	AO2/1 4.3.2.2
Total			11	

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	<p>Disease</p> <p>Way the disease is spread</p> <pre> graph LR subgraph Diseases Cholera Cold Malaria end subgraph SpreadMethods A[Animals that draw blood] B[Drinking contaminated water] C[Droplets in the air when people cough or sneeze] D[Eating food that is contaminated] E[Breathing air polluted with carbon dioxide] end Cholera --- A Cholera --- B Cold --- C Malaria --- D Malaria --- E </pre>	extra lines from left cancel the mark	<p>1</p> <p>1</p> <p>1</p>	AO1/1 4.3.3.1
05.2	<p>any two from:</p> <ul style="list-style-type: none"> • skin as a barrier • blood clots (over cuts) • nose (hairs) catch particles (breathed in) • mucus (in trachea / bronchi) traps microorganisms • acid in stomach kills microorganisms 		2	AO1/1 4.3.3.3
05.3	virus		1	AO1/1 4.3.3.2
05.4	2.5		1	AO2/1 4.3.3.5
05.5	28 / twenty eight	± 0.5 small square tolerance	1	AO3/2a 4.3.3.5
05.6	<p>number will decrease</p> <p>less likely to come into contact with someone with measles / the disease</p>		<p>1</p> <p>1</p>	AO2/1 4.3.3.5
Total			10	

Question 6

Question	Answers			Extra information	Mark	AO / Spec. Ref.
06.1	23				1	AO1/1 4.4.3.1
06.2	46			allow 23 pairs allow ecf from 6.1	1	AO1/1 4.4.3.1
06.3	Nucleus				1	AO1/1 4.4.3.4
06.4		X	X	all three correct for 2 marks one or two correct for 1 mark allow XY or YX in correct places	2	AO2/1 4.4.3.4
	X	XX	XX			
	Y	XY	XY			
06.5		X	X	either circled	1	AO2/1 4.4.3.4
	X	XX	XX			
	Y	XY	XY			
06.6	1 in 2				1	AO2/1 4.4.3.4
Total					7	

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	kilograms per metre cubed, kg/m ³		1	AO1/1 4.1.1.2
07.2	(C has) more particles in the same volume or in a given volume	allow atoms for particles allow description of a given area	1 1	AO2/1 4.1.1.2
07.3	randomly kinetic	this order only	1 1	AO1/1 4.1.1.3
07.4	(pressure) rises		1	AO2/1 4.1.1.3
Total			6	

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	(A) atrium / atria (B) ventricle		1 1	AO1/1 4.2.1.3
08.2	Pulmonary artery		1	AO1/1 4.2.1.3
08.3	keeps the (coronary) artery open or wide allowing the blood to keep flowing so glucose / oxygen gets to the heart (muscle)		1 1 1	AO1/1 AO2/1 AO2/1 4.3.1.3
08.4	all three bars correctly plotted	2 bars correctly plotted 1 mark ± 0.5 small squares	2	AO2/2 4.3.1.2
08.5	twice / two times (more likely)		1	AO2/2 4.3.1.2
08.6	reasoned argument for or against fruit and vegetables as the cause of CHD reasons for: <ul style="list-style-type: none"> (country) A has the highest death rate and the lowest (fruit and vegetable) consumption reasons against: <ul style="list-style-type: none"> (country) B has the highest (fruit and vegetable) consumption but still has the second highest death rate there may be other factors affecting death rate there is no clear pattern between death rate and consumption (of fruit and vegetables) mechanism of causation is not known 	max 2 marks if only reasons for or reasons against given.	3	AO3/1b 4.3.1.2

Question 8 continues on the next page

Question 8 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.7	smoking lack of exercise	allow any other correct risk factor for CHD	1 1	AO1/1 4.3.1.2
Total			14	

Draft

Question 9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	glucose + oxygen carbon dioxide	allow $C_6H_{12}O_6 + 6O_2$ allow $6CO_2$	1 1	AO1/1 4.2.1.1
09.2	(to) stop them falling in the solution or to stop them drowning (in the solution)		1	AO2/2 4.2.1.1
09.3	(water bubble) moves towards the maggots / boiling tube (as) the oxygen is used up (in respiration) drawing air in from the (capillary) tubing		1 1 1	AO2/2 AO2/1 AO2/2 4.2.1.1
09.4	x axis: Temperature in °C y axis: Rate of respiration in arbitrary units	both needed for the mark	1	AO2/2 4.2.1.1
09.5	repeat the experiment at 30 °C		1	AO3/1a 4.2.1.1
09.6	10.5	allow range 10.4–10.8	1	AO2/1 4.2.1.1
09.7	(sum total of) all reactions in a cell / body		1	AO1/1 4.2.1.1
Total			10	

Question 10

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.1	phytoplankton		1	AO2/1 4.4.2.1
10.2	seal		1	AO2/1 4.4.2.1
10.3	40 000 J	correct answer with or without working gains 2 marks allow $\frac{4000}{0.1}$ for 1 mark	2	AO2/1 4.4.2.1
10.4	cod numbers will increase because fewer will be eaten		1 1	AO2/1 4.4.2.1
Total			6	

Question 11

Question	Answers	Extra information	Mark	AO / Spec. Ref.
11.1	filtered	accept description of filtering, ie grit beds	1	AO1/2 4.4.1.8
	to remove solids	accept description of sterilisation method, i.e. chlorine, ozone or UV light	1	
	sterilised		1	
	to kill microorganisms		1	
11.2	without oxygen		1	AO1/1 4.2.1.1
11.3	bacteria / microorganisms		1	AO2/1 4.4.1.8
Total			6	

Question 12

Question	Answers	Extra information	Mark	AO / Spec. Ref.
12.1	dose / dosage efficacy / effectiveness		1 1	AO1/2 4.3.3.7
12.2	patient does not know who is taking the placebo or drug (and the) doctor does not know or only the drug company knows who is taking the drug or placebo		1 1	AO1/2 4.3.3.7
12.3	(drug A) reduced the blood cholesterol level more than drug B (drug A) reduced the thickness of the artery or drug B increased the thickness of the artery	allow (drug A) made the artery thinner or (drug B) made the artery thicker ignore side effects	1 1	AO3/1a 4.3.3.7
12.4	differences in number of patients reporting side effects are very similar we don't know what the patients died of		1 1	AO3/2b 4.3.3.7
12.5	To prevent false claims		1	AO1/2 4.3.3.7
Total			9	

Draft