SPECIMEN MATERIAL

GCSE
COMBINED SCIENCE: TRILOGY

PAPER 1: BIOLOGY 1H

Mark scheme

Specimen 2018

Version 1.0

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

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Marks should be awarded for each stage of the calculation completed correctly, as students are instructed to show their working.

Full marks can however be given for a correct numerical answer, without any working shown.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient are used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do not allow means that this is a wrong answer which, even if the correct answer is given as well, will still mean that the mark is not awarded.

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.

You should ignore any irrelevant points made. However, full marks can be awarded only if there are no incorrect statements that contradict a correct response.

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	**D**		1	AO2/1 4.1.1.2
	any **one** from: • has chloroplasts • has a (large) vacuole	ignore has a (cell) wall	1	AO2/1 4.1.1.2
01.2	**B**		1	AO2/1 4.1.1.2
	does **not** have a (cell) wall	allow has only a nucleus, (cell) membrane **and** cytoplasm	1	AO2/1 4.1.1.2
01.3	**C**		1	AO2/1 4.1.1.1
	any **one** from: • genetic material is not in a nucleus • has a single loop of DNA	allow no nucleus	1	AO2/1 4.1.1.1
01.4	real size = 25 / 100 000		1	AO2/2 4.1.1.5
	0.00025		1	AO2/2 4.1.1.5
	(conversion to) 0.25 (µm)	allow 0.25 (µm) with no working shown for **3** marks	1	AO2/2 4.1.1.5
Total			**9**	

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	water + carbon dioxide → oxygen + glucose	extra box ticked negates mark	1	AO1/1 4.4.1.1

02.2	**Level 3:** A coherent method is described with relevant detail, which demonstrates a broad understanding of the relevant techniques and procedures. The steps in the method are logically ordered. The method would lead to the production of valid results.	5–6	AO2/2 4.4.1.2
	Level 2: The bulk of the method is described with mostly relevant detail, which demonstrates a reasonable understanding of the relevant scientific techniques and procedures. The method may not be in a completely logical order and may be missing some detail.	3–4	
	Level 1: Simple statements are made which demonstrate some understanding of some of the relevant scientific techniques and procedures. The response may lack a logical structure and would not lead to the production of valid results.	1–2	
	No relevant content	0	
	Indicative content • description of how the apparatus would be used • reference to control intensity of light / brightness • use of ruler to measure distance of light from beaker / pondweed • reference to varying colour of light or use of different filters • plant releases gas / oxygen • measure number of bubbles / volume of gas produced • same length of time • reference to control of temperature • reference to control / supply of carbon dioxide in water • do repeats and calculate a mean		

Question 2 continues on the next page

Question 2 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	rate does not increase further if light intensity increased beyond 20	allow graph levels off after 20	1	AO3/1b 4.4.1.2
02.4	any **one** from: • temperature • carbon dioxide (concentration) • amount of chlorophyll	allow number of chloroplasts	1	AO2/2 4.4.1.2
Total			**9**	

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	any **two** from: • same result at pH 7 and 7.5 **or** could be any pH between 7 and 7.5 **or** not tested at pH 7.25 **or** need to test at smaller pH intervals (between 7 and 7.5) • accuracy of result only to nearest 0.5 minutes • no repeats • difficult to determine end point (colour)		2	AO3/3b 4.2.2.1
03.2	2.7/5 0.54 (units per minute)	 allow 0.52 with no working shown for **2** marks allow **1** mark for 0.52 **or** 0.56	1 1	AO2/2 4.2.2.1 AO2/2 4.2.2.1
03.3	(after 10 minutes) solution goes black (after 60 minutes) solution stays the same **or** does not go black **or** goes slightly orange		1 1	AO1/2 4.2.2.1 AO1/2 4.2.2.1
03.4	steeper curve levels off at 11.8 units **and** before 45 minutes		1 1	AO2/2 4.2.2.1 AO2/2 4.2.2.1

Question 3 continues on the next page

Question 3 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	no / little sugar produced	allow a correct description of what the graph would look like	1	AO2/2 4.2.2.2
	(because at 65 °C) the enzyme will be denatured	allow (because) the enzyme's shape will be changed **or** (because) the active site is damaged	1	AO1/1 4.2.2.2
	(so) will no longer fit the starch **or** (so) will not be able to catalyse the reaction		1	AO2/1 4.2.2.2
Total			**11**	

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	cells can break off	allow cells invade other tissues	1	AO1/1 4.2.2.7
	travel in blood	accept travel in lymph (fluid)	1	AO1/1 4.2.2.7
04.2	$\frac{(89-48)}{48} \times 100 = 85.416\dot{6}$		1	AO2/2 4.2.2.7
	85.4 (%)	allow 85.4 (%) with no working shown for **2** marks)	1	AO2/2 4.2.2.7
04.3	any **two** from: • similar survival rates for diagnosis in 1961 • survival rate (for diagnosis in 2011) is 1.5 times greater for prostate cancer compared to bowel cancer • (survival rates) have improved for both cancers • (survival rate) for prostate cancer has improved more	accept survival rate for bowel cancer has increased 2.4 times **but** for prostate cancer 3.4 / 3.36 times	2	AO2/1 3.2.2.7
	plus **two** from: • earlier diagnosis • improved screening programmes • improved drugs • difference in level of aggression of cancers • difference in ease of removing tumours	reason must be correctly linked to comparison	2	AO3/2a 3.2.2.7
Total			**8**	

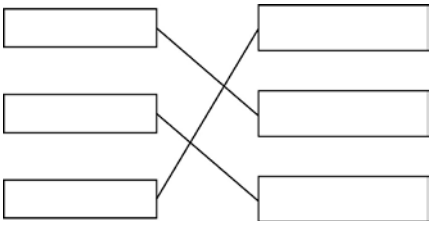
Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	plasma transports proteins / dissolved substances / food (molecules) / urea / hormones **or** blood cells are suspended in the plasma		1	AO1/1 4.2.2.3
	platelets are involved in blood clotting		1	AO1/1 4.2.2.3
05.2	the right side of the heart pumps blood to the lungs **and** the left side of the heart pumps blood around (the rest of) the body		1	AO1/1 4.2.2.2

Question 5 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	**Level 3:** A detailed and coherent evaluation is provided which considers a range of relevant points and comes to a conclusion consistent with the reasoning.		5–6	AO3/1b 4.2.2.4
	Level 2: An attempt to relate relevant points and come to a conclusion. The logic may be inconsistent at times but builds towards a coherent argument.		3–4	AO1/2 4.2.2.4
	Level 1: Discrete relevant points made. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.		1–2	AO1/1 4.2.2.4
	No relevant content		0	
	Indicative content **pros of statins:** • decreases blood cholesterol • slows down build-up of fatty material in arteries • (so) blood can flow to heart muscle cells **cons of statins:** • drug has to be taken regularly **or** may forget to take drug • drug will need to be taken long-term • side-effects of taking the drug • effects of drug will take time to happen **pros of stents:** • blocked artery is held open • (so) blood can flow to heart muscle cells • will remain in place / work for a long time • rapid recovery time **cons of stents:** • risk of infection from procedure • risk of surgery eg heart attack • risk of thrombosis **or** blood clot a justified conclusion			
Total			**9**	

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	any **one** from: • not all deaths recorded • not all causes of deaths recorded	allow cause may not be known	1	AO3/1b 4.3.1.1
06.2	antibiotics do not kill viruses	allow antibiotics only kill bacteria	1	AO1/1 4.3.1.8
06.3		all correct for **2** marks 1 or 2 correct for **1** mark	2	AO2/2 4.3.1.9
06.4	any **one** from: • to prevent false claims • to make sure the conclusions are correct / valid • to avoid bias		1	AO1/2 4.3.1.9
06.5	some people would be immune to EVD if less people (in a population) have EVD less chance of it being passed on	allow those vaccinated would not contract the disease	1 1	AO1/1 4.3.1.7 AO1/1 4.3.1.7

Question 6 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	**Level 3:** A detailed and coherent evaluation is provided which considers a range of arguments for and against the use of unlicensed drugs and comes to a conclusion consistent with the reasoning.		5–6	AO3/1b 4.3.1.1 4.3.1.7 4.3.1.9
	Level 2: An attempt to give arguments for and against the use of unlicensed drugs is made. The logic may be inconsistent at times but builds towards a coherent argument.		3–4	AO3/1b 4.3.1.1 4.3.1.7 4.3.1.9
	Level 1: Discrete relevant points made. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.		1–2	AO2/2 4.3.1.1 4.3.1.7 4.3.1.9
	No relevant content		0	
	Indicative content **pros** • might save some lives • vaccine could reduce chance of future outbreaks • patient made aware of risk and agreed to use of drug • sharing of results could speed up development of effective vaccines / drugs • used mainly for health workers who were risking their lives to help **cons** • could be dangerous **or** vaccine could harm a healthy person • goes against legislation / laws governing drug development • might set a precedent for other drugs not to be fully tested • unfair as not available to the African people a justified conclusion			
Total			**13**	

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	control		1	AO2/2 4.4.1.1 4.4.2.1
	to check that the indicator colour does not change on its own **or** to check any changes in colour are due to the organisms		1	AO2/3a 4.4.1.1 4.4.2.1
07.2	(tube) **E**		1	AO3/2b 4.4.2.1
	<u>most</u> carbon dioxide		1	AO2/2 4.4.2.1
	(due to) <u>only</u> respiration occurring	allow no carbon dioxide used for photosynthesis allow **1** mark **max** if chose tube **D** and give a correct reason	1	AO3/1a 4.4.1.1
07.3	the amount of carbon dioxide produced by respiration equalled amount absorbed for photosynthesis		1	AO3/2a 4.4.1.1 4.4.2.1
Total			**6**	

Question 8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08	(nitrate) ions are absorbed by active transport		1	AO1/1 4.1.3.3
	(active transport) is the movement of ions against the concentration gradient	allow (active transport) is the movement of ions from a dilute to a more concentrated solution	1	AO1/1 4.1.3.3
	(active transport) requires energy from respiration		1	AO1/1 4.1.3.3
	(respiration) requires oxygen		1	AO2/1 4.4.2.1
	no / little oxygen / air in water-logged soil		1	AO2/1 4.4.2.1
Total			**5**	

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