



GCSE
COMBINED SCIENCE: TRILOGY
8464/B/1F

Biology Paper 1F

Mark scheme

Specimen (set 2)

Version: 1.0

Keep secure

Please be aware that not all schools and colleges will be using these tests at the same time.

Help us to maintain the security of these papers by ensuring they are not distributed on social media or other platforms.

Important – please note

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers.

It must be stressed that a mark scheme is a working document. This mark scheme has **not** been through the full standardisation process. 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.

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.

The Information to Examiners is included as a guide to how the mark scheme will function as an operational document.

The layout has been kept consistent so that future operational mark schemes do not appear different from these test materials.

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
- the Assessment Objectives, level of demand 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 ecf 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 Allow

In the mark scheme additional information, 'allow' is used to indicate creditworthy alternative answers.

3.9 Ignore

Ignore is 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.

3.10 Do not accept

Do **not** accept 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.

4. Level of response marking instructions

Extended response questions are marked on level of response mark schemes.

- 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 two 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.

When assigning a level you should look at the overall quality of the answer. Do **not** look to penalise 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.

Use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 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.

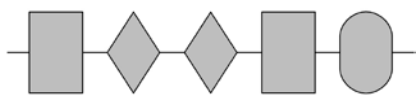
An answer which contains nothing of relevance to the question must be awarded no marks.

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand																
01.1	nucleus cell wall		1 1	AO1 4.1.1.1 4.1.1.2 Low																
01.2	any one from: <ul style="list-style-type: none"> contain (many) chloroplasts positioned near the top surface of the leaf packed closely together 		1	AO2 4.1.1.2 4.1.1.3 4.2.3.1 4.4.1.2 Low																
01.3	<table border="1"> <thead> <tr> <th>Structure</th> <th>Tissue</th> <th>Organ</th> <th>Organ System</th> </tr> </thead> <tbody> <tr> <td>Leaf</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>Xylem</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>Roots, stem and leaves</td> <td></td> <td></td> <td>✓</td> </tr> </tbody> </table>	Structure	Tissue	Organ	Organ System	Leaf		✓		Xylem	✓			Roots, stem and leaves			✓	additional tick in a row negates the credit for that row allow 1 mark for two correct rows	2	AO1 4.2.1 4.2.3.1 4.2.3.2 Low
Structure	Tissue	Organ	Organ System																	
Leaf		✓																		
Xylem	✓																			
Roots, stem and leaves			✓																	
01.4	×4 reason: any one from: <ul style="list-style-type: none"> gives the largest field of view easier to focus 		1 1	AO3 4.1.1.2 Low Standard																
01.5	eyepiece lens: ×10 and objective lens: ×40 or eyepiece lens: ×5 and objective lens: ×80	allow sensible suggestions that give a magnification of ×400	1	AO2 4.1.1.2 Low																

01.6	12.4 (mm)	allow 12 (mm)	1	AO2 4.1.1.5 Low
------	-----------	---------------	---	-----------------------

01.7	real width = $\frac{12.4}{400}$ 0.031 (mm)	an answer of 0.031 (mm) scores 2 marks	1	AO2 Low
		allow ecf from 01.6		

Total			11	
--------------	--	--	-----------	--

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
02.1	C		1	AO1 4.2.2.1 Low
02.2	B		1	AO1 4.2.2.1 Low
02.3	E		1	AO1 4.2.2.1 Low
02.4	any one from: <ul style="list-style-type: none"> • they are too big • they are insoluble 		1	AO1 4.2.2.1 Low
02.5	(pH) 7.5	allow answers in range 7.4 to 7.6	1	AO3 4.2.2.1 Low
02.6	(enzyme X) stomach (enzyme Y) small intestine		1	AO3 4.2.2.1 Low
02.7			1	AO3 4.2.2.1 Low
02.8	lock and key		1	AO1 4.2.2.1 Low

02.9	(some pH values): change the shape of the active site	allow some pH values denature enzymes	1	AO1
	(so) so substrate will no longer fit / bind to the active site		1	AO2 4.2.2.1 Standard

Total			10	
--------------	--	--	-----------	--

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
03.1	any two adaptations with linked descriptions from: <ul style="list-style-type: none"> many alveoli to provide a large surface area good blood supply to maintain steep diffusion / concentration gradient thin walls so gases do not have far to diffuse / travel well ventilated to maintain steep diffusion / concentration gradient 	1 mark for adaptation and 1 mark for linked description allow to collect oxygen or to bring carbon dioxide to lungs	4	AO1 4.1.3.1 4.2.2.2 Low Standard
03.2	an allergy		1	AO1 4.2.2.5 Low
03.3	any one from: <ul style="list-style-type: none"> narrow(er) / small(er) (air) passages / bronchioles less air / oxygen can pass through 		1	AO2 4.2.2.2 4.2.2.5 Low
03.4	3.3 (dm ³)		1	AO2 4.2.2.2 4.2.2.5 Low
03.5	any one from: <ul style="list-style-type: none"> fake drug inactive form of drug 		1	AO1 4.3.1.9 Low
03.6	neither the volunteers nor the scientists		1	AO2 4.3.1.9 Low

03.7	to avoid / reduce bias		1	AO3 4.3.1.9 Low
03.8	<p>any two from:</p> <ul style="list-style-type: none"> • drug only works for severe asthma attacks <p>or</p> <ul style="list-style-type: none"> • drug only increased lung capacity in severe asthma attacks • drug had little effect or slight reduction in healthy people • drug had no effect in mild asthma attacks • drug does not alleviate the problem entirely 		2	AO3 4.2.2.5 4.3.1.9 Low
Total			12	

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
04.1	salmonella		1	AO1 4.3.1.2 4.3.1.3 4.3.1.8 Low
04.2			1 1 1 1	AO2 4.3.1.9 Low
04.3	lower concentration of antibiotic / chemical further from the fungus	allow less antibiotic / chemical further from the fungus	1	AO3 4.3.1.9 Low
04.4	lead to mass production of antibiotics or lead to development of other antibiotics reduced infection by bacteria or antibiotics have saved many lives		1 1	AO2 4.3.1.8 AO1 Low Standard
Total			8	

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
05.1	0.27 (g)		1	AO2 4.1.3.2 Low
05.2	potato lost mass	allow potato (cells) lost water	1	AO2 4.1.3.2 Low
05.3	all 3 points plotted correctly	allow ecf from 05.1 allow 1 mark for 1 or 2 correct plots	2	AO2 4.1.3.2 Low
	suitable line of best fit	allow ecf from their plots	1	
05.4	2.6 (arbitrary units)	allow answer from their line	1	AO3 4.1.3.2 Low
05.5	same concentration as inside potato (cells)		1	AO3
	(so) no (net) movement of water	allow description of this	1	AO1
	by osmosis		1	AO1 Standard
Total			9	

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
06.1	carbon dioxide + water → (glucose) + oxygen	allow reactants in either order allow correct formulae, balancing not required	1	AO1 4.4.1.1 Standard
06.2	chlorophyll		1	AO2 4.2.3.1 4.4.1.2 Standard
06.3	glucose (produced in photosynthesis) is converted into starch		1	AO2 4.4.1.3 Standard
06.4	starch could be broken down (into sugar)		1	AO2 4.4.1 4.4.1.3 Standard
06.5	so the colour of the iodine solution / result can be seen		1	AO3 4.2.2.1 4.4.1.3 Standard
06.6	any one from: <ul style="list-style-type: none"> • turn off Bunsen / flame before collecting ethanol • use a water bath to heat the ethanol 	allow idea that there are no naked flames near the ethanol	1	AO3 4.4.1.1 Standard
06.7	A orange / brown B black / blue-black		1 1	AO3 4.2.2.1 4.4.1.2 4.4.1.3 Standard
Total			8	

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
07.1	36 000 (cm ³)		1	AO2 4.2.2.2 4.4.2.2 Standard
07.2	11600 / 1200 9.66666r	allow any number of decimals	1 1	AO2 4.2.2.2 4.4.2.2 Standard
07.3	muscles need more energy (for contraction) (so) more oxygen / glucose needed (for) increased respiration	need at least one reference to 'more' for full marks allow so more carbon dioxide / thermal energy needs to be removed	1 1 1	AO1 4.2.2.2 4.2.2.3 4.4.2.1 4.4.2.2 Standard

Question	Answers	Mark	AO / Spec. Ref.
07.4	Level 3: Relevant points (differences / functions) are identified, given in detail and linked logically to form a clear account.	5–6	AO2 AO1 4.2.2.2 Standard
	Level 2: Relevant points (differences / functions) are identified and there are attempts at logical linking. The resulting account is not fully clear.	3–4	
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	
	No relevant content	0	
	<p>Indicative content</p> <ul style="list-style-type: none"> • artery has a thicker wall • (because) artery has to withstand higher pressure • artery has thicker layer of elastic tissue / fibres • (so) it can stretch • (so) artery returns to original size / shape • artery has thicker layer of muscle • to maintain a force on the blood • vein has valves • (valves) prevent backflow of blood • artery carries blood away from the heart • vein carries blood towards the heart <p>ignore references to oxygenated / deoxygenated blood</p>		
Total		12	