GCSE
COMBINED SCIENCE: TRILOGY
8464/B/1F

Biology Paper 1F

Mark scheme

June 2024

Final v1.0

2 4 6 G 8 4 6 4 / B / 1 F / M S

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 Examiner.

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.

No student should be disadvantaged on the basis of their gender identity and/or how they refer to the gender identity of others in their exam responses.

A consistent use of 'they/them' as a singular and pronouns beyond 'she/her' or 'he/him' will be credited in exam responses in line with existing mark scheme criteria.

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 their judgement
- 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 do not form the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent (for example, a scientifically correct answer that could not reasonably be expected from a student's knowledge of the specification).

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**.
Alternative words in the mark scheme are shown by a solidus 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 a correct response. So, if the number of errors / 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** magnetic materials.

[2 marks]

Student	Response	Marks awarded
1	iron, steel, tin	1
2	cobalt, nickel, nail*	2

3.2 Use of symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, or uses symbols to denote quantities in a physics equation, 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. At any point in a calculation students may omit steps from their working. If a subsequent step is given correctly, the relevant marks may be awarded.

Full marks should be awarded for a correct numerical answer, without any working shown.
Full marks are not awarded for a correct final answer from incorrect working.

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

An error can be carried forward from one question part to the next and is shown by the abbreviation 'ecf'.

Within an individual question part, an incorrect value in one step of a calculation does not prevent all of the subsequent marks being awarded.

3.6 Phonetic spelling

Marks should be awarded if spelling is not correct but the intention is clear, **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 <u>not</u> 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.

3.11 Numbered answer lines

Numbered lines on the question paper are intended to support the student to give the correct number of responses. The answer should still be marked as a whole.

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 or three marks in each level.

Before you apply the mark scheme to a student's answer; read through the answer and, if necessary, 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. 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 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	**A** – (cell) membrane		1	AO1 4.1.1.1
	B – nucleus		1	4.1.1.2
	C – cytoplasm		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	to control the activities of the whole cell		1	AO1 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	to release energy in respiration		1	AO1 4.1.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4		must be in this order		AO1 4.1.1.2
	stage		1	RPA1
	eyepiece lens	allow eyepiece ignore lens unqualified	1	
	mirror		1	
	objective lens	allow objective ignore lens unqualified	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	*measurement* 36 (mm)	allow in the range of 35 to 37 (mm)	1	AO2 4.1.1.5
	conversion 36 000 (µm)	allow an answer using student's measurement × 1000	1	
	substitution $\frac{36\ 000}{40}$	allow student's converted measurement divided by 40	1	
	magnification 900	do **not** accept if units given	1	

Total Question 1	**13**

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	(as a) control **or** (to) compare (the other results to)	allow to show the effect of fan / wind do **not** accept control variable	1	AO3 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	(loss of mass / water) increases	allow mass of leaves decreases more allow more (mass / water) is lost	1	AO2 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	loss of water		1	AO2 4.2.3.2
	(because water) evaporated	allow by transpiration allow diffusion	1	
	from stomata / stoma	ignore from guard cells	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	greater		1	AO2 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5	do the investigation again using the same method		1	AO3 4.2.3.2

Total Question 2	**7**

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	**C**		1	AO1 4.2.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	platelets		1	AO1 4.2.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	any **two** from: • oxygen • hormones • urea • carbon dioxide • water • glucose • amino acids • fatty acids • glycerol • antibodies • lactic acid • minerals • vitamins	allow sugar allow 2 named minerals / vitamins / hormones / drugs for **2** marks allow other correctly named substances such as proteins	2	AO1 4.2.2.1 4.2.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	any **one** from: • blood is under lower pressure • easier to stop the bleeding • easier to puncture the vein • easier to access (vein / blood) • less painful • blood flows smoothly	allow converse if clearly referring to arteries allow less bleeding (after the donation) allow (veins) have thinner walls allow (veins) are closer to the surface (of the skin) ignore references to safety ignore references to oxygenated and deoxygenated blood	1	AO3 4.2.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	(advantage) any **one** from: • improved quality of life • lives are saved **or** deaths are reduced • reduced anaemia • restores blood levels (following severe burns / blood-loss) (disadvantage) any **one** from: • risk of infection • risk of rejection • allergic reaction • bruising	ignore more blood unqualified allow blood type must match allow wrong blood type given ignore religion	1 1	AO3 4.2.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.6	(advantage) any **one** from: • (pleasure from) helping others **or** (happiness from) saving lives • reveal potential health problems (disadvantage) any **one** from: • pain (when donating) • risk of infection • time (spent while donating) • feeling unwell (after donation) • bruising (from the donation site) • reduced physical activity for the rest of the day • possibility of rebleeding	 allow feel good factor allow examples such as HIV allow dizzy / hot / sweating / trembling / nauseous / fainting allow fatigue ignore religion	 1 1	AO3 4.2.2.3

Total Question 3	**9**

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	pain when urinating		1	AO1 4.3.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	any **one** from: • not all cases are reported / recorded • (there may be) false positives / negatives • references to population numbers only being estimates	allow people may not know they have it allow idea of misdiagnosis	1	AO3 4.3.1.3 4.2.2.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	bar chart		1	AO2 4.3.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	to compare **or** different cities have different population sizes	allow cities are different sizes	1	AO3 4.3.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	high fat diet smoking		1 1	AO2 4.2.2.4 4.2.2.6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	a stent		1	AO2 4.2.2.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	less / no blood (flow)		1	AO2 4.2.2.4 4.2.2.3
	(so) less / no oxygen (to heart muscle / cells)		1	4.4.2.1
	(so) less / no respiration	allow less energy available ignore reference to lactic acid	1	

Total Question 4	**10**

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	(reactants) water (products) oxygen	 allow H_2O allow O_2	 1 1	AO1 4.4.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	$C_6H_{12}O_6$		1	AO1 4.4.1.1 4.4.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	any **two** from: • respiration • to convert to starch • to produce / store fat / oil • to produce cellulose • to produce amino acids **or** to produce protein	 allow energy (source) do **not** accept energy produced / made / created do **not** accept energy for respiration allow produce / store starch ignore used for growth of the plant	2	AO1 4.4.1.3 4.4.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	higher / increase in temperature **or** more carbon dioxide	allow warmer allow combustion / burning releases carbon dioxide	1	AO3 AO2 4.4.1.2 4.4.1.3 4.4.2.3
	(so) more photosynthesis	allow faster photosynthesis	1	
	(so) more glucose / sugar made		1	
	(so) more protein / cellulose made		1	

Total Question 5	**9**

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	any **two** from: • less (fructose / sugar) needed	ignore fructose is sweeter than glucose	2	AO3 4.2.2.1
	• cheaper to produce / buy the drink	allow less (sugar) tax allow more profit ignore cheaper unqualified		
	• less energy in the drink (so people are more likely to buy it)	allow less calories / J / KJ in the drink		
		allow less (fructose / sugar) needed so would be cheaper for **2** marks		

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	add Benedict's (reagent / solution)		1	AO1 4.2.2.1 RPA3
	heat reagent / solution	allow appropriate method of heating if a temperature is given, must be at least 60 °C ignore warm	1	
	green / yellow / orange / brown / (brick) red	ignore starting colour	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	add Biuret (reagent / solution)	allow add Biuret A **and** Biuret B allow add potassium / sodium hydroxide solution **and** copper sulfate solution	1	AO1 4.2.2.1 RPA3
	mauve / purple / lilac / pink-purple	ignore starting colour	1	

Question	Answers	Mark	AO / Spec. Ref
06.4	**Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	4–6	AO1 4.2.2.1
	Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.	1–3	
	No relevant content	0	
	Indicative content ***Protein*** • protease ○ (protein) broken down into amino acids ○ (protease) produced in the stomach ○ (protease) produced in the pancreas ○ (protease) produced in the small intestine ○ (hydrochloric) acid provides the correct pH for protease (in the stomach) ***Fat*** • lipase ○ (fat) broken down into fatty acids ○ (fat) broken down into glycerol ○ (lipase) produced by the pancreas ○ (lipase) produced by the small intestine ○ bile ○ (bile) produced by the liver ○ (bile) released from the gall bladder ○ emulsification of fats ○ larger surface area for lipase ○ neutralises acid to provide the correct pH for enzymes For **Level 2**, answers must describe digestion of fat **and** protein linked to correct type of enzyme for both		

Total Question 6	**13**

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	concentration of salt solution		1	AO2 4.1.3.2 RPA2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.2	(water / solution on the tube / tubing) would affect / increase the mass	allow the results would not be valid	1	AO2 4.1.3.2 RPA2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	$\frac{0.96}{15.54} \times 100$		1	AO2 4.1.3.2 RPA2
	6.17 (760618…) (%)		1	
	6.2 (%)	allow answer written in **Table 1** allow correct conversion to one decimal place from students' incorrect percentage change calculation using figures from 0.0 Concentration of salt solution in mol/dm^3	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.4	all 4 points plotted correctly	allow a tolerance of ± ½ a small square allow **1** mark for 3 points plotted correctly ignore attempt to plot a point for 0 mol/dm^3	2	AO2
	line of best fit	ignore extrapolation	1	AO3 4.1.3.2 RPA2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.5	value from student's line of best fit	allow a tolerance of ± ½ a small square if no line of best fit drawn allow **1** mark for an answer in the range 0.64 to 0.66	1	AO3 4.1.3.2 RPA2

Total Question 7	**9**