GCSE
COMBINED SCIENCE: TRILOGY
8464/B/1F

Biology Paper 1F

Mark scheme

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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.

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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 <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.

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.
01.1	eat less fatty food		1	AO2 4.2.2.5 4.2.2.6
01.2	any **two** from: • strengthens muscles • strengthens heart (muscle) • reduces risk of Can younCan(coronary) heart disease / CHD / cardiovascular disease • reduces blood pressure • reduces risk of (Type 2) diabetes • improves mental health / mood • improves mobility	ignore references to losing weight / mass ignore references to immediate effects of exercise on body eg increases heart rate ignore makes you healthier allow makes you stronger allow improves stamina allow keeps your heart healthy allow reduces (blood) cholesterol allow improves circulation allow strengthens bones allow boosts immunity allow reduces risk of (some) cancers allow makes you fitter ignore improves a person's appearance	2	AO2 4.2.2.4 4.2.2.6

01.3	glucose + oxygen → carbon dioxide + water		1	AO1 4.4.2.1
01.4	C		1	AO2 4.2.1 4.2.2.2
01.5	any **two** from: • lowest / lower resting breathing rate • lowest / lower breathing rate after exercise • lowest / lower increase in breathing rate • least amount of time for breathing rate to return to resting rate	statements must be comparative allow less time for breathing rate to return to resting rate allow shortest recovery time	2	AO3 4.2.2.2 4.4.2.2
01.6	any **two** from: • only based on one measurement • person B may have done less intense exercise • other factors (besides breathing rate) indicate fitness	allow person B may have done a different type of exercise eg stamina / strength / speed allow age / sex / body mass may not have been controlled ignore references to medical conditions	2	AO3 4.4.2.2

01.7	deeper breathing	allow heavier breathing ignore breathing rate increases	1	AO1 4.4.2.2
	increased heart rate	allow blood flows faster ignore more blood flows around body	1	
		allow increased (body) temperature		
		allow (increased) sweating		
		allow increased blood flow to skin		
		do **not** accept lactic acid is produced		

01.8		word takes precedence		AO1 4.4.2.1
	oxygen	allow O_2 ignore O / O^2	1	4.4.2.2
	lactic acid		1	

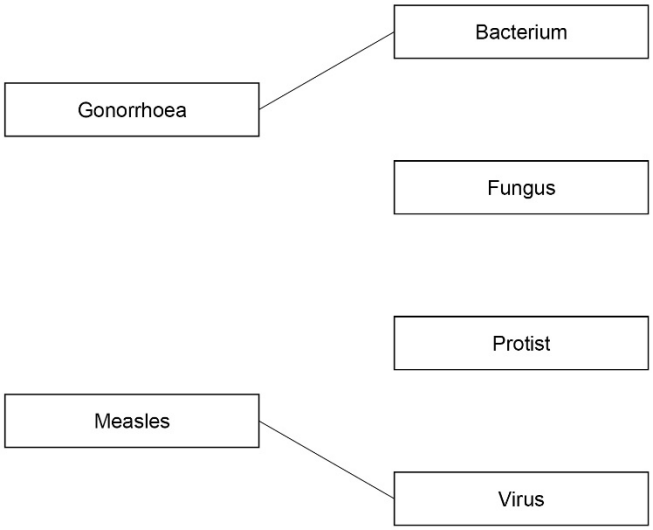
Total			**13**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	any **one** from: • (live) cells • (live) tissues • (live) animals	allow examples , eg mice / rats	1	AO1 4.3.1.9
02.2	7 / seven (years)		1	AO2 4.3.1.9
02.3	to see if the drug is safe to use		1	AO2 4.3.1.9
02.4	tablet that does not contain the drug / active ingredient	allow a sugar pill allow a fake drug	1	AO1 4.3.1.9
02.5	not the patients or the doctors		1	AO1 4.3.1.9
02.6	any **two** from: • age • gender • body mass • number of children (in group) **or** 100 in group • time (after taking medicine) when temperature was measured	allow all (children had a) high body temperature (at the start) allow dose of drug / medicine ignore temperature unqualified	2	AO2 4.3.1.9

02.7	any **one** from: • unethical not to treat ill children • children were ill so had to be treated • children may become more ill if no drug given		1	AO3 4.3.1.9
02.8	37.4 (°C)		1	AO2 4.3.1.9
02.9	any **two** from: • reduced (body) temperature faster • decreased (body) temperature more • reduced (body) temperature to normal / 37 °C • maintained normal (body) temperature / 37 °C for longer **or** for several hours	allow converse arguments allow paracetamol did **not** reduce (body) temperature to normal	2	AO3 4.3.1.9
Total			**11**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	transpiration		1	AO1 4.2.3.2
03.2	guard cells		1	AO1 4.2.3.1 4.2.3.2
03.3	0.04 (g)		1	AO2 4.2.3.1 4.2.3.2
03.4	$\frac{0.15}{24}$ = 0.0062(5) (g) **or** = 6.2(5) × 10^{-3} (g)	allow $\frac{1}{160}$ allow 0.006 / 0.0063 / 6 × 10^{-3} / 6.3 × 10^{-3} (g)	1 1	AO2 4.2.3.1 4.2.3.2

03.5	any **one** from: • leaf B lost more mass / water than leaf C **or** leaf C lost less mass / water than leaf B • when lower surface covered less mass / water was lost (than when upper surface covered) • when upper surface covered more mass / water was lost (than when lower surface covered)	allow B lost 013 g of mass / water **and** C lost 0.05 g of mass / water allow lower surface lost 0.13 g of mass / water **and** upper surface lost 0.05 g of mass / water	1	AO3 4.2.3.1 4.2.3.2
03.6	there are more stomata on the lower surface		1	AO3 4.2.3.1 4.2.3.2
03.7	more (mass / water) lost (because) evaporation / transpiration would be faster	'it' refers to the mass of water lost	1 1	AO3 4.2.3.2 AO2 4.2.3.2
Total			**9**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	extra line(s) from a disease negates that mark  		1 1	AO1 4.3.1.2 4.3.1.3
04.2	any **two** from: • skin (acts as a barrier) • mucus in trachea / bronchi • mucus in nose • cilia (in trachea / bronchi / respiratory tract) • (hydrochloric) acid in stomach	ignore references to the immune response allow mucus in airways allow mucus unqualified if **neither** idea given ignore references to hairs allow scab forms (if you cut yourself) allow tears	2	AO1 4.3.1.6

Question	Answers	Mark	AO / Spec. Ref.
04.3	**Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	4-6	AO1 4.2.2.3 4.3.1.1 4.3.1.6
	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 • white blood cells • detect / identify foreign antigens / cells / pathogens / bacteria • destroy / kill invading cells • phagocytes • engulf invading cells • digest / kill invading cells • produce antibodies • (antibodies) attach to invading cells • (antibodies) destroy / kill invading cells • (antibodies) make invading cells clump together • (so) phagocytes can engulf more cells / pathogens / bacteria • produce antitoxins • to destroy toxins • (so) less tissue damage • (therefore) don't feel as ill • produce memory cells • (so) immune response (to later exposure) is faster A description of the ways that white blood cells act is needed for Level 2.		

04.4	any **one** from: • HIV is a virus • antibiotics do **not** kill viruses • antibiotics (are used to) kill bacteria	allow HIV is **not** a bacterium	1	AO1 4.3.1.2 4.3.1.8
04.5	any **two** from: • avoid sexual intercourse • use a condom • do not share needles • use antiretroviral drugs • screen blood used for transfusions	ignore handwashing ignore social distancing allow practise safe sex ignore use protection unqualified ignore use contraception unqualified ignore use medication unqualified allow have regular checks / tests to see if you have HIV if no other marks awarded allow **1** mark for do not exchange body fluids	2	AO1 4.3.1.1 4.3.1.2
04.6	HIV damages the immune system		1	AO1 4.3.1.2
Total			**14**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	concentration of the sugar solution		1	AO1 4.1.3.2 RPA 2
05.2	gained <u>water</u> (water moves) by osmosis **or** (because) concentration of water outside the potato is greater than inside the cells / potato	 allow converse statements (because) concentration (of sugar solution) inside the potato is greater than outside the potato / cells	1 1	AO2 AO1 4.1.3.2 RPA 2
05.3	all points correctly plotted line of best fit drawn as a curve through all the points	allow ± ½ a square ignore extrapolation of curve	1 1	AO2 4.1.3.2 RPA 2
05.4	correct reading from their graph	allow ± ½ a square allow answer in range 0.23 to 0.24 (mol/dm^3) if no line drawn	1	AO3 4.1.3.2 RPA 2

05.5	$\frac{0.25 \times 100}{7.96}$ = 3.14(070352) 3.14 (%)	allow $\frac{(8.21-7.96) \times 100}{7.96}$ allow correct rounding to 3 sig figs of an incorrectly calculated percentage change	1 1 1	AO2 4.1.3.2 RPA 2
Total			**9**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	amylase	allow phonetic spelling allow carbohydrase do **not** accept amylose	1	AO1 4.2.2.1
06.2	small intestine		1	AO1 4.2.1 4.2.2.1
06.3	any **one** from: • greater magnification • higher resolving power	allow can see (smaller) sub-cellular structures / parts allow can see more detail (inside cells) allow reference to 3-D images	1	AO1 4.1.1.5
06.4	capillary		1	AO2 4.2.2.1 4.2.2.2
06.5	$20 = \frac{\text{image length}}{0.8}$ image length = 0.8 x 20 image length = 16 (mm)		1 1 1	AO2 4.1.1.5 RPA 1
06.6	diffusion		1	AO3 4.1.3.1
06.7	active transport	allow active uptake	1	AO3 4.1.3.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.8	any **one** from: • respiration • to form glycogen • to make amino acids / proteins	allow as an energy source do **not** accept to make / use / create / produce energy allow to make lipid / fat	1	AO1 4.4.2.1 4.4.2.3
06.9	**Level 2:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.		3–4	AO2 4.1.1.3 4.1.3.1 4.1.3.3 4.2.2.1
	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	
	Indicative content • have (many) microvilli • (to) increase surface area • wall of villus only one cell thick **or** is thin • capillaries are close to surface • (so) short pathway • good blood supply • (to) transport food molecules away **or** to the body • (and) maintain a diffusion gradient • cells have many mitochondria • (where) respiration takes place • (where) energy is transferred • (as) active transport requires energy • energy is needed to absorb sugar / food / molecules For Level 2 must make links between structure and it's function			
Total			**14**	