AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.7.1.1

Communities

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**2**
Available paper years	**2024–2024**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.7.1.1 Communities

Answer 01 · Mark scheme

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	(more) thyroxine secreted / released from thyroid (gland)	allow (more) thyroxine is produced / made / created **alternative answer** (more) adrenaline secreted / released / produced / made / created (1) from adrenal gland (1)	1 1	AO1 4.5.3.6

4.7.1.1 Communities

Answer 01 · Mark scheme

Question	Answers	Mark	AO / Spec. Ref.
04.2	**Level 3:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO3
	Level 2: Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO2
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO2
	No relevant content	0	
	Indicative content **trends** • percentage of population with resistance increased for 6 months **or** percentage of population with resistance increased when warfarin was given • then decreased after warfarin stopped being given • the decrease is slower than the increase • the change from increase to decrease is not instant (when warfarin stops being given at 6 months) • manipulated figures **increase explanations** • some rats have allele(s) / gene(s) for resistance to warfarin • this is due to (random) mutation(s) • (therefore) more likely to survive if warfarin is being used • rats with resistance reproduce • passing on allele / gene (for resistance) to next generation • repeats for several / many generations until all / most of population is resistant • several generations within 6 months **decrease explanations** • when warfarin is not used, rats with resistance are outcompeted for food / mates / territory / shelter by non-resistant rats • rats with resistance are killed by larger non-resistant rats • (therefore) rats without resistance become more likely to reproduce For **Level 3**, answers must explain increase **and** decrease in percentage of population resistant to warfarin.		4.6.2.2 4.6.3.1 4.6.3.4

Total Question 4	8

4.7.1.1 Communities

Answer 02 · Mark scheme

June 2024 | 8464/B/2H | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	the interaction of (a community of living) organisms and (the non-living parts of) their environment / habitat	allow the interaction of (a community of) biotic parts and the abiotic parts of their environment / habitat allow the interaction of a community and (the non-living parts of) their environment / habitat	1	AO1 4.7.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	any **two** from: • may be a predator therefore control prey population • may be prey so provide energy to predator • may be a primary consumer therefore control plant / algae population • may alter habitat for other species (to survive) • may provide shelter for other species (to survive) • may maintain biodiversity • may disperse seed / pollen	allow named examples throughout allow may be predator so keep prey population (fairly) constant ignore may be prey so provide food to predator	2	AO2 4.7.1.1 4.7.2.1 4.7.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	$(\frac{216}{4} =) 54$	allow $(\frac{216\ 000}{4000} =) 54$	1	AO2 4.7.3.2

4.7.1.1 Communities

Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4		ignore references to inversely proportional		
	as number of bacteria increases, the concentration of dissolved oxygen decreases	allow as bacteria increases, oxygen decreases allow there is a negative correlation allow converse	1	AO3 4.7.3.2
	(the relationship is) **not** number of bacteria increases and the concentration of oxygen increases (in the same ratio)	allow (the relationship is) **not** as bacteria increases, oxygen increases allow whereas proportional (relationship) would mean as one increases the other increases (in the same ratio) allow converse	1	

Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	(decrease in oxygen concentration causes a) decrease in the number of fish	allow (decrease in oxygen concentration means) more fish die	1	AO3
	(because) fish need oxygen to respire (aerobically)	allow invertebrates need oxygen to respire **and** fish eat invertebrates do **not** accept implications that otters require oxygen from water do **not** accept energy produced / made / created by respiration	1	AO2
	(therefore) otter population decreases due to less food	allow rate of reproduction (in otter population) is lower due to less food allow otters migrate to another river / area / habitat ignore decrease in oxygen causes decrease in otter population unqualified **alternative answer** (decrease in oxygen concentration means) more bacteria are present (1) (so) more fish die (from bacterial infection) (1) (therefore) otter population decreases due to less food **or** rate of reproduction (in otter population) is lower due to less food **or** otters migrate to another river / area / habitat (1)	1	AO2 4.7.2.1 4.7.3.2 4.4.2.1

Total Question 5	9

4.7.1.1 Communities

Answer 01 · Examiner comments

Question 4 (standard, standard/high & high demand)

04.1 Many students referred to increased adrenaline release as referred to increased thyroxine release. Either approach could gain 2 marks. Some students gave responses that were slightly too vague, such as just 'adrenaline' rather than the idea of 'adrenaline is released'. Some confusion was seen between the thyroid gland, adrenal gland and the pituitary. References to TSH and TRH were seen, but are beyond the specification and this was not required for the award of full marks.

Where students did not gain credit, it was common for them to give answers describing why the BMR had increased in terms of the need to compete for food or the need to gain more energy quicker in order to be able to compete.

04.2 Most students only described the data, and were therefore limited to Level 1. Simply repeating figures from the table could not gain any credit. It was also common for students to link the increase with the idea of resistant rats reproducing, enabling Level 2 to be reached.

It was less common for an appropriate link to be made to a decrease in population. Many students made an attempt at linking the decrease to competition but where this had been attempted, it was often only repeating information given in the stem of the question.

Some students misinterpreted the question and referred to antibiotic resistance, bacteria, and the immune system. It was common to see references to white blood cells and memory cells. Some students did not mention resistance at all, but used 'immunity' instead. Immunity is not synonymous with resistance, therefore credit could not be given for indicative content that referred to immunity. A common misconception was that the warfarin caused a mutation. Some students incorrectly assumed that the table showed the population size.

Where students had attempted to explain the increase by referring to a mutation, it was more common to see them stating that the mutation had been caused by giving warfarin and the need for the rats to adapt. Likewise, there were many references to 'survival of the fittest' and 'natural selection' with no further qualification.

If a student had made any attempt to explain how resistance was passed on to offspring, it was more common for them to express it in terms of 'the resistance' being passed on rather than the gene/allele. A few students attempted to explain trends in terms of dominant/recessive alleles.

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4.7.1.1 Communities

Answer 01 · Examiner comments June 2024 | 8464/B/2H | Original Q4

Rats with resistance to warfarin have a smaller mean mass than rats that are **not** resistant to warfarin.

Smaller rats are often at a disadvantage when competing against larger rats.

Explain the trends in the data when warfarin was being given and when warfarin was no longer given.

Use **Table 1**.

[6 marks]

- From 0 months when warfin was given only a few amount of rats had resitanse
- From 0 – 4 months where warfain was given Shows an increase of rats being resicant to warfan
- Showing how the rats had a mutation that now allowed more of them to Survive
- At 6 months warfin was stop being given but has reached its peak (more rats are resitance)
- 8 - 12 months decrease of population of rats rescance because warfin wasnt given there was no need for the rats to have that mutation anymore
- 12 months reached the lowest since the start

This student has described both trends, as shown on the indicative content in the mark scheme. They also link the increase in the percentage of the population that are resistant to warfarin with an explanation. This is in the third paragraph.

The student does not explain the decrease when warfarin stopped being given, therefore the response meets and exceeds the generic Level 2 descriptor, but does not match Level 3, therefore 4 marks were awarded.

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4.7.1.1 Communities

Answer 02 · Examiner comments

Question 5 (standard, standard/high & high demand)

05.1 Students found this a very challenging question with very few giving creditworthy responses. It was evident that students did not understand the breadth of the term ecosystem, with few students gaining the mark. The definition is given within the specification, so this was an AO1 question.

Some students correctly recognised that both living organisms and the environment were part of an ecosystem but expression was weak and did not meet the requirements of the definition, often referring to just plants and animals, instead of organisms, or to area rather than to environment or habitat.

Many students omitted the idea of interaction between organisms or organisms and their environment. A large proportion of responses used vague language, particularly of biological terms that students are expected to know, such as habitat, population or community.

05.2 The most common correct answer related to bullet point 1 and the control of prey populations. Students could answer in terms of animal species in general, or otters, or any other named animal.

Many attempts at other points were too vague. Statements such as ‘they are prey’ or ‘they are part of a food chain’ did not go far enough to gain credit for the idea that the species may be prey and therefore provide energy for a predator.

Many students gave examples that lacked enough detail to gain the mark such as ‘beavers build dams’, ‘birds build nests’ or 'prey feed the predators'. These did not go far enough to describe how that effects another species. Some students stated that otters defended smaller animals against larger predators, and this did not gain credit.

Marking point 4 was often awarded for faeces providing minerals for plants. Note that named examples such as this were acceptable, as shown in the extra information column of the mark scheme. Some students misunderstood the idea of stability and suggested that a species increases biodiversity.

05.3 Most students could select the correct figures and calculate the correct answer. The most common error was attempting to subtract one figure from the other.

05.4 Students more often gave marking point 1 than marking point 2. There were some references to inversely proportional, which were ignored, as shown on the mark scheme.

Simply quoting figures from the table was not enough to gain either mark. Likewise, just identifying that the symbol in the question means proportional was not sufficient for the mark.

05.5 Many students gave detailed explanations that matched all three marking points on the left-hand side of the mark scheme. The alternative approach (given on the right-hand side of the mark scheme) was seen occasionally and when it was seen often gained all 3 marks.

Some students referred to marking point 2 incorrectly, either in terms of fish breathing underwater, or otters needing oxygen from the water. References to ‘affecting the otter population’ were not given credit for the idea of ‘decreasing the otter population’.

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