AQA GCSE Biology | 8461

SPECIFICATION POINT 4.3.3.1

Detection and identification of plant diseases

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**3**
Available paper years	**2010–2023**

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.

4.3.3.1 Detection and identification of plant diseases

Answer 01 · Mark scheme January 2019 | BLY2F | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4(a)	root		1
4(b)(i)	chlorophyll		1
4(b)(ii)	absorbs / traps / takes in light (for) photosynthesis	do **not** accept attracts / solar energy / sunshine / sun accept to make food / glucose / sugar / biomass	1 1
4(c)	**Mineral ion** / **Effect of its shortage** Magnesium – Yellow leaves Nitrate – Stunted growth White flowers	**1** mark per correct line extra line from a mineral ion cancels the mark	2
Total			**6**

4.3.3.1 Detection and identification of plant diseases

Answer 01 · Mark scheme

January 2010 | BLY2F | Original Q4 | Legacy

BLY2F

4.3.3.1 Detection and identification of plant diseases

Answer 02 · Mark scheme June 2018 | 8461/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	phloem		1	AO2 4.2.3.2
05.2	translocation		1	AO1 4.2.3.2
05.3	either: less (sugars for) respiration (so) less energy released **or** less amino acids made (1) (so) less protein produced **or** less protein synthesis (1) **or** less cellulose made (1) (so) weaker cell walls (1)		 1 1	AO2 4.4.1.3 4.4.2.1
05.4	(aphids) can fly to another plant **or** part of the plant to get (more) food	ignore to fly unqualified allow to find a mate allow idea of less competition for food allow to escape predators do **not** accept escape prey	1 1	AO2 4.3.3.1
05.5	(oil) prevents aphids from attaching to leaf **or** causes aphids to slide off leaf **or** idea that oil may harm / kill the aphid	ignore 'the leaf is slippery' allow oil may be unpleasant to the aphid	1	AO2 4.3.3.2

4.3.3.1 Detection and identification of plant diseases

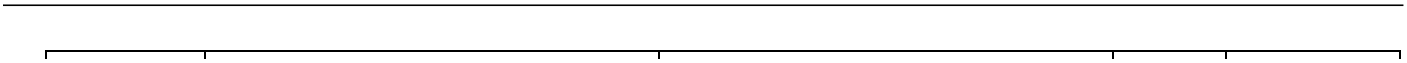
Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	(plant / stem has) thorns	allow spines / spikes / prickles ignore stings do **not** accept thorns protect (the plant) from predators	1	AO1 4.3.3.2
05.7	C (fungi / spores) blown by / in direction of the wind **or** it's the closest plant (to A)	if any other letter given then no marks for the question allow black spot / disease is blown by / in direction of the wind do **not** accept reference to bacteria / viruses / pollen being blown	1 1	AO3 4.3.1.4 4.3.3.1 AO2 4.3.1.4 4.3.3.1
05.8	any **one** from: • spread rose bushes out more • remove any infected parts of the plant • use a fungicide	allow isolate the infected plant allow idea of barrier around infected plant ignore separate unless qualified allow remove infected plant / A ignore pesticide do **not** accept insecticides / herbicide	1	AO2 4.3.1.4 4.3.3.1
Total			**11**	

4.3.3.1 Detection and identification of plant diseases

Answer 02 · Mark scheme

June 2018 | 8461/1F | Original Q5



4.3.3.1 Detection and identification of plant diseases

Answer 03 · Mark scheme

June 2023 | 8461/1F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.1	a group of the same / similar cells **or** a group of cells with a (similar / specific) function	ignore a group of cells unqualified ignore examples of tissue functions	1	AO1 4.2.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.2	meristem (tissue)		1	AO1 4.1.1.4 4.1.2.3 4.2.3.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.3	willow	ignore named parts of willow	1	AO1 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.4	any **one** from: • (berries are) easy to access / pick • easier to extract chemical • taking berries will not harm the plant	ignore berries are not underground allow taking leaves / roots might damage / kill the plant (so it cannot produce more chemical) allow idea that the lower mass / amount (of chemical) will be less toxic / harmful allow greater mass of berries than of leaves / roots	1	AO3 4.2.3.1

4.3.3.1 Detection and identification of plant diseases

Answer 03 · Mark scheme June 2023 | 8461/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.5	(0.6 × 1.2 =) 0.72	allow conversion to mg at any point in calculation	1	AO2 4.3.3.1
	(0.72 × 2 =) 1.44		1	
	1.44 × 1000	allow conversion of a correct mass calculated for berries / roots	1	
	1440 (mg)	allow a correct answer using an incorrect conversion factor of a multiple of 10	1	
	alternative route (2 × 1.2 =) 2.4 (1) (2.4 × 0.6 =) 1.44 (1) 1.44 × 1000 (1) 1440 (mg) (1)			

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.6	any **one** from: • lack of chlorophyll	allow lack of chloroplasts	1	AO1 4.3.3.1 4.3.1.2 4.3.1.4
	• lack of magnesium (ions)	allow lack of mineral (ions) **or** named example such as iron / nitrate / potassium / zinc (ions) ignore lack of nutrients / nitrogen allow lack of water allow incorrect pH of soil allow acidic / alkaline soil allow (named) infection allow lack of light allow other correct suggestions		

4.3.3.1 Detection and identification of plant diseases

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.7	any **two** from: • to check toxicity • to check dosage • to check its efficacy	allow to check it is safe allow to check for side effects allow to check it is not poisonous / dangerous / harmful allow to check how much is needed allow to check it works allow to check it does not interact with other drugs	2	AO1 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.8	(writers / companies may get) financial gain **or** (competitor may suffer) financial loss	ignore because the report has not been peer reviewed ignore have not used a double-blind trial	1	AO3 4.3.1.9

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.9	have the claims peer reviewed		1	AO1 4.3.1.9

Total Question 1	13

4.3.3.1 Detection and identification of plant diseases

Answer 03 · Examiner comments June 2023 | 8461/1F | Original Q6

Question 6 (Standard demand)

06.1 Whilst most students could describe a tissue as being 'a group of cells', with many of these going on to state that these cells were 'working together'; this was insufficient for credit. Further qualification in respect of the cells being 'similar' or of the cells 'having a particular function' was required to gain this mark. Thus, relatively few students were rewarded. It was evident that some students struggled, as ideas such as tissues being 'parts of organs' were not uncommon. Almost 79% of students failed to gain the mark.

06.2 Many answers referred to parts of the plant, such as xylem or root hairs. Knowledge of 'meristem' as being the tissue in plants where stem cells are found was by no means widespread. Some students had not read the question carefully enough and suggested animal tissues, most commonly 'bone marrow'. Just over 10% of students knew that meristem tissue contains stem cells and gained the mark.

06.3 A wide variety of plants were suggested, along with some suggestions of plant tissues and even fictitious plants such as 'the aspirin tree', perhaps as students struggled to recall the answer and had been trained to write down something, rather than nothing – that said, 17% of students did not attempt a response at all. Of the plants given in responses, 'willow' was

Answer 03 · Examiner comments

by far the most common and gained the mark for over 18% of students. Others such as 'foxglove' were mentioned, indicating a recollection of plants named in the specification.

06.4 Many answers simply repeated information given in the table, such as 'berries have the least mass of the chemical', but this was not sufficient as it does not explain why the berries are picked in preference to leaves or roots. Vague answers such as there being 'more berries' were also insufficient to gain credit. Around a quarter of students gain the mark, with common correct answers referring to the idea that picking berries would not harm the plant, that berries would be 'easier to collect' or that 'the chemical would be easier to extract'.

06.5 Relatively few students managed to complete the calculation correctly, with only 4% gaining all 4 marks. The most common error was by students who did not know the conversion factor for grams to milligrams. Fortunately, this usually only cost students 1 of the 4 marks, as answers which had used the incorrect conversion factor (whether this involved multiplying or dividing by an incorrect multiple of 10) were still able to gain the final mark. Students often got only part way through the calculation, stopping at 0.72 or 2.4, for 1 mark only; however, the 3rd and 4th marking points could still be gained if correctly addressed. Some students divided values, rather than multiplying, as was needed, whilst others arrived at somewhat unlikely answers equivalent to many hundreds of grams, far exceeding the 200 g mass of plant tissue it was extracted from. Nearly half of all responses gained no credit – either because it was not attempted – or completely incorrect.

06.6 Around 30% of students gained the mark in this question. A lack 'of magnesium' or 'of chlorophyll' was quite well known and many students gained this mark. Answers often implied a degree of speculation by students, but those who did attempt an answer may have been rewarded for this, as, for example, a lack 'of light' or of water' were both credited. A description of 'an infection' along with naming any plant disease also gained credit, as students are not expected to know, for example, that the tobacco mosaic virus does not infect nightshade plants. A not infrequent suggestion was that having chlorosis would 'put animals off from eating them', as students interpreted the question as asking for an advantage of having chlorosis, rather than what had caused the condition.

06.7 There were many good answers to this question, with frequent references to toxicity, dosage and efficacy. Some students, though, offered two ideas relating to toxicity, with descriptions regarding safety and side effects: thus, gaining only the one mark. However, over 90% of students gained some marks in this question, which was pleasing.

06.8 Many responses referred to writers of the report, or companies who might want the public to use or avoid the drug, however relatively few references to one party or another making financial loss or gain were made and as such only around 10% of students were awarded the mark. Other insufficient responses referred to ethics of using plants or the possibility that habitats might be destroyed by large nightshade plantations. Students only needed to refer to people 'buying' or someone 'selling' the product, to gain the mark or alternatively the idea that the writer of the biased report might have been 'paid' for their work.

06.9 Nearly 64% of students correctly indicated that scientists should 'have the claims peer reviewed' to be sure claims are valid.