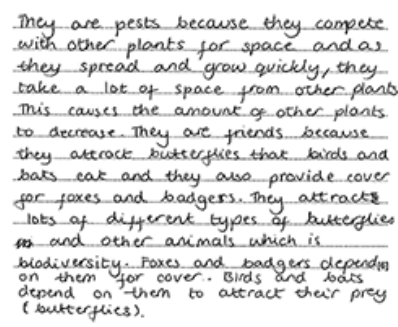


Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1			Photosynthesis ✓ Chlorophyll ✓ Sunlight ✓ Phloem ✓	4 (4 x AO 1.1)	<u>Examiner's Comments</u> The majority of candidates managed to gain either 1, 2 or 3 marks on this question. Answer line four appeared to be the most challenging, with a lot of candidates incorrectly selecting 'leaf'.
			Total	4	
2	a		Bacteria / fungi ✓	1 (AO 1.1)	<u>Examiner's Comments</u> Approximately half of all candidates were able to name a type of microorganism that would cause milk to spoil. Commonly seen incorrect responses were lactic acid and mould.
	b	i	Water bath ✓	1 (AO 1.2)	ALLOW descriptions of a water bath ALLOW incubator <u>Examiner's Comments</u> This question proved to be found quite challenging by candidates. Commonly seen incorrect responses were Bunsen burner or thermometer.
		ii	Dependent variable ✓	1 (AO 2.2)	<u>Examiner's Comments</u> This was answered correctly by less than half of all candidates. There didn't appear to be a common distractor. Where there was an incorrect response, it was evenly spread between the other options.
	c	i	A line starting at the same point as 15 °C and 35 °C but with a slope in between these two ✓	1 (AO 2.2)	<u>Examiner's Comments</u> Over half of all candidates were able to use the data to correctly draw a line on the graph. Where candidates were

					unsure, they usually left it blank rather than attempting the question.
		ii	Faster ✓ (Kinetic) energy ✓ Collisions ✓ Sugar ✓	4 (AO 3.2b) (AO 2.2) (AO 2.2) (AO 2.2)	ALLOW quicker/quickly/rapidly IGNORE more ALLOW speed / movement ALLOW interactions IGNORE reactions ALLOW substrate <u>Examiner's Comments</u> The first response line was generally well answered. The fourth response line was the least well answered, with the majority of candidates selecting milk rather than sugar.
		iii	Repeat at higher temperatures ✓ Identify the temperature where the pH does not decrease ✓	2 (2 x AO 3.3a)	<u>Examiner's Comments</u> Approximately half of all candidates were able to identify that you would need to repeat at higher temperatures. The second mark proved more challenging and where an incorrect response was given, it was evenly spread between the other options.
			Total	10	
3			Parasite ✓	1 (AO 1.1)	<u>Examiner's Comments</u> The majority of candidates correctly identified that mistletoe is a parasite. The most commonly seen incorrect response was mutualistic partner.
			Total	1	
4			B	1 (AO 1.1)	<u>Examiner's Comments</u> The majority of candidates answered this question correctly. There didn't appear to be a common distractor. Where there was an incorrect response, it was evenly spread across the other options.
			Total	1	
5			C	1 (AO 2.1)	<u>Examiner's Comments</u> This was answered correctly by the majority of candidates. There didn't appear to be a common distractor.

					Where there was an incorrect response, it was evenly spread across the other options.
			Total	1	
6			C	1 (AO 1.1)	<u>Examiner's Comments</u> Approximately half the candidates correctly selected C. D was the most commonly seen incorrect response.
			Total	1	
7			Level 3 (5–6 marks) Identifies both positive and negative actions of buddleia. and a detailed explanation of how the actions effect other organisms. <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i> Level 2 (3–4 marks) Attempts to identify positive or negative action of buddleia and a simple explanation of how the actions effect other organisms. OR Identifies both positive and negative actions of buddleia. <i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i> Level 1 (1–2 marks) Attempts to identify a positive or a negative action of buddleia. <i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i> 0 mark <i>No response or no response worthy of credit</i>	6 (3 xAO 2.1) (3 xAO 3.1b)	AO2.1 Applies knowledge and understanding of scientific ideas to identify the actions of buddleia in the habitats. Friend • butterflies depend on buddleia for food • foxes and badgers depend on buddleia for cover Pest • buddleia outcompetes other plants • buddleia has reduced biodiversity AO3.1b Evaluates information in the passage to explain why buddleia effects other organisms. • buddleia are the producers in food chains • (without them) birds and bats would not have enough food • (without buddleia) foxes and badgers would be more vulnerable to weather/predators • other plants have decreased because they would lack light/water/minerals/space • (less biodiversity because) there is less variety of (types of) butterflies/plants <u>Examiner's Comments</u>

					This was the level of response question on this paper. To obtain Level 3, candidates had to identify reasons why buddleia may be thought of as both 'friends' and 'pests', and explain these opinions using ideas about interdependence, competition and biodiversity. Very few candidates at Level 3 explained the opinions using ideas about interdependence, with the majority explaining the opinions using ideas about competition and biodiversity. At Level 2, candidates mainly identified reasons why buddleia may be thought of as both 'friends' and 'pests'. Level 1 candidates only identified one opinion. Exemplar 1  Exemplar 1 shows an answer that was given Level 3, 5 marks. The response is well constructed and relevant. The candidate has clearly identified why buddleia may be considered 'pests' and 'friends', and has given one explanation, linked to competition, for why they might be considered 'pests'. To gain L3, 6 marks, the candidate should have provided at least one further explanation using ideas about competition, interdependence or biodiversity.
			Total	6	
8	a		First check the answer on answer line If answer = 75 000 award 2 marks $(15/1000) = 0.015 \checkmark$ or	2 (AO 2.2) (AO 1.2)	<u>Examiner's Comments</u> Approximately half of all candidates answered this correctly, gaining the maximum marks. Where candidates only scored 1 mark, it was often

		(15 × 5 000 000) = 75 000 000 ✓ 75 000 ✓		because they did not convert grams to kilograms. There is still a significant number of candidates who haven't shown any working, which may have allowed them to gain a mark for processing even if their final answer was incorrect.
	b	Producers ✓ Secondary consumers ✓	2 (2 xAO 2.1)	<u>Examiner's Comments</u> This was answered correctly by the majority of candidates.
		Total	4	
9		C	1 (AO 2.1)	<u>Examiner's Comments</u> About half the candidates answered correctly. If candidates answered incorrectly, they tended to select A combustion or D respiration.
		Total	1	
10		D	1 (AO 1.1)	<u>Examiner's Comments</u> Half of all candidates selected the correct answer of D.
		Total	1	
11	a	pine trees → caterpillars ↗ cuckoos ↘ fungi Pine trees to caterpillars correctly drawn ✓ Caterpillars to cuckoos and fungi correctly drawn ✓	2 (2 × AO 2.1)	ALLOW birds instead of cuckoos IGNORE pyramids of biomass/numbers DO NOT ALLOW lines without arrows <u>Examiner's Comments</u> Most candidates did not score here generating a food web, by using lines instead of arrows. Some candidates were confused where the fungi went in relation to the feeding relationship. More candidates gained full marks rather than just one.  Assessment for learning

					Candidates could practice generating food webs which could be easily overcome the lack of understanding through developing examination technique.
b	i	(Use living organism/fugus) to kill a pest/caterpillars ✓	1 (AO 1.1)	ALLOW using natural predator/natural parasites to kill pests/caterpillar <u>Examiner's Comments</u> This question was one of the most challenging for the candidates whereby they did not know what a biological control was. Therefore it had a high no response from the candidates or provided a guess.  Assessment for learning Centres could make sure that candidates are aware of biological control in controlling pest numbers.	
	ii	1000 (times) ✓	1 (AO 1.2)	ALLOW 1×10^3 / thousand <u>Examiner's Comments</u> Roughly half of all candidates could calculate that spores were x1000 more concentrated sprayed on the soil than the tops of trees. Most answers which did not gain the mark subtracted 100 from 100 000.	
	iii	Any three from: Kills more caterpillars than water/control ✓ (Concentration used on the soil) contain more spores (than tree tops) ✓ Lasts longer (than tree tops) ✓ Not much difference between caterpillars killed for soil and trees ✓	3 (AO 3.1a) (AO 3.1a) (AO 3.2a)	ALLOW kills more caterpillars when sprayed on tree tops and soil IGNORE quote numbers unless qualified ALLOW higher concentration (of spores) ALLOW (soil) lasts many years but tree tops only a few months IGNORE lasts many years <u>Examiner's Comments</u> This question proved challenging for the candidates. It was testing the ability to interpret and analyse information from tables. It had a fairly	

					high no response from candidates but those who attempted and gained a mark were able to identify that the fungal spores last longer/contained more when sprayed on the soil. Most candidates were not able to identify that using spores killed more caterpillars than the water/control. Candidates who did not gain any marks were not comparative with their answers between spores sprayed on the tops of the tree and the soil. Exemplar 2 <i>Some may think spraying on top is better than in soil as it kills 50% of caterpillars however this will only last a few months and they are not as concentrated as spraying on soil. Spraying on soil lasts for many years and kills 90% therefore it is better as it lasts longer. Therefore in the long run it will kill more. On soil it also runs more concentrated than on top of trees. Evidently fungal spores are an effective way as they will spread from water drops. Water only will 2-3% which significantly lower.</i> Exemplar 2 gained full marks for correctly identifying spores kills more caterpillars than the control/water and spraying on the soil last longer and has a higher concentration.
			Total	7	
12			C ✓	1 (AO 1.1)	
			Total	1	
13			D ✓	1 (AO 1.1)	<u>Examiner's Comments</u> This question also proved to be challenging to the candidates in Section A. It was testing the knowledge and understanding of energy transfer through a food chain. The majority of candidates did not understand that respiration, answer D would cause loss of biomass. Most incorrect answers were A and C.  Misconception The majority of candidates did not understand that respiration would cause loss of biomass in a food chain

					and the main misconception they had was that growth would cause loss of biomass instead of gaining biomass.
			Total	1	
14			C ✓	1 (AO 1.1)	<u>Examiner's Comments</u> This multiple choice question was accessed well by the candidates, correctly identifying the order for the levels of organisation in an ecosystem as C.
			Total	1	
15			A ✓	1 (AO 2.1)	
			Total	1	