AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.3.4

Deforestation

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**17**
Available paper years	**2007–2023**

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.

4.7.3.4 Deforestation

Answer 01 · Mark scheme January 2007 | BLY1H | Original Q2 | Legacy

Question 2

	answers	extra information	mark
(a)	any **two** from: • burning • activity of microbes / microbial respiration • less photosynthesis **or** trees take in CO_2 **or** less CO_2 locked up in wood • CO_2 given off by clearing machinery	ignore CO_2 release unqualified do **not** accept CO_2 taken in for respiration	2
(b)(i)	range of different species	accept idea of variety of organisms or plants or animals	1
(ii)	any **one** from: • organisms may produce substances useful to humans • duty to preserve for future generations • effect on other organisms e.g. food chain effects • loss of environmental indicators	do **not** accept if food is only example ignore effect on human food supply	1
total			4

4.7.3.4 Deforestation

Answer 02 · Mark scheme

June 2007 | BLY1B | Original Q7 | Legacy

Seven	**2**	**1**	**4**	**2**

4.7.3.4 Deforestation

Answer 03 · Mark scheme

Question 6

	answers	extra information	mark
(a)	3.2	award **both** marks for correct answer irrespective of working if answer incorrect (55 + 55 + 1.2 +5) – (110 + 3) **or** 116.2 –113 **or** (55 + 55 + 1.2 +5 + 90) – (110 + 93) gains **1** mark	2
(b)	any **one** from: • less carbon dioxide taken in by trees • less photosynthesis • burning trees releases carbon dioxide • decay releases carbon dioxide	ignore carbon dioxide released by trees **or** trees store carbon dioxide	1
(c)	heat / infra red / radiation / energy radiated by Earth carbon dioxide absorbs / traps / radiates	must be in correct context ignore light do **not** accept reflection allow reflects ignore absorbs radiation / heat / light from Sun ignore ozone	1 1 1
total			6

4.7.3.4 Deforestation

Answer 03 · Mark scheme January 2008 | BLY1H | Original Q6 | Legacy

BLY1H

Answer 04 · Mark scheme November 2008 | BLY1BP | Original Q5 | Legacy

Five	**3**	**2**	**3**	**3**

Answer 05 · Mark scheme March 2009 | BLY1BP | Original Q6 | Legacy

Six	**2**	**4**	**1**	**3**

Answer 06 · Mark scheme June 2009 | BLY1BP | Original Q6 | Legacy

Six	**2**	**2**	**3**	**4**

Answer 07 · Mark scheme November 2009 | BLY1BP | Original Q7 | Legacy

Seven	**2**	**3**	**3**	**4**

Answer 08 · Mark scheme March 2010 | BLY1BP | Original Q8 | Legacy

Eight	**2**	**4**	**2**	**3**

Answer 09 · Mark scheme June 2010 | BLY1BP | Original Q8 | Legacy

No matching mark scheme was available in the supplied archive for this question.

Answer 10 · Mark scheme March 2011 | BLY1BP | Original Q3 | Legacy

Three	**2**	**2**	**3**	**2**

4.7.3.4 Deforestation

Answer 11 · Mark scheme

March 2011 | BLY1BP | Original Q9 | Legacy

Nine	1	1	3	3

Answer 12 · Mark scheme

November 2011 | BLY1BP | Original Q8 | Legacy

Eight	1	1	1	2

4.7.3.4 Deforestation

Answer 13 · Mark scheme June 2014 | BL3HP | Original Q2 | Legacy

2			6	AO1 3.3.1

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a 'best-fit' approach to the marking.

0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	There is at least one reason for deforestation **or** an attempt at a description of at least one way deforestation is affecting the atmosphere.	There is at least one reason for deforestation **and** a description of the way deforestation is affecting one gas in the atmosphere **or** the process that causes an effect.	There are reasons for deforestation **and** a clear description of the way deforestation is affecting one gas in the atmosphere **and** the process that causes this.

examples of the points made in the response	extra information
Reasons for deforestation • timber for construction / furniture / boat building / paper production • growing plants for biofuels for motor fuel / aviation / lawnmowers • use of wood as a fuel • land for building or agriculture to provide food, such as rice fields and cattle ranching	

Effects of deforestation
• increase in carbon dioxide in atmosphere
  ○ due to burning
  ○ due to activities of microbes
  ○ less carbon dioxide taken in / locked up (by trees)
  ○ less photosynthesis
• increase in methane in atmosphere due to rice production / cattle
	ignore references to oxygen
	
	accept explanations of the effect of water (vapour)

4.7.3.4 Deforestation

Answer 13 · Mark scheme

June 2014 | BL3HP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.

4.7.3.4 Deforestation

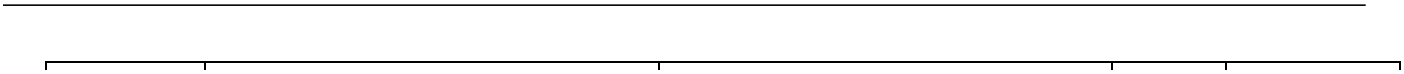
Answer 14 · Mark scheme June 2015 | BL3HP | Original Q3 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	any **two** from: • (volume of) peat compost has been steady and then declined **or** volume of peat compost has declined since 2005 • (volume of) peat-free compost has increased (since 1999) • (volume of) peat is higher than peat-free until 2005, then peat-free compost is higher (than peat) • total volume of peat and peat-free compost has increased	allow 2007 instead of 2005 allow 2007	2	AO2 342d
3(b)	increases carbon dioxide (in the atmosphere)	ignore methane	1	AO1 342
3(c)	any **one** from: • reduces biodiversity • destruction of habitats • disruption of food chains		1	AO1 342b
Total			**4**	

4.7.3.4 Deforestation

Answer 14 · Mark scheme

June 2015 | BL3HP | Original Q3 | Legacy



4.7.3.4 Deforestation

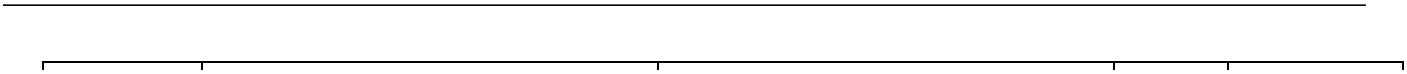
Answer 15 · Mark scheme June 2016 | BL3HP | Original Q4 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)(i)	forest at the edges (of the island) has been removed an appropriate area on the island is identified eg south east **or** bottom right	allow centrally the forest remains	1 1	AO3 3.4.2
4(a)(ii)	any **two** from: • (to provide land) for farming / agriculture • (to provide land) for quarrying • (to provide land / wood) for building • to provide fuel • to produce paper	allow to provide timber allow forest fires	2	AO2 3.4.1c 3.4.2c
4(b)	any **two** from: • decreased biodiversity • loss of habitats • increased carbon dioxide (concentration) • global warming	allow effects of global warming eg flooding / rise in sea level allow soil erosion	2	AO3 3.4.1c 3.4.2a/b/c
Total			**6**	

4.7.3.4 Deforestation

Answer 15 · Mark scheme

June 2016 | BL3HP | Original Q4 | Legacy



4.7.3.4 Deforestation

Answer 16 · Mark scheme

June 2017 | BL3HP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)	less CO_2 absorbed / taken in (by trees from the atmosphere)	allow release / increase of CO_2 from burning / use of (heavy) machinery ignore less photosynthesis unqualified	1	AO1 3.4.2a
1(b)(i)	0.8		1	AO2 3.4.2
1(b)(ii)	anywhere in range: 3(.0) – 3.4		1	AO2 3.4.2
1(c)	microorganisms respire **and** release CO_2	allow bacteria / fungi / decomposers allow anaerobic decay / respiration releases methane	1 1	AO1 3.4.2a
Total			**5**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.7.3.4 Deforestation

Answer 16 · Mark scheme

2(a)(i)	left ventricle		1	AO1 3.2.1c
2(a)(ii)	aorta	ignore artery allow aortic (artery)	1	AO1 3.2.1d
2(a)(iii)	(to keep) blood flowing in the right / one direction **or** prevent backflow (of blood)	ignore ref to veins	1	AO1 3.2.1e

4.7.3.4 Deforestation

Answer 16 · Mark scheme

June 2017 | BL3HP | Original Q1 | Legacy

2(b)	Reasons for: • less likely to die (44% cf. 59%) • lower risk of death from having a second operation • lower risk of heart infections • less chance of the valve stopping working • longer lasting • doesn't cause rejection • avoids religious issues of using organs from a pig **or** no ethical issue from using part of a living organism Reasons against: • chance of death by bleeding is increased • offers no advantage against clots **or** equal risk of blood clots • have to take anti-clotting drugs for life • can be noisy	max 3 marks if only reasons for or reasons against given allow converse for each point if clearly referring to the pig tissue valve ignore cost allow doesn't stop working allow been used for a longer period of time ignore religion **or** ethical unqualified	4	AO3 3.2

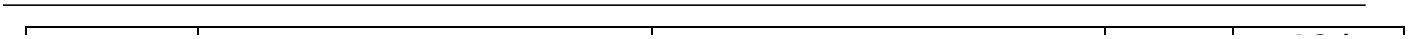
2(c)	(inserted to) keep the (coronary) artery / arteries open allows more blood to flow (to the heart muscle) **or** return blood flow to normal	do **not** allow veins allow (more) glucose / oxygen to reach the heart (muscle)	1 1	AO1 3.2.1f

Total		**9**

4.7.3.4 Deforestation

Answer 16 · Mark scheme

June 2017 | BL3HP | Original Q1 | Legacy



4.7.3.4 Deforestation

Answer 17 · Mark scheme

June 2023 | 8461/2H | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.1	(0 to 6h): in the dark so (only) respiration occurs	ignore reference to animals allow no / limited light so (only) respiration occurs allow night(time) so (only) respiration occurs	1	AO2 4.7.1.2 4.7.2.2 4.4.1.2 4.4.2.1
	(respiration) produces carbon dioxide		1	
	(8 to 12h): in the light so photosynthesis (rate) is faster than respiration (rate)	allow in the light so more photosynthesis than respiration allow day(time) so more photosynthesis than respiration do **not** accept no respiration	1	
	idea of net / overall uptake of carbon dioxide	allow uptake of carbon dioxide by photosynthesis is greater / faster than output by respiration	1	

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.2	field of maize only takes in carbon dioxide for 6 months of the year (compared to all year)	answers must be comparative allow converse argument allow maize takes in carbon dioxide for a shorter amount of time	1	AO3 4.7.2.4 4.7.3.4 4.7.3.3
	(and) field of maize takes in less carbon dioxide per day than rainforest		1	

4.7.3.4 Deforestation

Answer 17 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.3	for comparison		1	AO2
	(because) different areas started with different numbers (of species)	do **not** accept (because) different areas started with different numbers of trees	1	AO3 4.7.2.4 4.7.3.1 4.7.3.4 4.7.3.6 4.7.3.3

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.4	any **one** from: • number of tree species increased rapidly at first • the number of tree species increases more slowly later • rate of increase of number of tree species decreases with time • beyond about 50 years there were more tree species than in the original rainforest • there was (great) variability of number of tree species from one study area to another at the same time	ignore answers referring to numbers of trees unqualified allow it takes 45 to 55 years for the forest to recover (the number of species) ignore biodiversity increases	1	AO3 4.7.2.4 4.7.3.1 4.7.3.6 4.7.3.3

4.7.3.4 Deforestation

Answer 17 · Mark scheme

June 2023 | 8461/2H | Original Q6

Question	Answers	Extra information	Mark	AO / Spec Ref.
06.5	more / different types of food available more / different types of habitat / shelter **or** nest sites available	ignore more food available allow more / different habitats	1 1	AO2 4.7.2.4 4.7.3.1 4.7.3.6 4.7.3.3

Total Question 6	11

4.7.3.4 Deforestation

Answer 17 · Examiner comments June 2023 | 8461/2H | Original Q6

Question 6

This question was about the combined effects of respiration and photosynthesis on the carbon dioxide concentration in the air and the recovery of a rainforest community following deforestation.

06.1 Most students only considered the effects of photosynthesis in this question about changing carbon dioxide concentrations in the air in a tropical rainforest over a 24-hour period. For the first 6 hours shown in Figure 9 there was no light – hence only respiration took place and this produced carbon dioxide, hence the high levels of carbon dioxide shown on the graph. Many students understood that photosynthesis would not occur in the dark but then attributed respiration solely to animals in the forest. Between 8 am and 12 noon, the graph showed that carbon dioxide levels decreased. While most understood that the plants would be photosynthesising at this time, few realised that respiration also took place but the rate of photosynthesis exceeded that of respiration – hence a net uptake of carbon dioxide. Fewer than one-quarter of students reached even half-marks and only 1 percent scored all 4 marks.

Answer 17 · Examiner comments June 2023 | 8461/2H | Original Q6

06.2 Many students missed the concept of the time factor in answering this question which asked for an explanation why replacing rainforest with a maize crop would increase the carbon dioxide concentration in the air over one year. Using information from Figure 9 and Figure 10 should have indicated that maize removed less carbon dioxide from the air over the course of one day (not simply that the carbon dioxide concentration in the air decreased less at midday). Although many commented on the maize crop growing for just 6 months of the year, few stressed that this would mean the maize was only taking in carbon dioxide for half the year compared to the rainforest doing the same throughout the year. Only 1 in 40 students fully demonstrated their understanding of this situation.

06.3 Figure 11 showed an increase in the number of tree species with time following deforestation. The data were presented as percentages compared with adjacent control areas. About half of the students appreciated that presenting the data as percentages enabled comparisons to be made, but hardly any made the point that the initial numbers of species would have varied from one study area to another thus making a comparison of absolute numbers invalid. Mistakenly referring to the number of trees rather than to the number of tree species was quite common.

06.4 The stem to this question gave the information that the biodiversity of trees increased in the regenerating forest, but many restated this as their conclusion from the data in Figure 11. Further details from the data were required – such as the number of tree species exceeding the original number after about 50 years, or the fact that for any point in time there was great variability from one area to another, or a description of the changing pattern of recovery with time. Only 10 percent were successful here.

06.5 Many attributed the given increase in animal diversity in the regenerating rainforest to there being more food or more habitat available rather than to more variety of food types and more types of habitat.