AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	points plotted correctly line of best fit drawn		1 1	AO2 AO3 4.9.3.1
01.2	average concentration of carbon dioxide in the atmosphere increases with time		1	AO3
01.3	burning more fossil fuels releases more carbon dioxide into the atmosphere/carbon dioxide that was trapped in the fossils deforestation less trees to remove carbon dioxide from the atmosphere	accept other sensible answers that specifically relate to carbon dioxide in the atmosphere	1 1 1 1	AO1 4.9.2.2
02.1	oxides of nitrogen		1	AO1 4.9.3.1
02.2	incomplete combustion		1	4.9.3.1
02.3	$C_4H_{10} + 4.5O_2 \rightarrow 4CO + 5H_2O$ **or** $2C_4H_{10} + 9O_2 \rightarrow 8CO + 10H_2O$		1	AO2 4.9.3.1
02.4	oxides of nitrogen – breathing problems carbon monoxide – poisoning of humans particulates – global dimming		1 1 1	AO1 4.9.3.2
02.5	sulfur dioxide		1	AO1 4.9.3.2

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
03.1	advantages: • reduction in combustion of fossil fuels so less carbon dioxide released • provide new jobs • alternatives can be sustainable disadvantages: • some alternatives to fossil fuels still produce carbon dioxide • alternatives to fossil fuels not always as reliable • alternatives can be expensive • jobs from fossil fuel industry can be lost • not all governments may be able to afford to invest in alternatives to fossil fuels	one mark for each advantage and disadvantage, up to a maximum of four marks accept any other sensible answers to receive full marks, students should provide at least one advantage and one disadvantage	4	AO3
03.2	advantages: • reduce deforestation • some farming/cattle farming can produce greenhouse gases disadvantages: • prevents population from farming/producing enough food/making money • unfair to South American countries	one mark for each advantage and disadvantage, up to a maximum of three marks accept any other sensible answers to receive full marks, students should provide at least one advantage and one disadvantage	3	AO3

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
03.3	advantages: • reduction in combustion of fossil fuels, so less carbon dioxide released • provides new jobs • alternatives can be sustainable disadvantages: • some alternatives to fossil fuels still produce carbon dioxide • alternatives to fossil fuels not always as reliable • alternatives can be expensive • jobs from fossil fuel industry could be lost • not all governments may be able to afford to invest in alternatives to fossil fuels	one mark for each advantage and disadvantage, up to a maximum of three marks accept any other sensible answers to receive full marks, students should provide at least one advantage and one disadvantage	4	AO3
04.1	**Level 3:** The descriptions of the comparisons are detailed and accurate.		5-6	AO1 AO2 4.9.1.1
	Level 2: The descriptions of the comparisons are correct, although lacks detail.		3-4	
	Level 1: The descriptions of the comparisons lack clarity and coherence.		1-2	
	No relevant content.		0	

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content: • Mars' atmosphere is mainly CO_2 • but the percentage of CO_2 in Earth's atmosphere is only about 0.04% • both atmospheres include nitrogen and argon • but the percentage of nitrogen in Earth's atmosphere is much greater than that on Mars (around 80% on Earth, about 2% on Mars) • percentage of argon in both atmospheres is similar, at around 1% • both atmospheres include oxygen • but the percentage of oxygen in Earth's atmosphere is much greater than that on Mars (around 20% on Earth, less than 1% on Mars)			
04.2	$\frac{21}{0.7} = 30$		1	AO2
04.3	cannot observe directly	accept other suitable reasons	1	AO3 4.9.1.2
04.4	greenhouse gases (carbon dioxide, methane, and water vapour) present in atmosphere percentage of the atmosphere made of carbon dioxide is greater on Mars than on Earth but Mars' atmosphere is less dense therefore less radiation from the Sun is absorbed by the atmosphere reduced greenhouse effect		1 1 1 1	AO3 4.9.2.1
04.5	sublimation		1	AO1 4.2.2.1

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
05.1	2 O atoms are drawn, 1 with 6 crosses and 2 dots, the other with 6 dots and 2 crosses. O atoms share 2 dots and 2 crosses		2	AO1 4.2.1.4
05.2	**Level 3:** The descriptions of the explanations are detailed and accurate. The reasons given are clear and coherent.		5-6	AO1 4.9.1.3
	Level 2: The descriptions of the explanations are correct, although lacks detail. Reasons are given for some, although these may not be clearly explained.		3-4	
	Level 1: The descriptions of the explanations and reasons lacks clarity and coherence.		1-2	
	No relevant content.		0	
	Indicative content: • little oxygen in atmosphere • algae and plants evolved • carried out photosynthesis • $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$ • as algae and plants increased, so did the percentage of oxygen in the atmosphere			
05.3	trees carry out photosynthesis carbon dioxide converted to other products therefore, reduce volume of greenhouse gases in atmosphere		1 1 1	AO1 4.9.1.4
05.4	acid rain damages plant life/trees therefore, less plants carry out photosynthesis and removing carbon dioxide from the atmosphere		1 1	AO3 4.9.2.2

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
06.1	greenhouse gases in the atmosphere maintain temperatures in Earth high enough to support life/absorb and re-emit infrared radiation		1	AO1 4.9.2.1
06.2	methane/water vapour		1	AO1 4.9.2.2
06.3	burning fossil fuels deforestation	accept other correct answers	1 1	AO1 4.9.2.2
06.4	rising sea levels more extreme weather events species extinction	accept any three correct effects	1 1 1	AO1 4.9.2.3
07.1	120 × 100 = 12 000 g 12 000 g = 12 kg		1 1	AO2 4.9.2.4
07.2	$\frac{12}{2}$ = 6 kg		1	AO1 4.9.2.4
07.3	mass of carbon dioxide = 1050 × 120 = 126 000 g or 126 kg $\frac{126}{6}$ = 21 people for the same mass of CO_2 per person 22 people for a smaller mass of CO_2 per person		1 1 1	AO2 4.9.2.4
07.4	car more convenient	accept any sensible answers	1	AO3 4.9.2.4
08.1	0.68 °C		1	AO2
08.2	2015, 2016, 2017, 2018	all four required for the mark	1	AO2

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
08.3	2001		1	AO2
08.4	global annual mean surface temperature increases with time		1	AO3
08.5	increase in greenhouse gases in the atmosphere due to: • burning fossil fuels leading to the release in carbon dioxide • cattle farming releases methane • deforestation so less carbon dioxide removed from the atmosphere • decomposition of landfill releases methane		1 1	AO1 4.9.2.2
08.6	student is correct for the years 2016 to 2018 but since 2000 the overall trend is up the time period from 2016 to 2018 is not long enough to draw a firm conclusion		1 1 1	AO3 4.9.2.2
09.1	to allow people to reduce their carbon footprints	accept other suitable answers	1	AO3 4.9.2.4
09.2	• most vegetarian food produce less carbon dioxide emissions than meat • so vegetarian diet likely to have lower carbon dioxide emissions • however, if a person swapped chicken for cheese, they could increase carbon dioxide emissions		1 1 1	AO3 4.9.2.4
09.3	8 kg for beef + 3 kg for cheese = 11 kg		1 1	AO2 4.9.2.4

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
09.4	cattle farming produces methane		1	AO3 4.9.2.4
10.1	no direct observations (because so long ago)		1	AO1 4.9.1.2
10.2	**Level 3:** The descriptions of the explanations are detailed and accurate. The reasons given are clear and coherent.		5-6	AO1 4.9.1.2 4.9.1.3 4.9.1.4
	Level 2: The descriptions of the explanations are correct, although lacks detail. Reasons are given for some, although these may not be clearly explained.		3-4	
	Level 1: The descriptions of the explanations and reasons lacks clarity and coherence.		1-2	
	No relevant content.		0	

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content: • during the first billion years, volcanic activity released gases that formed the early atmosphere • including mainly carbon dioxide, water vapour, nitrogen and small amounts of methane and ammonia • water vapour from volcanoes condensed to form oceans • and carbon dioxide dissolved in the oceans, so reducing the amount of carbon dioxide in the atmosphere • about 2.7 million years ago algae first produced oxygen by photosynthesis • as more algae and plants grew, the percentage of oxygen in the atmosphere increased • and the percentage of carbon dioxide decreased			
10.3	methane carbon dioxide	accept other correct answers	1 1	AO1 4.9.2.2
10.4	global climate change	accept an effect of global climate change, for example, rising sea levels, more extreme weather, changes in rainfall, changes to ecosystems, polar ice caps melting	1	AO1 4.9.2.2

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
11.1	shorter wave radiation emitted from the Sun passes through the atmosphere emitted by the Earth as longer wave radiation greenhouse gases in the atmosphere trap some of the longer wave radiation trapping the energy and warming the Earth		1 1 1 1	AO1 4.9.2.1
11.2	produces sulfur dioxides that cause acid rain acid rain damages plants plants carry out photosynthesis, which removes carbon dioxide from the atmosphere		1 1 1	AO2 4.9.3.1
11.3	human activity leads to increase in carbon dioxide and methane in the atmosphere as greenhouse gases, they increase the average temperature of the Earth therefore, this will in turn cause more water vapour to be held by the atmosphere as water vapour is also a greenhouse gas, this will further enhance the greenhouse effect leading to a further increase in the average temperature of the Earth/global climate change		1 1 1 1 1	AO2 4.9.2.2
12.1	fluorine – 2,7 neon – 2,8		1 1	AO2 4.1.1.7
12.2	Group 7 – atoms have seven electrons in outer shell: reactive because atoms gain one electron in reactions to achieve full outer shell/stable electronic structure Group 0 – atoms have full outer shell; unreactive because this arrangement is stable		1 1	AO1 4.1.2.4 4.1.2.6

Question	Answers	Extra information	Mark	AO / Specification reference
12.3	increases from top to bottom of both groups		1	AO1 4.1.2.4 4.1.2.6