Question Number	Answer	Acceptable answers	Mark
1(a)(i)	answer must refer to water vapour water vapour condensed / rain falls / water vapour removed / (water vapour) turns to water		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	An explanation linking • carbon dioxide (level) reduced (1) • so oxygen (level) increased (1)	 carbon dioxide turned into oxygen (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	$2Cu + O_2 \rightarrow 2CuO$ (3) lhs (1) rhs (1) balancing of correct formulae (1)	accept multiples ignore state symbols even if incorrect	**(3)**

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	$\frac{21}{100}$ x 50 (1) (= 10.5 cm^3) 50 minus answer to previous step (1) or 100 – 21 (1) (= 79 cm^3) $\frac{79}{100}$ x 50 (1) (= 39.5 cm^3)	correct answer with no working / 39.5 (cm^3) (2) allow TE allow TE	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(b)(iii)	**C** nitrogen		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)	C oxygen other gases nitrogen		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	A description to include • Photosynthesis /absorb carbon dioxide and releases oxygen (1) • (green) plants (1)	reject respiration for photosynthesis ignore breathe in carbon dioxide ignore breathe out oxygen	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	A description to include second marking is dependent on the first • a glowing splint (1) • relights (1)	smouldering splint reject a blown out splint lit splint glows brighter (2)	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)(i)	to ensure all the oxygen is removed/to ensure the oxygen is completely removed	ignore ensure all the air is removed	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	An explanation linking • measure the volume of gas in the syringe at the end of experiment (1) • subtract from {100 cm^3 / original volume} to give volume of oxygen (1)	 e.g. 100-79 (= 21 cm^3)	 **(2)**

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	**D** less than 0.5%		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	A explanation linking any **two** of • dissolves /is absorbed (1) • in the oceans (1) • incorporated into marine organisms (1) • formed carbonate rocks (1) • increase in (green) plants/plants start growing • photosynthesis /plants remove carbon dioxide	reject references to plants respiring/breathing	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(iii)	<u>heat</u>	reflects <u>heat back to Earth</u> reject references to the ozone layer	(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	A description to include • glowing splint (1) M1 • relights (1) M2	smouldering splint reject unlit splint ignore blown out splint M2 dependent on M1 but lighted splint burns brighter (2)	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	An explanation linking • volume of gas in bell jar decreases/water rises to fill the space (1) • oxygen is removed from the air (1)	{volume/amount} of air decreases accept oxygen is used up	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	(amount of gases remaining) 79% (1) (volume remaining) = $\frac{1000 \times 79}{100}$ (1) = 790 (cm^3)	ecf for incorrect percentage of volume of gases remaining in M1 correct answer or valid calculation alone scores (2)	(2)

Question Number	Answer	Acceptable answers	Mark
3(d)	magn m sulphate	accept magnesium sulphate	(1)

Question Number	Answer	Acceptable answers	Mark
4(a)	An explanation linking **two** of the following points • nobody was there / OWTTE (1) • there are no (written) records / measurements (1) • {different / conflicting} sources of information (1)	 {limited / unreliable} evidence e.g. data based on atmospheres on other planets (gases in) ice core and rock data not old enough	 **(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)	lowered the amount of {water vapour / carbon dioxide} / oceans absorbed carbon dioxide	**reject** all removed	 **(1)**

Question Number	Answer	Acceptable answers	Mark
4(c)	An explanation linking **two** of the following points • photosynthesis (in plants) (1) • {decreased / absorbed} carbon dioxide (1) • {increased / released} oxygen (1)	 if respiration confused with photosynthesis max 1	 **(2)**

Question Number	Answer	Acceptable answers	Mark
4(d)	**A** 0.04		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(e)	Any **one** from the following points • deforestation (1) • volcanic activity (1) • respiration (1) • increase in temperature (1)	 more animals **ignore** references to biofuels	 **(1)**

Question number	Answer	Mark
5(a)	B	(1)

Question number	Answer	Mark
5(b)	An answer that provides a description by making reference to: • adds carbon dioxide/adds water vapour (1) • removes oxygen (1)	(2)

Question number	Answer	Additional guidance	Mark
5(c)	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via justification/reasoning (1 mark): • as concentration of carbon dioxide increases the (mean global) temperature increases (overall) (1) • {but there is no evidence that the increase in (mean global) temperature is caused by the increase in concentration of carbon dioxide/other factors may cause the increase in (mean global) temperature} (1) OR • as concentration of carbon dioxide increases the (mean global) temperature increases (1) • so this does provide evidence that an increase in carbon dioxide is causing the Earth's temperature to rise (1) OR • as concentration of carbon dioxide increases the (mean global) temperature overall increases but {fluctuates/increases and decreases} (1) • so this does not provide evidence that an increase in carbon dioxide is causing the Earth's temperature to rise (1)	Award for conclusion (second mark) only given if reason given	(2)

Question number	Answer	Mark
5(d)	D	(1)

Question Number	Answer	Acceptable answers	Mark
6(a)	nitrogen	Name only	**(1)**

Question Number	Answer	Acceptable answers	Mark
6(b)	oxygen	Name only	**(1)**

Question Number	Answer	Acceptable answers	Mark
6(c)	D (the gas dissolving in oceans)		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(d)	An explanation linking two of: • no humans on Earth (1) • no measurements taken (1) • different sources conflict (1) • websites may refer to different times (1)	 no evidence/data/records (gases in) ice core or rock data not old enough Ignore little/insufficient/limited evidence websites can be wrong Ignore websites can give different information	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(e)(i)	50 – 41 (1) M1 (= 9) 9/50 x 100 (1) M2 (= 18)	 ECF from M1 give full marks for correct answer with no working If 82% allow 1 mark out of 2	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(e)(ii)	$2\ Cu + O_2 \rightarrow 2\ CuO$	any multiples of all the equation eg $4\ Cu + 2O_2 \rightarrow 4\ CuO$	**(1)**