

Earth's Atmosphere and Climate Change

Q1. (2018) – 6c, 6d, 6e

A)

Question Number	Answer	Additional guidance	Mark
6(c)	An explanation including <ul style="list-style-type: none"> plants (grow/ evolve etc.) (1) photosynthesis occurs (1) 	allow trees or any other reference to plants reject respiration/breathing for MP2 ignore all other information	(2) AO 1 1

B)

Question Number	Answer	Mark
6(d)	<div style="display: flex; justify-content: space-between;"> <div> <p>change in the amount of carbon dioxide in the atmosphere</p> <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px 5px;">increase</div> <div style="border: 1px solid black; padding: 2px 5px;">decrease</div> </div> </div> <div> <p>process causing the change</p> <ul style="list-style-type: none"> • carbon dioxide absorbing the Sun's energy • carbon dioxide dissolving in oceans • volcanic emissions • using argon in light bulbs • burning hydrogen </div> </div> <p>reject multiple lines from a box</p>	(2) AO 1 1

C)

Question Number	Answer	Additional guidance	Mark
6(e)(i)	suitable description of variation (within a year) (1)	allow increases and decreases / goes up and down [or vice-versa] allow fluctuates reject a pattern described for a timescale other than a year e.g. goes up one year and down the next	(1) AO 3 2a

D)

Question Number	Answer	Additional guidance	Mark
6(e)(ii)	increases (over time) (1)	ignore from (number) to (number) allow positive correlation, trend etc.	(1) AO 3 2a

E)

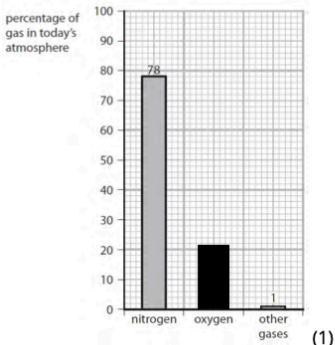
Question Number	Answer	Additional guidance	Mark
6(e)(iii)	15 with no working or correct working scores 2 figures read from graph 364-366 and 349-351 (1) subtraction of numbers from above (1)	negative answer does not score 2 nd mark	(2) AO 2 1

Q2. (2019)

Question number	Answer	Mark
1(a)	<p>C photosynthesis is the only correct answer</p> <p>A and B are processes that required oxygen</p> <p>D is a process that does not involve oxygen</p>	1

Q3. (2019) – 1b

A)

Question number	Answer	Additional guidance	Mark
1(b)(i)	<p>Vertical bar for oxygen to just over 20% as shown in the bar chart (ignore width):</p>  <p>(1)</p>	<p>ignore bars touching each other</p> <p>ignore 21 above bar</p>	(1)

B)

Question number	Answer	Additional guidance	Mark
1(b)(ii)	<p>MP1 : $\frac{21}{100}$ (1) (=0.21)</p> <p>MP2 : 0.21×300 (1) (= 63) (cm³)</p>	<p>63 (cm³) with no working scores 2 marks</p> <p>$300/4.76 = 63$ (2)</p> <p>$300/4.8 = 62.5$ (2)</p> <p>allow 21×300 (1) (= 6300)</p> <p>allow $\frac{300}{100}$ (1) (= 3)</p>	(2)

Q4. (2020)

A)

Question number	Answer	Mark
1(a)(i)	<p>A argon This is the only correct answer.</p> <p>B is incorrect because butane is not found in the air</p> <p>C is incorrect because chlorine is not found in the air</p> <p>D is incorrect because hydrogen is only found in the air in extremely small amounts</p>	(1)

B)

Question number	Answer	Mark
1(a)(ii)	C 21 This is the only correct answer. A, B and D are incorrect	(1)

C)

Question number	Answer	Additional guidance	Mark
1(b)	carbon dioxide	allow CO ₂	(1)

D)

Question number	Answer	Additional guidance	Mark
1(c)	An explanation linking any two <ul style="list-style-type: none"> • Earth cooled (1) • water (vapour) condensed (1) • oceans formed / seas formed / rainfall (1) 	allow temperature decreased	(2)

E)

Question number	Answer	Mark
1(d)(i)	allow 2 for correct answer with or without working change in concentration = $410.83 - 407.96$ (= 2.87) (1) = 3 (1)	(2)

F)

Question number	Answer	Additional guidance	Mark
1(d)(ii)	volcanic activity / burning of fossil fuels / deforestation / respiration	allow more vehicles on road ignore global warming / ice-caps melting / farming	(1)

Q5. (2021) – 9d

Question number	Answer	Additional guidance	Mark
9(d)	An explanation linking <ul style="list-style-type: none"> • {carbon dioxide / water} produced (1) • (the gases) absorb heat radiated from earth (1) re-radiate heat back into the atmosphere (1)	allow formula allow traps the heat	(3) AO2

Q6. (2022) – 9e

Question number	Indicative content	Mark
*9(e)	<p>Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlines in the generic mark scheme.</p> <p>The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant.</p> <p>AO1 (6 marks)</p> <p>Natural: Origins:</p> <ul style="list-style-type: none"> • {carbon dioxide / water / gases} from volcanoes • the Earth cooled • so water vapour condensed (to form oceans/seas) reducing amount of water vapour • carbon dioxide {dissolves in/absorbed by} the oceans reducing amount of carbon dioxide • some carbon dioxide incorporated into sea animals' shells <p>Natural: Evolution</p> <ul style="list-style-type: none"> • plants evolved • photosynthesis • photosynthesis releases oxygen increasing amount of oxygen • photosynthesis absorbs carbon dioxide reducing amount of carbon dioxide <p>Human effects</p> <ul style="list-style-type: none"> • amounts of carbon dioxide in recent time increasing due to burning fossil fuels • amounts of carbon dioxide in recent time increasing due to agriculture • deforestation means less carbon dioxide absorbed • reforestation means more oxygen produced 	(6) AO1

Q7. (2023) – 4a, 4b(i, ii), 4c (i), 4d (i, ii)

A)

Question number	Answer	Additional guidance	Mark
4(a)	bar on bar chart for carbon dioxide to 95 %	allow $\pm \frac{1}{2}$ small square ignore width of bar	(1) AO2-1

B)

Question number	Answer	Additional guidance	Mark
4(b)(i)	over the past 3 billion years the average surface temperature of the Earth has decreased.		(1) AO2-1

C)

Question number	Answer	Additional guidance	Mark
4(b)(ii)	an explanation linking any two from <ul style="list-style-type: none"> {the Earth / atmosphere / water vapour} cooled (1) water vapour condensed / formed clouds (1) {(liquid) water / rain} formed (1) produced {oceans / seas / rivers / bodies of water} (1) 	allow surface temperature has decreased allow lakes	(2) A02-1

D)

Question number	Answer	Mark
4(c)(i)	photosynthesis	(1) A01-1

E)

Question number	Answer	Additional guidance	Mark
4(d)(i)	(416.56 – 371.17 =) 45.39 (1) = 45 (1) (to nearest whole number)	answer of 45 alone with or without working scores (2) 1 mark for correct rounding (has to use only the numbers 416.56 and 371.17 in any calculation)	(2) A02-1

F)

Question number	Answer	Additional guidance	Mark
4(d)(ii)	eg global warming / {ice caps/glaciers} melting / changing habitats / rising sea levels	allow { enhanced/increased } greenhouse effect / increased global temperatures / climate change / allow effects of climate change eg <u>more</u> extreme weather allow more photosynthesis ignore references to pollution / less oxygen in the air reject references to ozone layer / deforestation / acid rain	(1) A01-1

Q8. (2024) – 9d

Question number	Indicative content	Mark
*9(d)	<p>Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlines in the generic mark scheme.</p> <p>The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant.</p> <p>AO1 (6 marks)</p> <p>Photosynthesis</p> <ul style="list-style-type: none"> • plants/ trees absorb carbon dioxide • and release oxygen • in photosynthesis <p>Change in atmosphere</p> <ul style="list-style-type: none"> • plants/ trees overall increase amount of oxygen • plants/ trees overall reduce amount of carbon dioxide <p>Temperature</p> <ul style="list-style-type: none"> • carbon dioxide absorbs sun's energy that is radiated back from Earth • this increases Earth's temperature • called greenhouse effect • global warming <p>Changes in plant coverage over time</p> <ul style="list-style-type: none"> • plants evolved so more photosynthesis • in recent years less tree coverage • due to deforestation • so less photosynthesis • so carbon dioxide reduced from original levels but now increasing 	(6) AO1