2.28 The Atmosphere: Evolution and Greenhouse Gases: 10-minute Pack

AQA 8464 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 As the young Earth gradually cooled during its first billion years, the huge amount of water vapour released by volcanic activity began to change state.

(a) Explain what happened to this water vapour as the Earth cooled, and name the feature of the Earth that this process eventually formed. **(2)**

(Total for Question 1 is 2 marks)

2 Acid rain forms when nitrogen oxides and sulfur dioxide react in the atmosphere.

(a) State one consequence of acid rain on buildings or vegetation. **(1)**

(b) Explain why acid rain can damage limestone buildings. **(1)**

(Total for Question 2 is 2 marks)

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3 Expressing concentrations: convert an atmospheric concentration given in ppm into percent by volume.

(a) Convert 410 ppm into percent by volume. Give your answer in percent to three significant figures. **(2)**

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(Total for Question 3 is 2 marks)

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4 Nitrogen gas now makes up about 78% of the Earth's atmosphere, yet only a small amount of nitrogen was released directly by early volcanic activity.

(a) Suggest why nitrogen gas gradually built up in the atmosphere over billions of years, rather than reacting away or escaping. **(2)**

(Total for Question 4 is 2 marks)

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Mark scheme · 2.28 The Atmosphere: Evolution and Greenhouse Gases: 10-minute Pack

Question 1

(a) the water vapour condensed (turned into liquid water) as the Earth cooled oe **B1**

(a) forming the Earth's oceans cao **B1**

(a) Answer: The water vapour condensed into liquid water, forming the oceans

Question 2

(a) damage to limestone buildings or corrosion of metal or harm to freshwater ecosystems or damage to leaves **B1**

(a) Answer: Damage to limestone buildings (etching) or harm to plants and freshwater life.

(b) acid reacts with calcium carbonate in limestone to form soluble calcium compounds that wash away, causing erosion **B1**

(b) Answer: Acid reacts with calcium carbonate in limestone to form soluble compounds that are washed away, causing erosion.

Question 3

(a) convert ppm to fraction: 410 / 1 000 000 then x 100 to get percent **M1**

(a) 0.0410% cao **A1**

(a) Answer: 0.0410%

Question 4

(a) nitrogen is a very unreactive (inert) gas under normal atmospheric conditions, so once present it does not readily react further and simply accumulates oe **B1**

(a) nitrogen was also gradually added by processes such as ammonia (from volcanic gases) reacting with oxygen, and by bacteria removing nitrogen compounds from soil and oceans and releasing nitrogen gas oe **B1**

(a) Answer: Nitrogen is very unreactive, so it accumulated over time rather than reacting away; it was also gradually released by processes such as ammonia reacting with oxygen and by bacteria in soil/oceans

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