Written to the specification from Speca's own topic maps, then independently rechecked for accuracy. These are original practice questions, not past-paper questions. Spotted a mistake? Tell us at hello@speca.co.uk.

SPECA

GCSE Combined Science (AQA Trilogy) · Chemistry

Chemistry of the Atmosphere · Mark Scheme

For use with the Worksheet. Marking points are indicative, not exhaustive: award equivalent correct answers.

1) Nitrogen: approximately 80% (1); oxygen: approximately 20% (1) [2]

2) Any two of: carbon dioxide; water vapour; noble gases (e.g. argon) (1 mark each, max 2) [2]

3) Intense volcanic activity released gases forming an early atmosphere similar to Mars or Venus today: mainly carbon dioxide, with little or no oxygen (1); water vapour was also released, which condensed to form the oceans (1); small amounts of methane and ammonia, plus nitrogen, were also produced volcanically (1) [3]

4) Algae and later plants removed carbon dioxide from the atmosphere by photosynthesis (1); carbon dioxide also became locked into sedimentary rocks and into fossil fuels (and dissolved into the oceans, precipitating as carbonate sediment) (1) [2]

5) Algae began photosynthesising and producing oxygen around 2.7 billion years ago (1); over roughly the next billion years, as plants evolved, the proportion of oxygen rose to a level that eventually allowed animals to evolve (1) [2]

6) Any three of: water vapour; carbon dioxide; methane (1 mark each, max 3) [3]

7) Short-wavelength radiation from the Sun passes through the atmosphere and warms the Earth's surface (1); the surface emits longer-wavelength radiation back out (1); greenhouse gases absorb and re-radiate some of this longer-wavelength radiation, keeping the surface warmer than it would otherwise be (1) [3]

8) Any two of: burning fossil fuels; deforestation (reduces CO2 removal by photosynthesis); certain industrial processes (accept other valid named activities, 1 mark each, max 2) [2]

9) Any two of: livestock/cattle farming; rice paddy fields; landfill sites/decomposing waste (1 mark each, max 2) [2]

10) Any one of: rising sea levels; more frequent or severe extreme weather events; changes to the amount and timing of rainfall; loss of habitats/biodiversity (1 mark) [1]

11) The total carbon dioxide and other greenhouse gas emissions (1) across the full life cycle of a product, service, or event (1) [2]

12) Any one of: reducing emissions can cost more; it can be less convenient; it may compete with other priorities (accept other valid reason, 1 mark) [1]

13) Any three of: carbon dioxide; water vapour; carbon monoxide; sulfur dioxide; oxides of nitrogen; particulates/soot (1 mark each, max 3) [3]

14) Carbon monoxide is toxic (1), and is colourless and odourless, so it is hard to detect (1) [2]

15) Sulfur dioxide and nitrogen oxides dissolve in atmospheric water/react with water vapour, forming acidic rain (1); this causes problems such as respiratory problems in humans, or damage to buildings/aquatic life/plants (any one, 1 mark) [2]

16) Particulates (solid soot/unburned hydrocarbon particles) released into the atmosphere reflect sunlight back into space (1), reducing the amount of sunlight reaching the Earth's surface, global dimming (1) [2]

Total: 34 marks

Speca is an independent product and is not affiliated with, endorsed by, or sponsored by AQA. This mark scheme is originally authored by Speca and is not an AQA document.