

Gases from Air: Questions

1. The table gives information about five gases in the air.

Gas	Nitrogen	Oxygen	Carbon dioxide	Argon	Water vapour
Formula	N ₂	O ₂	CO ₂	Ar	H ₂ O
Melting point/°C	-210	-218	-56	-189	0
Boiling point/°C	-196	-183	-78	-186	100

- (a) Put a ring around the temperature (°C) at which only water vapour is removed from air.

-200 **-105** **-10** **105** [1]

- (b) Put a ring around the temperature (°C) at which water vapour and carbon dioxide are removed from air.

-200 **-105** **-10** **105** [1]

- (c) Put a ring around the temperature (°C) at which all the gases in the table are liquefied.

-200 **-105** **-10** **105** [1]

- (d) A liquid mixture of argon, nitrogen and oxygen is allowed to warm up. In which order are the gases produced.

_____ first

_____ last [2]

- (e) Calculate the density of oxygen gas at room temperature and atmospheric pressure. (Relative atomic mass: O = 16. The volume of 1 mole (the formula mass) of oxygen molecules at room temperature and atmospheric pressure is 24 dm³)

_____ [2]

2. This question is about the extraction of oxygen and nitrogen from liquid air.

- (a) Why is it important to remove water and carbon dioxide before liquefying air?

_____ [1]

- (b) Suggest two reasons why liquid oxygen is more expensive to buy than liquid nitrogen.

1. _____

2. _____ [2]

- (c) The density of liquid nitrogen is 0.88 g/cm³. The mass of 1 mole (the formula mass) of nitrogen molecules is 28 g.

- (i) What volume of liquid nitrogen does 1 mole of nitrogen molecules occupy?

_____ cm³ [3]

- (ii) Why is it an advantage to transport nitrogen as a liquid rather than as a compressed gas?

_____ [1]

