## **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 <sub>2</sub>	O <sub>2</sub>	CO <sub>2</sub>	Ar	H₂O
Melting point/°C	-210	-218	-56	-189	0
Boiling point/°C	-196	-183	-78	-186	100

Doming.	point C	100	100	7.0	100	100
(a)	Put a rin air.	g around the te	emperature (°C)	at which only	water vapour is	removed from
	-200	-	105	-10	109	5 [1]
(b)		ng around the toved from air.	emperature (°C	c) at which wate	er vapour and	carbon dioxide
	-200	-	105	-10	109	5 [1]
(c)	Put a rii liquefied		temperature (	°C) at which a	ll the gases in	the table are
	-200	-	105	<b>-10</b>	109	5 [1]
(d)		mixture of argor gases produced		oxygen is allow	ed to warm up.	In which order
					first	t
					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 c	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/cm <sup>3</sup> . 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?
		3101
		cm <sup>3</sup> [3]
		(ii) Why is it an advantage to transport nitrogen as a liquid rather than as a compressed gas?
		[4]



3.	Fractio	Fractional distillation of liquid air is done in many small factories throughout the UK Fractional distillation of crude oil is done in a small number of large factories. Explain this						
		lifference. Use your knowledge of social, economic, industrial and environmental aspon your answer.						
			<del></del>					
		<u>-</u>						
			[8]					

