

Question Number	Answer	Mark
12(a)	<p>Use of $pV = NkT$ (1)</p> <p>Conversion of temperature to kelvin (1)</p> <p>$N = 2.1 \times 10^{24}$ [min 2sf] (1)</p> <p><u>Example of derivation</u></p> $N = \frac{1.24 \times 10^5 \text{ Pa} \times 7.08 \times 10^{-2} \text{ m}^3}{1.38 \times 10^{-23} \text{ J K}^{-1} \times (273 + 25) \text{ K}} = 2.13 \times 10^{24}$	3
12(b)	<p>Use of $pV = NkT$ (1)</p> <p>$\Delta N = 1.5 \times 10^{24}$ (allow ecf from (a)) (1)</p> <p><u>Example of calculation</u></p> $\frac{p_2}{p_1} = \frac{N_2}{N_1}$ $N_2 = 2.13 \times 10^{24} \times \left(\frac{3.45 \times 10^4 \text{ Pa}}{1.24 \times 10^5 \text{ Pa}} \right) = 5.93 \times 10^{23}$ $\Delta N = 2.13 \times 10^{24} - 5.93 \times 10^{23} = 1.54 \times 10^{24}$ <p>[Use of ‘Show that’ value from (a) gives $\Delta N = 1.44 \times 10^{24}$]</p>	2
Total for question 12		5