

Question Number	Answer	Mark
17(a)	<p>Use of $pV = NkT$ [Allow temperature substituted in °C] (1)</p> <p>Conversion of temperature to kelvin (1)</p> <p>Use of $\Delta p = p_2 - p_1$ (1)</p> <p>$\Delta p = 1.1 \times 10^6 \text{ Pa}$ [If pressure rounded to $1.4 \times 10^7 \text{ Pa}$, then $\Delta p = 1.2 \times 10^6 \text{ Pa}$] (1)</p> <p><u>Example of calculation</u></p> $\frac{p_1}{T_1} = \frac{p_2}{T_2}$ $p_2 = 1.28 \times 10^7 \text{ Pa} \times \frac{(42.5 + 273) \text{ K}}{(17.5 + 273) \text{ K}} = 1.39 \times 10^7 \text{ Pa}$ $\Delta p = (1.39 \times 10^7 - 1.28 \times 10^7) \text{ Pa} = 1.10 \times 10^6 \text{ Pa}$	4

***17(b)**

This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.

Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.

The following table shows how the marks should be awarded for structure and lines of reasoning.

	Number of marks awarded for structure of answer and sustained line of reasoning
Answer shows a coherent and logical structure with linkages and fully sustained lines of reasoning demonstrated throughout	2
Answer is partially structured with some linkages and lines of reasoning	1
Answer has no linkages between points and is unstructured	0

Total marks awarded is the sum of marks for indicative content and the marks for structure and lines of reasoning

IC points	IC mark	Max linkage mark	Max final mark
6	4	2	6
5	3	2	5
4	3	1	4
3	2	1	3
2	2	0	2
1	1	0	1
0	0	0	0

Indicative content

IC1 As the temperature increases the (average) kinetic energy of the (air) molecules increases

IC2 So mean/average speed of the air molecules increases
[Accept mean/average velocity/momentum]

IC3 The (average/mean) change of momentum of air molecules when colliding with the tank/walls increases

IC4 The rate of collision of air molecules with the tank/walls increases [Accept "collision frequency" or "number of collisions per second" for "rate of collision"]

IC5 The rate of change of momentum increases and so the force on the tank/walls, increases

IC6 The pressure (exerted by the gas) increases, since $p = F/A$

[If atoms/particles referred to, then max 1 linkage mark]

6

Total for question 17

10