Gas pressure GCSE AQA Higher Physics Past Papers Answers

01.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	range of speeds moving in different directions	 accept random motion	1 1	AO1/1 4.3.3.1
01.2	internal energy		1	AO1/1 4.3.2.1
01.3	density = mass / volume		1	AO1/1 4.3.1.1
01.4	0.00254/0.0141 0.18 kg/m^3	 accept 0.18 with no working for the **2** calculation marks	1 1 1	AO2/1 AO2/1 AO1/1 4.3.1.1
Total			**7**	

02.

Question	Answers	Extra information	Mark	AO/ Spec. Ref
1	any **two** from: • calculate a mean • reduces the effect of random errors • identify / remove anomalies	 reduces human error is insufficient allow to assess the repeatability of the data	2	AO3 4.3.3.2
2	random error (because) eye position would not be the same each time (relative to the liquid)	allow a parallax error human error is insufficient allow systematic error only if it is clear that the student always viewed liquid level from above meniscus (or below)	1 1	AO3 4.3.3.2
3	(a temperature increase would) increase the pressure in the tube (even if the volume was constant) (because a higher temperature would mean) higher (average) kinetic energy of molecules / particles	 allow higher (average) speed for higher (average) kinetic energy	1 1	AO1 4.3.3.3

Question	Answers	Extra information	Mark	AO/ Spec. Ref
4		an answer of 8.0 (cm^3) scores **3** marks		AO2 4.3.3.2
	$1.6 \times 10^5 \times 9.0$ (= 1.44×10^6)		1	
	$1.44 \times 10^6 = 1.8 \times 10^5 \times V$ **or** $V = \frac{1.44 \times 10^6}{1.8 \times 10^5}$	allow for **2** marks $V = \frac{1.6 \times 10^5 \times 9.0}{1.8 \times 10^5}$	1	
	$V = 8.0$ (cm^3)		1	
5	work is done on the air (in the tyre)		1	AO1 4.3.3.3
	so the temperature (of the air) increases	allow the (average) kinetic energy of the particles increases	1	
Total			**11**	

03.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1	The particles move in random directions. The particles move with a range of speeds.		1 1	AO1 4.3.3.1
2	100 000 × 0.030 = 3000 p × 0.025 = 3000 $p = \frac{3000}{0.025}$ p = 120 000 (Pa)	 allow a correct substitution using an incorrectly calculated value using pV = constant allow a correct rearrangement using an incorrect value of the constant allow a correct calculation using an incorrect value of the constant allow correct substitution into $p_1V_1 = p_2V_2$ for first 2 marking points	 1 1 1 1	AO2 4.3.3.2
3	particles would have a higher (mean) kinetic energy (so) increased number of collisions with the walls of the balloon per second greater forces exerted in collisions (between particles and balloon walls) greater force exerted on same area	allow particles would have a higher (mean) speed do not accept particles vibrate more allow greater frequency of collisions with the walls of the balloon allow greater rate of change of momentum (of particles) allow description using p=F/A	1 1 1 1	AO1 4.3.3.1
Total			**10**	

04.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1	0(.0) to 12(.0)	allow 2(.0) to 12(.0) (N)	1	AO1 4.3.3.2
2	mass of gas (in the syringe) **or** temperature (of the gas)		1	AO3 4.3.3.2
3	constant = 60 × 45 **or** constant = 2700		1	AO2 4.3.3.2
	2700 = p × 40		1	
	$p = \frac{2700}{40}$		1	
	p = 67.5 (kPa)	allow 68 (kPa)	1	
4	there is more time between collisions of particles and the walls of the syringe **or** there are less frequent collisions between the particles and the walls of the syringe		1	AO1 4.3.3.2
	(causing) a lower (average) force on the walls of the syringe		1	
	(and) pressure is the total force per unit area		1	
Total			**9**	

05.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1	random	allow all / any ignore many different	1	AO1 4.3.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2	more (air) particles (in the tyre)		1	AO1 4.3.3.1
	greater number of collisions with tyre (walls) per second	allow collisions with tyre (walls) are more frequent allow greater rate of collisions with tyre (walls) do **not** credit MP2 if linked to an increased air temperature or increased speed / E_k of particles ignore greater force per m^2	1	4.3.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3	(as temperature increases the) air particles have greater (mean) kinetic energy	allow particles move with greater speeds (on average)	1	AO1 4.3.3.1
	(so) more collisions with tyre (walls) per second	allow collisions with tyre (walls) are more frequent allow greater rate of collisions with tyre (walls)	1	
	(and) greater force in each collision	allow greater rate of change of momentum in each collision	1	
	greater (mean) force per square metre causes greater pressure (on wall of tyre)	allow 'on a given area' for 'per square metre'	1	

Total Question		7