

Q1. (2018)

a)

03.1	they move in random directions		1	AO1 6.3.3.1
	they move with a range of different speeds		1	

b)

03.2	the (mean) speed of the particles would increase	allow kinetic energy increases	1	AO1 6.3.3.1
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c)

03.3	(if the temperature increases) the pressure increases	allow an explanation in terms of large pressure difference	1	AO1 6.3.3.1
	so it could explode		1	AO2 6.3.3.1

Q2. (2018)

a)

03.4	p = 0.1 (MPa)		1	AO2 6.3.3.1
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b)

03.5		an answer of 27 scores 3 marks		AO3 6.3.3.1
	$p = 2.25 \times \left(\frac{25}{100}\right)$	allow any correct method of determining 25% of 2.25 allow use of 2.2–2.3	1	
	p = 0.56	allow 0.55–0.575	1	
	t = 27 (minutes)	allow 26–28 minutes allow correct value of t using their calculated value of p	1	

c)

03.6	(the volume of the air) increases		1	AO1 6.3.3.1
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Q3. (2019)

02.1	pressure decreased		1	AO2.1	E
	because molecules have less (kinetic) energy	allow less speed/velocity	1	6.3.3.1	
	so fewer collisions (with the wall/container each second)	allow collide with less force	1		
		allow less force on the walls			

Q4. (2020)

05.1	they vibrate about fixed positions.		1	AO1 6.3.1.1
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Q5. (2021)

06.4	more collisions per second		1	AO1 6.3.3.1
	a greater force per collision		1	

Q6. (2022)

04.3	the relationship is linear	allow the relationship obeys $y = mx + c$ allow the gradient (of the graph) is constant do not accept (directly) proportional	1	AO2 6.3.3.1
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Q7. (2022)

04.5	the particles spread out	do not allow particles expand	1	AO1 6.3.1.1
	so the steam / gas takes up a greater <u>volume</u>	allow there is less gas in the same <u>volume</u>	1	
	and density = $\frac{\text{mass}}{\text{volume}}$ so the density decreases	do not allow density of particles decreases	1	

Q8. (2023)

a)

06.1	(air) particles move faster or (air) particles have increased kinetic energy		1	AO1 6.3.3.1
	(so air) particles collide more frequently with the wall / chamber or (so air) particles collide with more force with the wall / chamber		1	
	(so) the pressure increases	dependent on MP1 or MP2	1	

b)

06.4	any one from: • lubrication • use hotter coffee • decrease the temperature of the surroundings	allow oil the device/wheel	1	AO3 6.1.2.1
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Q9. (2024)

06.2	(at higher temperatures) the (average) speed of the particles is greater	allow the (average) kinetic energy of the particles is greater do not accept vibrations	1	AO3 6.1.1.1 6.1.1.4 6.3.2.1 6.3.3.1
	so the frequency of collisions (between particles and the turbine) increases		1	
	and the force of each collision (between a particle and the turbine) is greater		1	
	so more energy transferred (each second)	dependent on MP2 or MP3 ignore increases the power	1	