Eduqas Physics GCSE
Topic 2: Particle model of matter
Mark Schemes for Questions by topic

1.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	2	Temperature = 0 [K] - 1 mark Pressure = 12 [N/cm^2] – 1 mark			
(b)	2	The molecules travel faster / have more energy (1) More frequent / harder collisions / collide more often [with the container] (1)		More frequent / harder collisions with each other	They collide more / there is more energy / increased number of collisions
Total	4				

2.

Question			Marking details	Mark
7.	(a)	(i)	Plots ± ½ small square division (2), curve (1)	3
		(ii)	As the volume increases, the pressure decreases (1) in a non-linear way / decreasing rate (1) (inversely proportional / as volume doubles the pressure is halved award both marks)	2
		(iii)	Around 67 000 (**take the value that occurs from their line** ± 500)	1
	(b)		Indicative content: As the volume increases, the molecules have further to travel between collisions with the container therefore they take a longer time to travel so the rate of change of momentum is reduced. This reduces the force from any one molecule when in collision with the walls. Since pressure = force / area, the decrease in the force gives a reason for a decrease in pressure / increase in area causes pressure. **5 – 6 marks** The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar. **3 – 4 marks** The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar. **1 – 2 marks** The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar. **0 marks** The candidate does not make any attempt or give a relevant answer worthy of credit. **Question total**	6 **[12]**
			Foundation tier paper total	**[60]**

3.

Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
(a)			3	All points correctly plotted to within <1 small square tolerance (2) 4 points correctly plotted to within <1 small square tolerance (1) 3 or less points correctly plotted to within <1 small square tolerance (0) Curve of best fit drawn to within <1 small square tolerance (1) No thick, whispy, double or wobbly curves			
(b)	(i)		2	As the depth increases the volume of the balloon decreases (1) at a decreasing rate (1)			Inversely proportional
	(ii)		1	Reading taken from candidate's graph ± 0.5 i.e. 14.0 [m]			
	(iii)		2	Pressure = 100 [kPa] (1) Because each time the depth decreases by 10 m the pressure decreases by 100 kPa (1)			
	(iv)		2	The product of p and V is a constant [from the table] / energy remains constant / number of kJ remains constant (1) which only happens if temperature is constant (1) **The 2nd mark must be linked to the 1st mark.**	Complete statement of Boyle's law award 1 mark		Obeys Boyle's law
TOTAL			10				

4.

Question	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.	**Mark**	**AO spec ref**
2		**6**	AO1 1.1.2a

0 marks	**Level 1 (1–2 marks)**	**Level 2 (3–4 marks)**	**Level 3 (5–6 marks)**
No relevant content.	Considers either solid or gas and describes at least one aspect of the particles. **or** Considers both solids and gases and describes an aspect of each.	Considers both solids and gases and describes aspects of the particles. **or** Considers one state and describes aspects of the particles and explains at least one of the properties. **or** Considers both states and describes an aspect of the particles for both and explains a property for solids or gases.	Considers both states of matter and describes the spacing and movement / forces between the particles. Explains a property of both solids and gases.

examples of the points made in the response	extra information
Solids • (particles) close together • (so) no room for particles to move closer (so hard to compress) • vibrate about fixed point • strong forces of attraction (at a distance) • the forces become repulsive if the particles get closer • particles strongly held together/not free to move around (shape is fixed) **Gases** • (particles) far apart • space between particles (so easy to compress) • move randomly • negligible/no forces of attraction • spread out in all directions (to fill the container)	any explanation of a property must match with the given aspect(s) of the particles.

Total		**6**

5.

Question			Answer	Marks	AO element	Guidance
7	(a)	(i)	**FIRST CHECK THE ANSWER ON ANSWER LINE.** **If answer = 240 (kPa) award 3 marks** Select: $P_1V_1=P_2V_2$ ✓ $P \times 50\ cm^3 = 100\ kPa \times 120\ cm^3$ ✓ $P = 100\ kPa \times 120\ cm^3 \div 50\ cm^3 = 240\ (kPa)$ ✓	3	1.1 2.2 2.2	
		(ii)	particles have less space, so hit the walls more often ✓ more momentum change per second (per unit area) ✓ ⇒ greater force ⇒greater pressure ✓	3	1.1	
		(iii)	No temperature change ✓ Work is done in pushing the piston in ✓ Increase internal energy of gas, so temperature rises ✓ Slow change allows gas to cool back as energy is transferred to environment ✓	4	1.2	**ALLOW** idea of 'heat leaking out'