FREE REVISION PACK

Kinetic Theory

Pearson Edexcel International Advanced Level Physics · Unit 5 (WPH15) · Specification points 132

Easy | Multiple choice · past-paper questions

5	5	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Helium and hydrogen at the same temperature	Edexcel IAL January 2024 · Unit 5 · Q8	1 mark
2	Easy	Gas molecules of different mass at the same temperature	Edexcel IAL January 2021 · Unit 5 · Q1	1 mark
3	Easy	Mass ratio from root mean square speeds	Edexcel IAL January 2025 · Unit 5 · Q6	1 mark
4	Easy	Ratio of rms speeds for xenon and argon	Edexcel IAL October 2025 · Unit 5 · Q10	1 mark
5	Easy	rms speeds of two gases at the same temperature	Edexcel IAL June 2024 · Unit 5 · Q8	1 mark

Key ideas to have ready

- Mean molecular KE: $\frac{1}{2}m\langle c^2\rangle = \frac{3}{2}kT$, so it depends only on temperature.
- Gases at the same temperature have the same mean KE; heavier molecules move more slowly.
- $\langle c^2\rangle \propto T/m$; $c_{rms} \propto \sqrt{(T/m)}$.
- At constant volume, $p \propto T \propto \langle c^2\rangle$.

How to use this pack

1. The questions are grouped into levels (Easy). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in Pearson's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

Questions 1–5

Choose **one** answer for each question and put a cross in the box next to it.

Edexcel IAL January 2024 · Unit 5 · Q8

1 A mixture of helium gas and hydrogen gas is kept at room temperature.

Which of the following is correct?

- ☒ **A** The mean kinetic energy of the helium molecules is greater than the mean kinetic energy of the hydrogen molecules.
- ☒ **B** The mean kinetic energy of the helium molecules is less than the mean kinetic energy of the hydrogen molecules.
- ☒ **C** The mean square velocity of the helium molecules is greater than the mean square velocity of the hydrogen molecules.
- ☒ **D** The mean square velocity of the helium molecules is less than the mean square velocity of the hydrogen molecules.

Edexcel IAL January 2021 · Unit 5 · Q1

2 A mixture of oxygen gas and nitrogen gas is kept at room temperature. Oxygen molecules are more massive than nitrogen molecules.

Which of the following is correct?

- ☒ **A** The mean velocity of the oxygen molecules is greater than the mean velocity of the nitrogen molecules.
- ☒ **B** The mean speed of the oxygen molecules is the same as the mean speed of the nitrogen molecules.
- ☒ **C** The mean kinetic energy of the oxygen molecules is greater than the mean kinetic energy of the nitrogen molecules.
- ☒ **D** The mean kinetic energy of the oxygen molecules is the same as the mean kinetic energy of the nitrogen molecules.

Edexcel IAL January 2025 · Unit 5 · Q6

3 A container is filled with a mixture of two gases, X and Y.

The root mean square velocity of molecules in gas X is twice the root mean square velocity of molecules in gas Y.

The temperature of the gas mixture is constant.

What is the ratio $\frac{\text{mass of molecules of gas X}}{\text{mass of molecules of gas Y}}$?

☒ **A** $\frac{1}{4}$

☒ **B** $\frac{1}{\sqrt{2}}$

☒ **C** $\frac{1}{2}$

☒ **D** 1

Edexcel IAL October 2025 · Unit 5 · Q10

4 A container is filled with a mixture of xenon gas and argon gas, at a constant temperature. The mass of a molecule of xenon is three times the mass of a molecule of argon.

Which of the following is the ratio $\frac{\sqrt{\langle c^2 \rangle} \text{ of xenon}}{\sqrt{\langle c^2 \rangle} \text{ of argon}}$?

☒ **A** $\frac{1}{\sqrt{3}}$

☒ **B** $\frac{1}{3}$

☒ **C** $\sqrt{3}$

☒ **D** 3

Edexcel IAL June 2024 · Unit 5 · Q8

5 A container is filled with a mixture of two gases, X and Y, at constant temperature. Each molecule of gas X has twice the mass of each molecule of gas Y.

The ratio $\frac{\text{r.m.s. velocity of molecules in gas X}}{\text{r.m.s. velocity of molecules in gas Y}}$ is

☒ **A** $\frac{1}{\sqrt{2}}$

☒ **B** $\frac{1}{2}$

☒ **C** 1

☒ **D** $\sqrt{2}$

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**