A Level · OCR · Physics

3 mins 3 questions

Multiple Choice Questions

Kinetic Theory of Gases

Kinetic Theory of Gases / Kinetic Theory of Gases Equation / The Boltzmann Constant / Average Kinetic Energy of a Molecule / Internal Energy of an Ideal Gas

Easy (1 question)	/1
Medium (1 question)	/1
Hard (1 question)	/1
Total Marks	**/3**

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Easy Questions

1 A piston has a fixed amount of trapped ideal gas.

The gas exerts pressure *p* and has volume *V.* The thermodynamic (absolute) temperature of the gas is *T*. The mass of each atom is *m*. There are *N* atoms of the gas. The Boltzmann constant is *k*.

What quantities are required to determine the root mean square speed $\sqrt{c^2}$ of the atoms?

A. *k* and *T*

B. *p* and *V*

C. *p*, *V* and *T*

D. *p*, *V*, *N* and *m*

(1 mark)

Medium Questions

1 The kinetic theory of matter is a model used to describe the behaviour of particles (atoms or molecules) in an ideal gas. There are a number of assumptions made in the kinetic model for an ideal gas.

Which one of the following assumptions is **not** correct?

A. The collisions of particles with each other and the container walls are perfectly inelastic.

B. The electrostatic forces between particles are negligible except during collisions.

C. The particles occupy negligible volume compared to the volume of the gas.

D. There are a large number of particles in random motion.

(1 mark)

Hard Questions

1 A container has an ideal gas. The mean square speed of the gas molecules in the container is 3.0×10^5 m^2 s^{-2}.

Over a period of time, a third of the gas molecules escape from the container. The pressure and volume of the gas in the container remain the same.

What is the mean square speed of the molecules left in the container?

A. 1.0×10^5 m^2 s^{-2}

B. 2.0×10^5 m^2 s^{-2}

C. 4.5×10^5 m^2 s^{-2}

D. 9.0×10^5 m^2 s^{-2}

(1 mark)