ILLUSTRATION

Find number of moles in 480 gm O_2.

ABJ

ILLUSTRATION

What is kinetic energy of gas at 0 K or at – 273 ^{0}C.

ABJ

ILLUSTRATION

Determine the average and r.m.s. speed of system of 5 particles of same mass having speeds (each in m/s): 1, 2, 3, 4, 5.

ILLUSTRATION

The absolute temperature of a gas is increased 3 times. The root mean square velocity of the molecule will become –

A. 3 times

B. 9 times

C. (1/3) times

D. $\sqrt{3}$ times

ILLUSTRATION

There is a container having oxygen gas at temperature 27^0C. Find V_{rms} of O_2 gas.

ABJ

ILLUSTRATION

A gas is in a container of volume 5 ltr at 2 atmospheric pressure. Find translational kinetic energy of gas in container.

ABJ

ILLUSTRATION

He gas of mass 16 gm is in a container at 37^0C. Find translational kinetic energy of gas in container.

ABJ

The temperature of an ideal gas is increased from 27°C to 927°C. The rms speed of its molecules becomes -

A. Twice B. Half C. Four times D. One fourth

ILLUSTRATION

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ILLUSTRATION

If the r.m.s. velocity of a gas at a given temperature (Kelvin scale) is 300 m/sec. What will be the r.m.s. velocity of a gas having twice the molecular weight and half the temperature on Kelvin scale ?

A. 300 m/sec B. 600 m/sec C. 75 m/sec D. 150 m/sec

ILLUSTRATION

The r.m.s speed of oxygen molecule in a gas is v. If the temperature is doubled and the O_2 molecule dissociate into oxygen atoms, the r.m.s speed will become

A. V B. v $\sqrt{2}$ C. 2v D. 4v

ILLUSTRATION

The pressure exerted on the walls of container by a gas is due to the fact that gas molecules are –

A. Losing their kinetic energy.
B. Sticking to the walls.
C. Changing their momenta due to collision with the walls.
D. Getting accelerated towards the wall.

ILLUSTRATION

The pressure of a gas increases on raising the temperature of a given gas in a container because –

A. The average velocity of molecules increase so that per second the number of collisions on the wall increases.
B. The mass of molecules increases
C. The molecules get smaller time to remain in contact with the wall
D. There is a loss of energy in each collisions of the molecules

ILLUSTRATION

The gas molecules are not accumulated at the bottom of the container because -

A. These do not have gravitational force between them.
B. Molecules have less mass and high velocities and therefore no gravitational force.
C. The direction of motion of molecules is changing on account of collisions.
D. These is cohesive force between the gas molecules and the wall of the container acting in all direction.

ILLUSTRATION

Consider a collision between an oxygen molecule and a hydrogen molecule in a mixture of oxygen and hydrogen kept at room temperature. Which of the following are possible ?

A. The kinetic energies of both the molecules increase.
B. The kinetic energies of both the molecules decrease
C. The kinetic energy of the oxygen molecule increases and that of the hydrogen molecule decreases
D. The kinetic energy of the hydrogen molecule increases and that of the oxygen molecule decreases

MA

ILLUSTRATION

The temperature at which the r.m.s velocity of oxygen molecules equal that of nitrogen molecules at $100^{o}C$ is nearly

A. 426.3 K B. 456.3 K C. 436.3 K D. 446.3 K

ILLUSTRATION

The rms velocity of molecules of a gas at temperature T is v_{rms}. Then the root mean square of the component of velocity in any one particular direction will be –

A. $V_{rms} / \sqrt{3}$ B. $\sqrt{3}\, v_{rms}$ C. $v_{rms}/3$ D. $3v_{rms}$

ILLUSTRATION

If some gas has pressure P, then pressure exerted by molecules along x direction will be –

A. P B. P/2 C. P/3 D. P/6

ILLUSTRATION

The energy of a given sample of an ideal gas depend only on its –

A. Volume B. Pressure C. Density D. Temperature

ILLUSTRATION

When a gas is forced in a smaller volume without change in temperature, its pressure increases because its molecules –

A. Strike the unit area of the container walls more often.
B. Strike the unit area of the container walls at higher speed.
C. Strike the unit area of the container wall with greater force.
D. Have more energy.

ILLUSTRATION

The pressure of a gas increases on raising the temperature of a given gas in a container because –

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B. The mass of molecules increases.
C. The molecules get smaller time to remain in contact with the wall.
D. There is a loss of energy in each collisions of the molecules.

ILLUSTRATION

Cooking gas containers are kept in a lorry moving with uniform speed. What will be the effect on temperature of the gas molecules?

ILLUSTRATION

Calculate Kinetic Energy of 1 mole of N_2 at 20^0C

ILLUSTRATION

Two separate containers of gas are in thermal equilibrium with each other. One contains He and the other contains Ar. Which of the following statements is correct?

A. $\left\langle v_{He}^2 \right\rangle = \left\langle v_{Ar}^2 \right\rangle$

B. $\left\langle v_{He}^2 \right\rangle > \left\langle v_{Ar}^2 \right\rangle$

C. $\left\langle v_{He}^2 \right\rangle < \left\langle v_{Ar}^2 \right\rangle$

ILLUSTRATION

At what temperature, will the root mean square velocity of hydrogen be double of its value at S.T.P., pressure remaining constant?

AN

ILLUSTRATION

Calculate rms velocity of oxygen molecule at 27°C.

AN

ILLUSTRATION

Calculate the kinetic energy of a gram molecule of argon at 127°C.

AN

ILLUSTRATION

Two ideal gases at temperature T_1 and T_2 are mixed. There is no loss of energy. If the masses of molecules of the two gases are m_1 and m_2 and number of their molecules are n_1 and n_2 respectively. Find the temperature of the mixture.

ILLUSTRATION

The ratio of number of collision per second at the walls of containers by H_2 and Ne gas molecules kept at same volume and temperature.

BBAN

ILLUSTRATION

What should be temp of O_2 gas molecules from escaping the earth?

BBAN

ILLUSTRATION

The rms velocity of smoke particles of mass 3×10^{-17} kg. at 27° C in m / sec is……

BBAN

ILLUSTRATION

If at STP velocity of sound in a gas is 400 ms^{-1} (γ = 1.5), then what will be the rms velocity of gas molecules at NTP.

BBAN

ILLUSTRATION

When gas temperature becomes twice by heating then gas dissociate from molecular form to atomic form. What will be the effect on V_{rms}.

BBAN

ILLUSTRATION

An electric bulb of volume 250 cm^3 has been sealed at a pressure of 10^{-3} mm of mercury and temperature 27°C. Find the number of air molecules in the bulb.

BBAN

ILLUSTRATION

The temperature of a gas is - 68°C. To what temperature should it be heated so that (i) the average kinetic energy of the molecules be doubled, (ii) the root mean square velocity of the molecules be doubled?

BBAN

ILLUSTRATION

The temperature of a gas is - 68°C. To what temperature should it be heated so that (i) the average kinetic energy of the molecules be doubled, (ii) the root mean square velocity of the molecules be doubled?

BBAN

ILLUSTRATION

Calculate for hydrogen at 27°C: (i) Translational kinetic energy of one gram-molecule of the gas, (ii) Translational kinetic energy of one gram gas and (iii) root mean square velocity of the molecules.

BBAN

ILLUSTRATION

Eight gas molecules chosen at random are found to have speeds of 1,1,2,2,2,3,4 and 5 m s^{-1}. Determine

a. the mean speed of the molecules b. the root mean square speed of the molecules c. the root mean square speed of the molecules,

ILLUSTRATION

A tank used for filling helium balloons has a volume of 0.300 m^3 and contains 2.00 mol of helium gas at 20.0°C.

(a) what is the total translational kinetic energy of the molecules of the gas?

(b) What is the average kinetic energy per molecule?

ILLUSTRATION

What is the average translational kinetic energy of a molecule of an ideal gas at a temperature of 27°C ?

ILLUSTRATION

What is the total random translational kinetic energy of the molecules in 1 mole of ideal gas at a temperature of 27°C ?

ILLUSTRATION

What is the root-mean-square speed of oxygen molecules at a temperature of 27°C ?

ILLUSTRATION

At the same temperature, which molecule travels faster, O_2 or N_2? How much faster?

ILLUSTRATION

A pure gas sample at 25 °C has an average molecular speed of 682 m/s. What is the identity of the gas?

A) CH_4 B) H_2 C) HCl D) NO E) CO_2

ILLUSTRATION

Calculate the kinetic energy of 1 mole of nitrogen molecules at 300 K?

ILLUSTRATION

Explain the following:
A toy balloon filled with hydrogen rises to the ceiling, but if filled with carbon dioxide sinks to the floor.