ILLUSTRATION

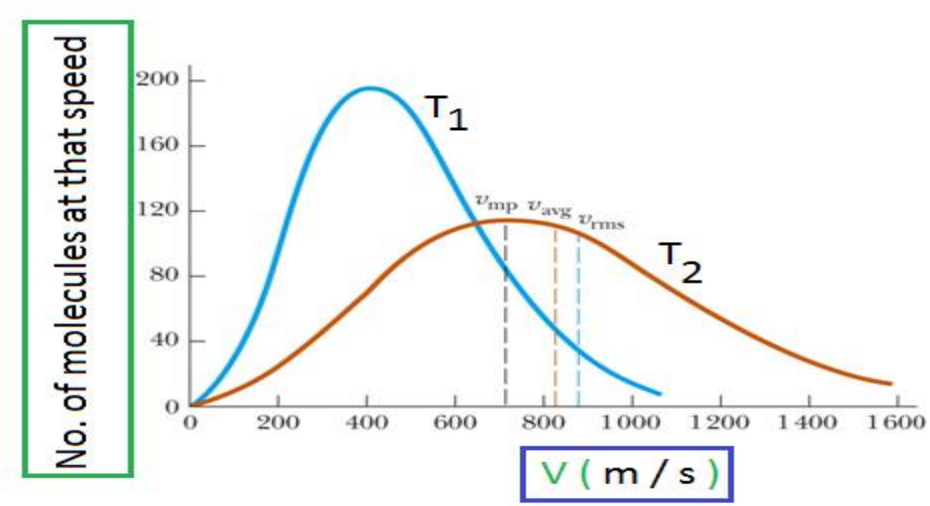
The velocities of ten particles in ms-1 are 0, 2, 3, 4, 4, 4, 5, 5, 6, 9. Calculate (i) average speed and (ii) rms speed (iii) most probable speed.

ILLUSTRATION

RMS speed of gas molecules is ------ times that of speed of sound in gas.

ILLUSTRATION

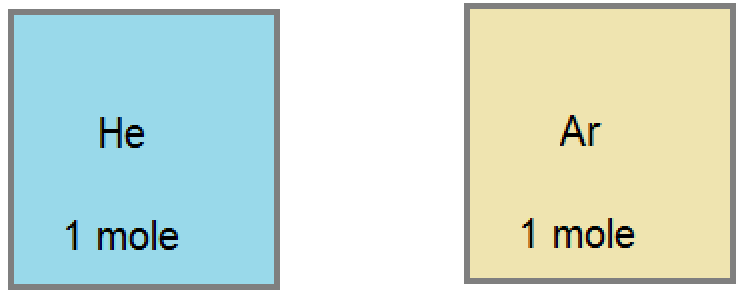
Below graph shows the distribution of velocities of gas particles in a particular temperature.



Which is more T_1 or T_2?

ILLUSTRATION

One container having 1 mole of He and other container 1 mole of Ar at same temperature and same volume. Compare the followings



Argon	> Or <	Helium
m		**m**
No. of paticles		No. of paticles
V_{rms}		V_{rms}
$V_{avg\ speed}$		$V_{avg\ speed}$
$V_{most\ probable\ speed}$		$V_{most\ probable\ speed}$
Kinetic energy		Kinetic energy

ILLUSTRATION

Degree of freedom of a monatomic gas due to its rotational motion will be

A. 3 B. 5 C. 0 D. 6

ILLUSTRATION

The number of translational degrees of freedom for a diatomic gas is -

A. 3 B. 5 C. 0 D. 6

ILLUSTRATION

Calculate the total number of degrees of freedom possessed by the molecules in one cm^3 of H_2 gas at NTP.

AN

ILLUSTRATION

If the density of a gas at NTP is 1.3 mg / cm ^{3} and velocity of sound in it is 330 m/s. The number of degree of freedom of gas molecule is ------

ILLUSTRATION

Degree of freedom of hydrogen and ozone gases will be respectively –

A. 3 and 5

B. 5 and 6

C. 6 and 5

D. 5 and 3

ILLUSTRATION

Equal volumes of monoatomic and diatomic gases at the same temperature are given equal quantities of heat. Then,

A. the temperature of diatomic gas will be more
B. the temperature of monoatomic gas will be more
C. the temperature of both will be zero
D. nothing can be said

AN

ILLUSTRATION

The value of rotational K.E. at temperature T of one gram molecule of a diatomic gas will be –

A. RT B. 3 RT / 2 C. 5 RT D. RT / 2

ILLUSTRATION

At NTP the density of a gas is 1.3 kg/m^3 and the velocity of sound propagation in the gas is 330 m/s. The degree of freedom of gas molecule is-

A. 3 B. 5 C. 6 D. 7

ILLUSTRATION

Total Translational kinetic energy of gas in terms of number of moles n
(if N is total number of molecules)

ILLUSTRATION

A container posses 5 moles of oxygen and 6 moles of nitrogen. Determine ratio of average (mean) translational kinetic energy.

ILLUSTRATION

If total translational kinetic energy per unit volume of gas is E. determine its pressure.

sardana

ILLUSTRATION

If at 27^0C kinetic energy of any gas is K then at what temperature it will be 2K?

sardana

ILLUSTRATION

Moment of inertia of diatomic gas about given AOR is I. calculate its angular speed about this given AOR, assume temperature of gas is T.

sardana

ILLUSTRATION

Calculate the difference between two specific heats of 1 g of nitrogen gas at NTP. Molecular weight of nitrogen = 28 and J = 4.186×10^{7} erg cal^{-1}.

ILLUSTRATION

Calculate the difference between two specific heats of 1 g of helium gas at NTP. Molecular weight of helium = 4 and J = 4.186×10^{7} erg cal^{-1}.

AN

ILLUSTRATION

Calculate the molar specific heat at constant volume. Given : specific heat of hydrogen at constant pressure is 6.85 cal mol^{-1} K^{-1} and density of hydrogen= 0.8999 g dm^{-3}. One mole of gas= 2.016 g, J = 4.2×10^{7} erg cal^{-1} and 1 atmosphere = 10^{6} dyne cm^{-2}.

AN

ILLUSTRATION

The specific heat of argon at constant volume is 0.075 k cal / kg K. Calculate its atomic weight. [R = 2 cal / mol K]

AN

ILLUSTRATION

One mole of a monatomic gas is mixed with 3 moles of a diatomic gas. What is the molecular specific heat of the mixture at constant volume ? [R = 8.31 J /mol K]

BBAN

ILLUSTRATION

A gaseous mixture enclosed in a vessel consists of one g mole of a gas A with ($\gamma = 5 / 3$) and another B with ($\gamma = 7 / 5$) at a temperature T. The gases A and B do not react with each other and assumed to be ideal. Find the number of moles of the gas B, if γ for the gaseous mixture is (19 / 13).

ILLUSTRATION

A gas for which $\gamma = 5/3$ is heated at constant pressure. The percentage of total heat given that will be used for external work is :

ILLUSTRATION

The kinetic energy of rotation of diatomic gas at 27^0 C will be (K = 1.38 × 10^{-23} Joule / K) –

A. 2.07×10^{-21} Joule/molecule

B. 4.14×10^{-21} Joule/molecule

C. 6.14×10^{-23} Joule/molecule

D. 3.07×10^{-23} Joule/molecule

ILLUSTRATION

The gases are at the absolute temperature 300^0K and 350^0K respectively. The ratio of average kinetic energy of their molecules –

A. 7 : 6 B. 6 : 7 C. 36 : 49 D. 49 : 36

ILLUSTRATION

Mean kinetic energy of one gram helium at 27^0 C will be –

A. 3527×10^{-7} Joule
B. 6×10^{-18} Joule
C. 933×10^{-3} Joule
D. 933.7 Joule

ILLUSTRATION

The molar specific heat under constant pressure of oxygen is C_P = 7.03 cal / mole k. The quantity of heat required to raise the temperature from 10°C to 20°C of 5 moles of oxygen under constant volume will approximately be.

ILLUSTRATION

A vessel contains hydrogen gas of 7.50×10^{17} molecules per unit volume and the root mean square speed of the molecules is 2.50 km s^{-1}at a temperature of 30 °C. Determine

a. the average translational kinetic energy of a molecule for hydrogen gas,

b. the pressure of hydrogen gas.

(Given the molar mass of hydrogen gas = 2 g mol^{-1}, $N_A = 6.02 \times 10^{23}$ $mol^{-1}$and $k = 1.38 \times 10^{-23}$ J K^{-1})

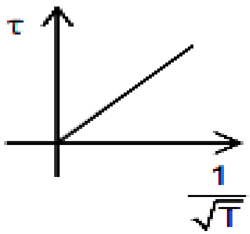
ILLUSTRATION

Estimate the mean free path of nitrogen molecule in a cylinder containing nitrogen at 2.0 atm and temperature 27°C. Take the radius of a nitrogen molecule to be roughly 1.0° Å.

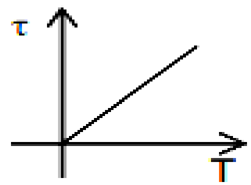
ILLUSTRATION

Which graph correctly represents variation between relaxation time (ζ) of gas molecules with absolute temperature of gas (T) of gas

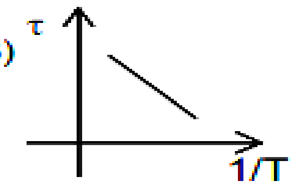
(1)



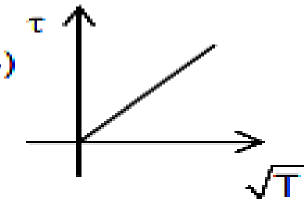
(2)



(3)



(4)



ILLUSTRATION

The temperature of a rigid container of oxygen gas (O_2) is lowered from 300^0C to 0^0C. As a result, the mean free path of oxygen molecules

A. Increases.

B. Is unchanged.

C. Decreases.

ILLUSTRATION

A gas molecule with a molecular mass of 32.0 u has a speed of 325 m/s. What is the temperature of the gas molecule?

A.72 K

B. 136 K

C. 305 K

D. None of these

ILLUSTRATION

Systems A and B are both monatomic gases. At this instant,

A. TA > TB.
B. TA = TB.
C. TA < TB.
D. There's not enough information to compare their