KINETIC THEORY OF GASES

(a) At a given temperature for solid liquid gas:(i) Internal kinetic energy: maximum for ------ and minimum for ------

(ii) Internal potential Energy : maximum for ------ and minimum for ------

(iii) Total Internal Energy : maximum for ------ and minimum for ------

KINETIC THEORY OF GASES

(b) At a given temperature for rared and compressed gas:

(i) Internal kinetic energy: maximum for ------ and minimum for ------

(ii) Internal potential Energy : maximum for ------ and minimum for ------

(iii) Total Internal Energy : maximum for ------ and minimum for ------

Ideal Gas at Absolute zero Temperature

v _{rms} = -----KE. of molecule = -----Internal energy of gas is ------Pressure of gas is ------Volume of gas is ------

Name of Industrial and household Gases	
To purify drinking water	
Welding	
Semiconductors	

Which of the statement is correct with reference to kinetic theory of gases ?

A. There is no loss of total kinetic energy of the molecules of the gas due to elastic collision.

B. There is no potential energy associated with any molecule of the gas

C. The molecules are moving randomly and obeys the Newton's laws of motion.

D. All of the above

Which of the following statement is not according to the postulates of kinetic theory of gases ?

- A. Gas molecules are of small size
- B. Gas molecules are always in motion with all possible velocities
- C. There is no force between the molecules
- D. None of these

In kinetic theory of gases, it is assumed that molecules -

- A. Have same mass but can have different volume
- B. Have same volume but masses can be different.
- C. Have both mass and volume different
- D. Have same mass but negligible volume.

Which of the following quantities is zero on an average for the molecules of an ideal gas in equilibrium?

- A. Kinetic energy
- B. Momentum
- C. Density
- D. Speed

Which of the following is correct:

- (a) Hydrogen is an ideal gas
- (b) Oxygen is an ideal gas
- (c) Air is an ideal gas
- (d) None of the above gases is ideal

Which is at higher temperature?



p vs V graph

An ideal gas A and a real gas B have their volumes increased from V to 2V under isothermal conditions. The increase in internal energy

(a) Will be same in both A and B(b) Will be zero in both the gases

(c) of B will be more than that of A

(d) of A will be more than that of B

Gases cool / heat when they expand and cool / heat when they compress. Why?

When some liquid evaporates, the average speed of the molecules remaining will _____.

(A) Increase because the more energetic molecules have left

(B) Decrease because the more energetic molecules have left

(C) Remain unchanged because all molecules have about the same speed

(D) Increase because there are fewer molecules

A sample of oxygen with volume of 500 cc at a pressure of 2 atm is compressed to a volume of 400 cc. What pressure is needed to do this if the temperature is kept constant?

A tank of nitrogen has a volume of 14.0 L and a pressure of 760 mm Hg. Find the volume of the nitrogen when its pressure is changed to 400 mm Hg while the temperature is held constant.

Which is high P_1 or P_2 ?



1500 ml of a gas at a room temperature of 23°C is inhaled by a person whose body temperature is 37°C, if the pressure and mass stay constant, what will be the volume of the gas in the lungs of the person?

A balloon has a volume of 2500 mL on a day when the temperature is 30 °C. If the temperature at night falls to 10 °C, what will be the volume of the balloon if the pressure remains constant?
A gas is filled in the cylinder shown in the figure. The two pistons are joined by a string. If the gas is heated, the pistons will

(a) Move towards left(b) Move towards right(c) Remain stationary(d) None of these





A sample of O_2 is at a pressure of 1 atm when the volume is 100 ml and its temperature is 27°C. What will be the temperature of the gas if the pressure becomes 2 atm and volume remains 100 ml.

A 2 L flasks contains helium gas at a pressure of 685 torr and a temperature of 0 $^{\circ}$ C. What would be the pressure in the flask if the temperature is increased to 150 $^{\circ}$ C?

A 6.00 L sample at 25.0 °C and 2.00 atm contains 0.500 mol of a gas. If we add 0.250 mol of gas at the same pressure and temperature, what is the final total volume of the gas?

A container holds three gases: oxygen, carbon dioxide, and helium. The partial pressures of the three gases are 2.00 atm, 3.00 atm, and 4.00 atm, respectively. What is the total pressure inside the container?

The partial pressure of F_2 in a mixture of gases where the total pressure is 1.00 atm is 300 torr. What is the mole fraction of F_2 ?

In a closed system, the chamber is pressurized to 1200 torr. If the chamber holds 3 moles of N_2 , 2 moles of O_2 and 1 mole of F_2 , what is the pressure of each gas?

A container holds three gases, oxygen, CO_2 , and helium. The partial pressures of the three gases are 2 atm, 3 atm and 4 atm respectively. What is the total pressure inside the container?

3 moles of N2 and 4 moles of O2 in a 35 L container at a temperature of 250C, what will be the pressure of the resulting mixture of gases be? What would be the partial pressure of each gas?

A child's helium-filed balloon escapes at sea level and 20.0 ° C. When it reaches an altitude of 3300 m where the temperature is 4.40°C and the pressure is only 0.710 atm, how will its volume compare to that at sea level?

The equation of state corresponding to 8g of O_2 is				
(a) PV = 8 RT	(b) PV = RT / 4	(c) PV = RT	(d) PV = RT / 2	

A closed container of volume 0.02 m³ contains a mixture of neon and argon gases at a temperature of 27°C and pressure of 1 x 10 ⁵ N / m². The total mass of the mixture is 28 g. If the gram molecular weights of neon and argon are 20 and 40 respectively, find the masses of the individual gases in the container, assuming them to be ideal. Given : R = 8.314 J/mol/K.

Calculate the temperature of the Sun, if density is 1.4g cm⁻³, pressure is 1.4 x 10 ⁹ atmosphere and average molecular weight of gases in the Sun in 2 gm / mole. [Given R = 8.4 J mol⁻¹K⁻¹]

At the top of a mountain a thermometer reads 7°C and barometer reads 70 cm of Hg. At the bottom of the mountain they read 27°C and 76 cm of Hg respectively. Compare the density of the air at the top with that at the bottom.

During an experiment an ideal gas is found to obey an additional law VP^2 = constant. The gas is initially at temperature T and volume V. What will be the temperature of the gas when it expands to a volume 2V?

By increasing temperature of gas by 5° C, its pressure increases by 0.5% from its initial value at constant volume, then what is initial temperature of gas?

A vessel of volume 8.0 x 10^{-3} m³ contains an ideal gas at 300 K and 200 k Pa. The gas is allowed to leak till the Pressure falls to 125 kPa. Calculate the amount of the gas leaked, assuming that the temperature remains constant.
A container contains on average 5 molecules / cm^3 . If the gas has temperature of 3 K, then its pressure will be (N / m^2).

Write state equation for 1gm of H_2 .

For He, if 4PV = RT, then calculate amount of mass of He?

A sample of argon gas is at a pressure of 1 atm. When the volume is 100 ml and the temperature is 35°C. What must its temperature if the pressure become 720 mm of Hg and its volume becomes 200 ml.

BBAN

A balloon is filled with hydrogen at a given pressure at 20°C. What fraction of gas will escape out of the balloon, if the temperature rises to 40°C at constant pressure ?

BBAN

In a certain region of space, there are only 5 molecules per cm ³ on an average. The temperature is 3 K. What is the average pressure of this very dilute gas? (Given K = $1.38 \times 10^{-23} \text{ JK}^{-1}$).

A flask is filled with 13 gm of an ideal gas at 27°C and its temperature is raised to 52°C. The mass of the gas that has to be released to maintain the temperature of the gas in the flask at 52°C and the pressure remaining the same is ---

(a) 2.5 g	(b) 2.0 g	(c) 1.5 g	(d) 1.0 g
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Air is filled at 60°C in a vessel of open mouth. The vessel is heated to a temperature T, so that 1 / 4th part of air escapes. Assuming the volume of vessel remaining constant, the value of T is

(a) 80°C (b) 444°C (c) 333°C (d) 171°C

The expansion of an ideal gas of mass m at a constant pressure P is given by the straight line D. Then the expansion of the same ideal gas of mass 2m at a pressure P/ 2 is given by the straight line



An ideal gas occupies a volume of 100cm³ at 20°C and 100 Pa.
(a) Find the number of moles of gas in the container
(b) How many molecules are in the container?

Find the volume in mL, when 7 g of O_2 and 1.5 g of CI_2 are mixed in a container with a pressure of 482 atm and at a temperature of 22 $^{\circ}C$.

At 25°C and 760 mm of Hg pressure a gas occupies 600 mL volume. What will be its pressure at a height, where temperature is 10°C and volume is 640 mL.

An ideal gas of molecular weight M_0 is filled in a tube of length L and area of cross section A. find pressure P at a distance x from one end where pressure is P_0 ; if temperature is constant.

