	INDIAN SCHOOL AL WADI AL KABIR	
Class: XI	**Department: SCIENCE 2022 – 23** **SUBJECT - PHYSICS**	**Date of submission: 10.02.2023**
Worksheet No: 12 WITH ANSWERS	**CHAPTER: KINETIC THEORY**	**Note:** **A4 FILE FORMAT**
Name of the student:	**CLASS / SECTION :**	**Roll No:**

OBJECTIVE TYPE QUESTIONS

[1] State the number of degree of freedom possessed by a monoatomic molecule in Space
[a]2 [b.]3 [c]6
[b]

[2] State the number of degree of freedom possessed by a diatomic molecule in Space
[a]4 [b.]5 [c]6
[b]

[3] Perfect gas equation is
[a.] PV = μRT [b] P/V = μRT [c] P = μRT v
[a]

Define the following:

[4] Mean free path
It is the average distance travelled by a molecule between two successive collision

[5]What is an ideal gas
A gas that satisfies the equation, PV =μRT at all temps& pressures are said to be an ideal gas

[6]State any two characteristics of an ideal gas

1. The size of the gas molecules is negligibly small.
2. There is no force of attraction amongst the molecules of the gas.

[7]Define Molar specific heat capacity at constant pressure [C_P]

[8]Define Molar specific heat capacity at constant volume [C_v]

[9]Write any 3 postulates of kinetic theory of an ideal gas

[10]C_P is greater than C_V .Why?

Extra amount of heat is taken by the gas to perform work.

[11] State law of equipartition of energy:

For a dynamic system in thermal equilibrium, the total energy of the system gets equally divided amongst its various degrees of freedom and the energy associated with each degree of freedom per molecule is $\frac{1}{2}K_B T$

Long type questions

[12] Obtain the ratio of specific heat capacity of a monoatomic Gas, $\gamma = \frac{C_P}{C_V}$

[13] Obtain the ratio of specific heat capacity of a diatomicatomic Gas, $\gamma = \frac{C_P}{C_V}$

[14] Two cylinders A and B of equal capacity are connected to each other via a stopcock. A contains a gas at standard temperature and pressure. B is completely evacuated. The entire system is thermally insulated. The stopcock is suddenly opened. Answer the following:

(a) What is the final pressure of the gas in A and B ?

(b) What is the change in internal energy of the gas?

(c) What is the change in the temperature of the gas?

Answer: (a) Since the final temperature and initial temperature remain the same,

∴ $P_2V_2 = P_1V_1$

But $P_1 = 1$ atm, $V_1 = V$, $V_2 = 2V$ and $P_2 = ?$

∴ $P_2 = \frac{P_1V_1}{V_2} = \frac{1 \times V}{2V} = 0.5$ atm

(b) Since the temperature of the system remains unchanged, change in internal energy is zero.

(c) The system being thermally insulated, there is no change in temperature (because of free expansion)

PREPARED BY: MR. WILLIAM	CHECKED BY: HOD - SCIENCE