Department of Physics,
Mugberia Gangadhar Mahavidyalaya

1st Assignment

Introduction to Thermodynamics (Basics of Kinetic Theory & Thermodynamic Description of system)

1. Write the Postulates of molecular kinetic theory of an ideal gas.
2. What would be the greatest effect on the ideal gas law if there is a slight attractive force between the molecules?
3. Using the Berthelot equation of state,

$$P = \frac{RT}{v-b} - \frac{a}{Tv^2},$$

show that $v_C = 3b$, $T_C = \sqrt{\frac{8a}{27bR}}$, and $P_C = \frac{1}{12b}\sqrt{\frac{2aR}{3b}}$. (

4. Draw V-T and p-T diagrams for a perfect gas undergoing (i) isobaric expansion and (ii) isothermal compression.
5. What do you mean by intensive and extensive thermodynamic variables? Provide appropriate examples.
6. Write the Zeroth Law of Thermodynamics and explain how the concept of temperature arises from it.
7. Consider a closed system undergoing a thermodynamic process. Explain how you would determine the work done and heat exchanged during the process. Use relevant equations and explain the physical significance of each term.