Brain International School
Vikas Puri, New Delhi

ASSIGNMENT NO. 6

SUBJECT: PHYSICS **CLASS-XI** **DEC,2025**

CH: 10 Thermal properties of Matter

1. What is meant by coefficient of linear expansion, superficial expansion and cubical expansion? derive the relation between them.
2. Prove that the coefficient of cubical expansion of an ideal gas at constant pressure is equal to the reciprocal of its absolute temperature.
3. Define coefficient of thermal conductivity. Write its S.I unit.
4. A copper block of mass 2.5 kg is heated in a furnace to a temperature of 500 °C and then placed on a large ice block. What is the maximum amount of ice that can melt? (Specific heat of copper = 0.39 J g^{-1} K^{-1}; heat of fusion of water= 335 J g^{-1}).
5. State Wein's displacement law.
6. In an experiment on the specific heat of a metal, a 0.20 kg block of the metal at 150 °C is dropped in a copper calorimeter (of water equivalent 0.025 kg) containing 150 cm^3 of water at 27 °C. The final temperature is 40 °C. Compute the specific heat of the metal.

CH: 11 Thermodynamics

7. Zeroth law of thermodynamics.
8. First law of thermodynamics.
9. Second law of thermodynamics.
10. Derive and expression for work done in an isothermal process by an ideal gas.
11. Derive a formula for the work done by an ideal gas in an adiabatic process.
12. Derive a relation between two principle specific heats of a gas or derive Mayer's formula.
13. Show that slope in adiabatic process is γ times the slope in isothermal process.

CH: 12 Kinetic Theory

14. Derive an expression for the pressure due to an ideal gas.
15. Kinetic interpretation of temperature.
16. State the law of equipartition of energy.
17. Defines degree of freedom. Calculate the degrees of freedom of monoatomic, diatomic and triatomic gas molecules.
18. What is meant by mean free path of a gas molecule? Derive an expression for it. On which factors does it depend?