UNIT- 7 – THERMODYNAMICS

I. Answer in brief (2/3 marks)

1. Define molar heat capacity. Give its unit.
2. Define is Gibb's free energy.
3. Define enthalpy of combustion.
4. Define enthalpy of neutralization.
5. What is lattice energy?
6. Define the calorific value of food. What is the unit of calorific value?
7. What are state and path functions? Give two examples.
8. Give Kelvin statement of second law of thermodynamics.
9. The equilibrium constant of a reaction is 10, what will be the sign of ΔG? Will this reaction be spontaneous?
10. Enthalpy of neutralization is always a constant when a strong acid is neutralized by a strong base: account for the statement.
11. State the third law of thermodynamics.

II. Answer in a paragraph (5 marks)

1. Write down the Born-Haber cycle for the formation of $CaCl_2$.
2. State the various statements of second law of thermodynamics.
3. What are spontaneous reactions? What are the conditions for the spontaneity of a process?
4. Identify the state and path functions out of the following:

   a) Enthalpy b) Entropy c) Heat d) Temperature e) Work f) Free energy.

5. List the characteristics of internal energy.
6. Explain how heat absorbed at constant volume is measured using bomb calorimeter with a neat diagram.
7. Calculate the work involved in expansion and compression process.
8. Derive the relation between ΔH and ΔU for an ideal gas. Explain each term involved in the equation.
9. List the characteristics of Gibbs free energy.