Board – CBSE	Class – 11th	Topic – Thermodynamics

1. Derive the mathematical expression for 1st law of thermodynamics and state its limitations.

2. Express the change in internal energy of a system when
   a) No heat is absorbed by the system from the surroundings, but work (w) is done on the system. What type of wall does the system have?
   b) No work is done on the system, but q amount of heat is taken out from the system and given to the surroundings. What type of wall does the system have?

3. Define molar heat capacity.

4. Explain the thermodynamic equilibrium?

5. State the Hess's Law of constant heat summation?

6. What is Gibbs's Helmholtz equation?

7. Why does entropy of a solid increase on fusion?

8. What are intensive and extensive properties? Give two examples of each.

9. Derive the relation between ΔH and ΔU.

10. Is the bond energy of all the four C-H bonds in CH_4 molecule equal? If not why?

11. What do you understand by spontaneity?

12. Calculate the entropy change involved in conversion of one mole (18 g) of solid ice at 273K to liquid water at the same temperature (latent heat of fusion = 6025 J mol^{-1})

13. Two moles of an ideal gas initially at 27°C and one atmospheric pressure are compressed isothermally and reversibly till the final pressure of the gas is 10 atm. Calculate q, w and U for the process.

14. The heat liberated on complete combustion of 7.8 g benzene is 327 kJ. The heat has been measured at constant volume at 27^{0}C. Calculate the heat of combustion of benzene at constant pressure. (R= 8.314 JK^{-1} mol^{-1})

15. Calculate the $\Delta_f H^0$ for the reaction
    $$H_2 \ (g) + \ Br_2 \ (g) \rightarrow \ 2HBr(g)$$
    Bond enthalpy are given as: H – H = 436 kJ mol^{-1} , Br – Br = 192 kJ mol^{-1} ,
    H – Br =368 kJ mol^{-1}

16. Enthalpy and entropy changes of reaction are 40.63°kJ mol^{-1} and 108.8 JK^{-1} mol^{-1} respectively. Predict the feasibility of the reaction at 27° C.

17. Does an aqueous solution of Mg^{2+} ions have larger entropy before or after hydration of ions?

18. Lifting of water to the top of a hill is quite possible. Why can't this be considered as a spontaneous process?

19. Define a system. What are open, closed and isolated systems? Give examples.

20. Define Enthalpy change of a reaction or heat of reaction?