DEPARTMENT OF CHEMISTRY

SHYAM LAL COLLEGE , (University of delhi)

Physical Chemistry Assignments, B.Sc.Phy. Sc.(CBCS) IInd Semester

By : Dr. Vinod Kumar

1. State and Explain the first Law of Thermodynamics.
2. State Zeroth Law of Thermodynamics.
3. Why $\mathbf{C_P}$ is always greater than $\mathbf{C_V}$?
4. What are the limitations of first law of thermodynamics? Define the second law of thermodynamics.
5. At absolute zero, the entropy of all pure elements and compounds is zero. Explain.
6. What is the difference between equilibrium constants K_P and K_C ? Show how the two are related? Explain the units of K_P and K_C.
7. Show that $\Delta G^0 = -RT \ln K$.
8. State and explain Lechatelier's principle.
9. What would be the pH of a 0.1 molar sodium acetate solutions when the dissociation constant for acetic acid is 1.8×10^{-5}?
10. Derive Henderson equation to calculate the pH of a buffer solution.
11. Show that for an aqueous solution of a salt of a weak base and strong acid $pH= -\log \sqrt{K_W C/K_b}$.
12. Explain ,why an aqueous solution of $CuSO_4$ is acidic and that of NaCl is neutral?
13. Write the solubility product expression for the ionic compound $A_X B_y$.
14. How can we predict whether a precipitate will form when two solutions are mixed?
15. A sample of 25ml of 0.10M $Ba(NO_3)_2$ is added to 25ml of 0.010M Na_2CO_3. Will $BaCO_3$ precipitate? $K_{sp} = 8.1 \times 10^{-9}$.