



Satyaniketans

**Adv. M. N. Deshmukh Arts, Science and Commerce  
College Rajur**

Department of Chemistry

**FYBSc Sem- I**

Chemistry Paper I (Physical Chemistry)

**Tutorial No- 2**

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**Que- Solve the following**

- 1) Calculate the hydrogen ion concentration of a solution whose pOH is 8.6.
- 2) The degree of ionization of 0.1 M monobasic weak acid is 0.130.  
Calculate the pH of solution and  $pK_a$  of monobasic weak acid.
- 3) A buffer solution containing 0.25 M acetic acid and 0.50 M sodium acetate. Calculate the pH of buffer solution, if ionization constant of acetic acid at room temperature is  $1.82 \times 10^{-5}$ .
- 4) Calculate the hydrolysis constant, degree of hydrolysis and pH of 0.001 M ammonium chloride at  $25^\circ\text{C}$ . (Given:  $K_b = 1.8 \times 10^{-5}$  and ionic product of water at  $25^\circ\text{C}$ ,  $K_w = 1.0 \times 10^{-14}$ )
- 5) Calculate  $\Delta H^0$  for the reaction  $\text{CO}_2(\text{g}) + \text{H}_2(\text{g}) \longrightarrow \text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g})$  given the  $\Delta H_f^0$  for  $\text{CO}_2(\text{g})$ ,  $\text{CO}(\text{g})$  and  $\text{H}_2\text{O}(\text{g})$  are -393.5, -111.3 and -241.8 kJ  $\text{mol}^{-1}$  respectively.
- 6) Calculate the heat of formation of HCl at 348 K from the following data:



The mean heat capacities over this temperature range are

$$\text{H}_2(\text{g}); \quad C_p = 28.53 \text{ JK}^{-1}\text{mol}^{-1}$$

$$\text{Cl}_2(\text{g}); \quad C_p = 32.26 \text{ JK}^{-1}\text{mol}^{-1}$$

$$\text{HCl}(\text{g}); \quad C_p = 28.49 \text{ JK}^{-1}\text{mol}^{-1}$$