Daily Tutorial Sheet-1	Level-1

1.(B) $C_1\alpha_1^2 = C_2\alpha_2^2$

$0.1\times10^{-4} = 2.5\times10^{-2}\times\alpha_2^2$

$4\times10^{-4} = \alpha_2^2 \quad \Rightarrow \quad \alpha_2 = 2\times10^{-2} \quad \Rightarrow \quad$ % ionization = 2 %

2.(A) Acid is H^+ donor.

3.(A) $[H^+] = \sqrt{K_aC} \quad \Rightarrow \quad K_{a_1}C_1 = K_{a_2}C_2$

$1.8\times10^{-4}\times10^{-3} = 1.8\times10^{-5}\times C_2 \quad \Rightarrow \quad C_2 = 10^{-2}$

4.(C) $A_xB_y \rightleftharpoons xA^{y+} + yB^{x-}$

t = 0	C	0	0
$t = t_{eq}$	$C(1-\alpha)$	$xC\alpha$	$yC\alpha$

$$K_{eq} = \frac{(xC\alpha)^x(yC\alpha)^y}{C(1-\alpha)} \quad \text{where } 1-\alpha \approx 1 \quad \Rightarrow \quad \alpha = \left(\frac{K_{eq}}{C^{x+y-1}x^xy^y}\right)^{\frac{1}{x+y}}$$

5.(A) Due to common ion effect dissociation of weak electrolyte is suppressed

6.(B) Weaker electrolytes ionize feebly

7.(B) Lower the value of K_b ; weaker is the base

8.(A) $[H^+] = 10^{-5} = \sqrt{K_aC} \quad \Rightarrow \quad K_a = 10^{-10}$

9.(D) pH is nearest to 7 (will be slightly more than 7)

10.(B) On increasing temperature ionisation of water increases

$\Rightarrow$ $[H^+]$ increases and hence pH decreases

11.(A) The solution is slightly basic because concentration of NaOH is too low. The concentration of OH^- is contributed not only from NaOH but also from water.

12.(C) $pH = 14 - pOH = 14 + \log\left[OH^-\right] = 14 + \log\dfrac{50\times10^{-3}\times2}{100} = 11$

13.(D) $HX \rightleftharpoons H^+ + X^-$

If, $HX \rightarrow$ acid

then, $X^- \rightarrow$ conjugate base

14.(B) $pH = -\log\left[H^+\right] = -\log(0.005\times2) = 2$

15.(C) $pH = \dfrac{1}{2}(pK_a - \log C)$

$2 = \dfrac{1}{2}(pK_a + 1) \quad \Rightarrow \quad K_a = 10^{-3} \quad \Rightarrow \quad \alpha = \sqrt{\dfrac{K_a}{C}} = 0.1$