Daily Tutorial Sheet-2	Level-1

16.(C) $K_a = K_{a_1} \times K_{a_2} = 5 \times 10^{-15}$

17.(A) NaCl is neutral salt (salt of strong acid HCl & strong base NaOH). Hence pH of its solution is always 7 irrespective of its conc.

18.(D) meq of base (10×0.1) > meq of acid (10×0.05) ; Hence pH > 7.

19.(D) Milli moles of $[H^+]$ = 2, Milli moles of $[OH^-]$ = 3

$$pH = 14 + \log [OH^-] = 14 + \log \frac{1}{500} = 14 - \log 500 = 11.3$$

20.(C) Final $(H^+) = \dfrac{100 \times 0.015 + 100 \times 0.005}{200} = 0.01M \quad \Rightarrow \quad pH = 2$

21.(C) $pOH = \dfrac{1}{2}\left(pK_b - \log C\right)$

$$\alpha = \sqrt{\frac{K_b}{C}} = \sqrt{\frac{2 \times 10^{-5}}{10^{-3}}} = 0.14142 \ (> 0.05)$$

So, we can not use the standard formula. Solve for α .

$K_b = \dfrac{C\alpha^2}{1-\alpha}$ and then use $pOH = -\log(C\alpha)$

22.(A) Combination of strong acid and neutral salt is not a buffer

23.(A) Adding CH_3COONa to CH_3COOH will suppress dissociation of acetic acid, resulting in decrease in $[H^+]$ and hence pH increases

24.(D) $pH = pK_a + \log\left[\dfrac{\text{conjugate base}}{\text{weak acid}}\right]$

25.(D) This is a case of hydrolysis of salt of weak acid and strong base

26.(D) Basic buffer has pH > 7

27.(D) Buffer capacity is maximum when $[\text{Conjugate base}] = [\text{Weak acid}]$

28.(D) $pH = 14 - \left(pK_b + \log \dfrac{[salt]}{[base]}\right) = 14 - \left(5 + \log \dfrac{1}{0.1}\right) = 8$

29.(B) Na_2CO_3 on hydrolysis will give NaOH and H_2CO_3. Resultant solution will be basic.

30.(D) Salt of weak acid & strong base HCOONa, KCN is basic. Salt of strong acid & weak base $C_6H_5\overset{+}{N}H_3Cl^-$ is acidic.