

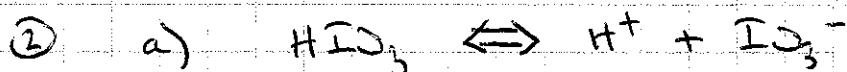
Weak Bases

$$\textcircled{1} \quad K_w = K_a \cdot K_b$$

$$1 \times 10^{-14} = K_a (1.7 \times 10^{-6})$$

$$K_a = \frac{1 \times 10^{-14}}{1.7 \times 10^{-6}}$$

$$K_a = \boxed{5.9 \times 10^{-9}}$$

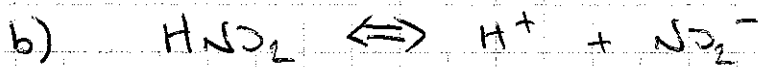


$$K_a = 1.7 \times 10^{-1}$$

$$K_w = K_a \cdot K_b$$

$$1 \times 10^{-14} = 1.7 \times 10^{-1} K_b$$

$$K_b = \boxed{5.9 \times 10^{-14}}$$

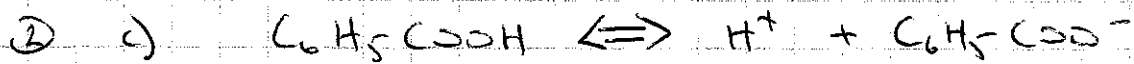


$$K_a = 5.1 \times 10^{-4}$$

$$K_w = K_a \cdot K_b$$

$$1 \times 10^{-14} = 5.1 \times 10^{-4} K_b$$

$$K_b = \boxed{1.96 \times 10^{-11}}$$

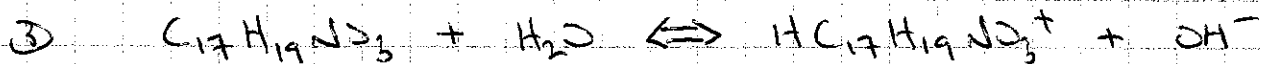


$$K_a = 6.6 \times 10^{-5}$$

$$K_w = K_a \cdot K_b$$

$$1 \times 10^{-14} = 6.6 \times 10^{-5} K_b$$

$$K_b = \boxed{1.5 \times 10^{-10}}$$



I	0.01	-	0	0
C	-x	-	+x	+x
E	0.01-x	-	x	x

$$K_b = \frac{[\text{HC}_{17}\text{H}_{19}\text{NO}_3^+][\text{OH}^-]}{[\text{C}_{17}\text{H}_{19}\text{NO}_3]}$$

$$7.5 \times 10^{-7} = \frac{(x)(x)}{(0.01-x)}$$

$$7.5 \times 10^{-7} = \frac{x^2}{0.01}$$

$$x = 8.66 \times 10^{-5}$$

$$[\text{OH}^-] = 8.66 \times 10^{-5} \text{ mol/L}$$

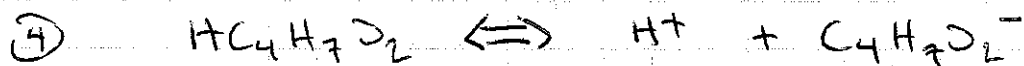
$$\text{pOH} = -\log(8.66 \times 10^{-5})$$

$$= 4.06$$

$$\text{pH} = 14 - \text{pOH}$$

$$= 14 - 4.06$$

$$\text{pH} = \boxed{9.94}$$



I	0.3	0	0
C	-x	+x	+x
E	0.3-x	x	x

$$K_a = \frac{[\text{H}^+][\text{C}_4\text{H}_7\text{O}_2^-]}{[\text{HC}_4\text{H}_7\text{O}_2]}$$

$$1.52 \times 10^{-5} = \frac{(x)(x)}{0.3-x}$$

$$1.52 \times 10^{-5} = \frac{x^2}{0.3}$$

$$x = 0.00214$$

$$[\text{H}^+] = \boxed{0.00214 \text{ mol/L}}$$

$$\text{pH} = -\log(0.00214)$$

$$\text{pH} = \boxed{2.67}$$



I	0.001	-	0	0
C	-x	-	+x	+x
E	0.001 - x	-	x	x

$$K_b = \frac{[\text{HC}_{21}\text{H}_{22}\text{N}_2\text{O}_2^+][\text{OH}^-]}{[\text{C}_{21}\text{H}_{22}\text{N}_2\text{O}_2]}$$

$$1 \times 10^{-6} = \frac{(x)(x)}{(0.001-x)}$$

$$1 \times 10^{-6} = \frac{x^2}{0.001}$$

$$x = 3.16 \times 10^{-5}$$

$$[\text{OH}^-] = 3.16 \times 10^{-5} \text{ mol/L}$$

$$\begin{aligned} \text{pOH} &= -\log(3.16 \times 10^{-5}) \\ &= 4.5 \end{aligned}$$

$$\text{pH} = 14 - \text{pOH}$$

$$= 14 - 4.5$$

$$\text{pH} = \boxed{9.5}$$