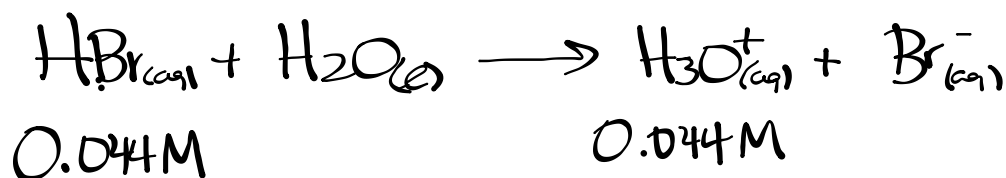
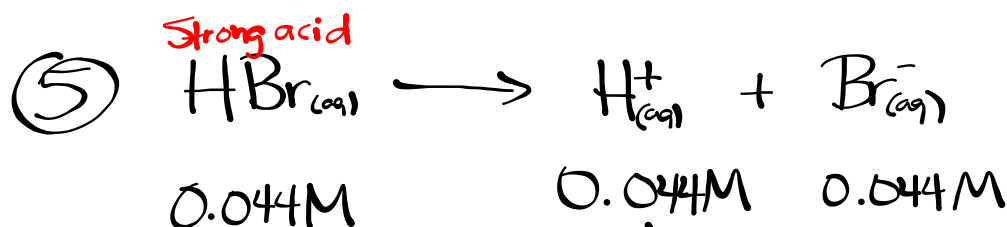
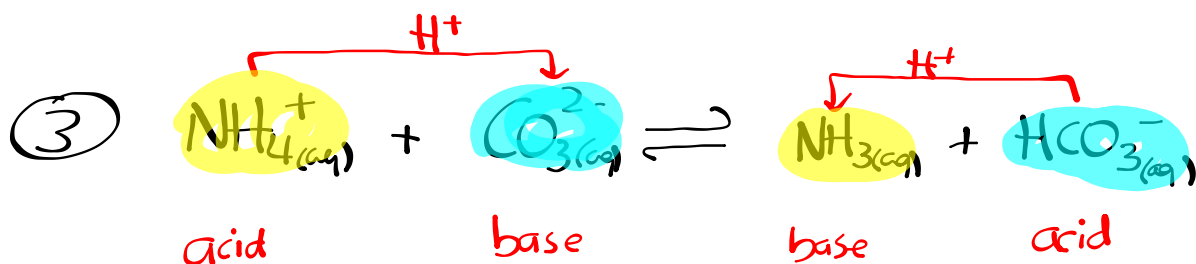


## Worksheet



$$\text{pH} = -\log[\text{H}_3\text{O}^+]$$

$$\text{pH} = -\log[0.044]$$

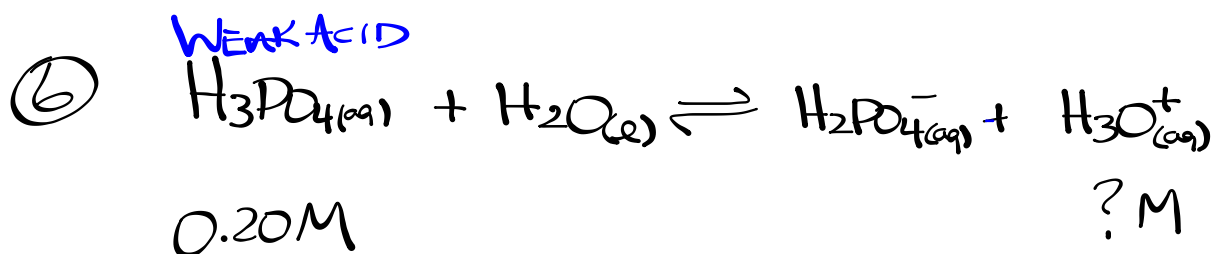
$\text{pH} = 1.36$

$$\text{pH} + \text{pOH} = 14.00$$

$$\text{pOH} = 14.00 - 1.36$$

$\text{pOH} = 12.64$

pOH = ?



$$K_a = \frac{[\text{H}_2\text{PO}_4^-][\text{H}_3\text{O}^+]}{[\text{H}_3\text{PO}_4]}, \quad [\text{H}_2\text{PO}_4^-] = [\text{H}_3\text{O}^+]$$

$$K_a = \frac{[\text{H}_3\text{O}^+]^2}{[\text{H}_3\text{PO}_4]}$$

$$7.1 \times 10^{-3} = \frac{[\text{H}_3\text{O}^+]^2}{0.20}$$

$$[\text{H}_3\text{O}^+] = \sqrt{(7.1 \times 10^{-3})(0.20)}$$

$$[\text{H}_3\text{O}^+] = 0.038 \text{ M}$$

$$\text{pH} = -\log[\text{H}_3\text{O}^+]$$

$$\text{pH} = -\log[0.038]$$

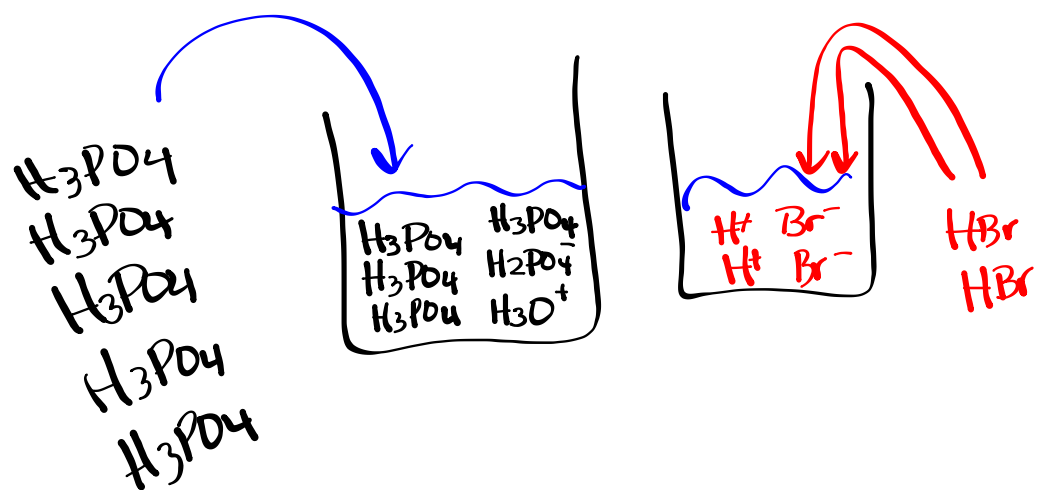
$$\text{pH} = 1.42$$

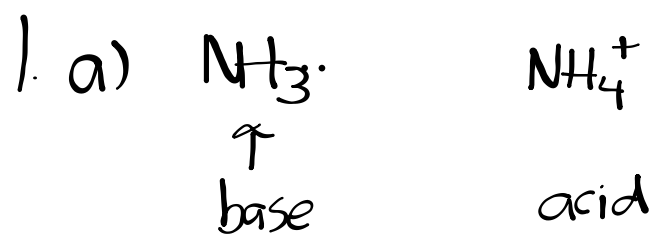
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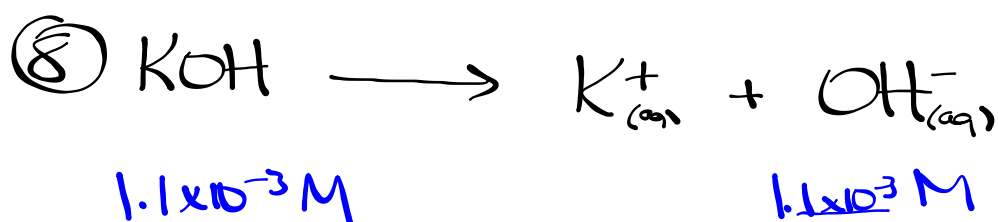

$$\text{pH} + \text{pOH} = 14.00$$

$$\text{pOH} = 14.00 - 1.42$$

$$\boxed{\text{pOH} = 12.58}$$







$$V = 980. \text{ mL}$$

$$\checkmark \text{ pH} = 11.05$$

$$\text{pH} + \text{pOH} = 14.00$$

$$\text{pOH} = 14.00 - 11.05$$

$$\underline{\text{pOH} = 2.95}$$

$$[\text{OH}^{-}] = 10^{-\text{pOH}}$$

$$[\text{OH}^{-}] = 10^{-2.95}$$

$$[\text{OH}_{(\text{aq})}^{-}] = 1.1 \times 10^{-3} \text{ M}$$

$$C = \frac{n}{V}$$

$$n = C \times V$$

$$n = (1.1 \times 10^{-3} \text{ mol/L}) \times 0.980 \text{ L}$$

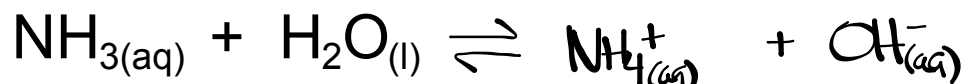
$$n = 0.001078 \text{ mol}$$

$$0.001078 \text{ mol KOH} \times \frac{56.11 \text{ g KOH}}{1 \text{ mol KOH}} = \boxed{0.062 \text{ g KOH}}$$

## Weak Bases

Weak bases react with water to form the hydroxide ion and conjugate acid of the base.

WEAK BASE



0.076 M

base dissociation constant

$$K_b = \frac{[\text{NH}_4^+(\text{aq})][\text{OH}^-(\text{aq})]}{[\text{NH}_3(\text{aq})]}, \quad [\text{NH}_4^+(\text{aq})] = [\text{OH}^-(\text{aq})]$$

$$K_b = \frac{[\text{OH}^-(\text{aq})]^2}{[\text{NH}_3(\text{aq})]}$$

$$[\text{OH}^-(\text{aq})] = \sqrt{(4.72 \times 10^{-5})[0.076]}$$

$$[\text{OH}^-(\text{aq})] = 1.1 \times 10^{-3} \text{ M}$$

$$K_a K_b = K_w$$

$$K_b = \frac{K_w}{K_a} = \frac{1.0 \times 10^{-14}}{5.8 \times 10^{-10}}$$

$$K_b = 1.72 \times 10^{-5}$$

$$K_a K_b = K_w$$

$$K_b = \frac{K_w}{K_a}$$