<u>CONCEPT:</u> BUFFERS

Solutions which contain a _____ acid and its _____ base are called *buffer solutions* because they resist drastic changes in pH.

- They resist drastic changes in pH by keeping _____ and _____ constant.

- Adding a small amount of **STRONG BASE** and, the pH _____, but not by much because the _____ neutralizes the **STRONG BASE** added.

- Adding a small amount of **STRONG ACID** and, the pH _____, but not by much because the _____ neutralizes the **STRONG ACID** added.

PRACTICE: Which one of the following combinations does not create a buffer?

a) $HC_2H_3O_2$ and $K\ C_2H_3O_2$

b) H_2SO_3 and $NaHSO_3$

c) H_3PO_4 and NaH_2PO_4

d) HNO_3 and KNO_3

e) NH_4Cl and NH_3

PRACTICE: Which of the following combinations can result in the formation of a buffer?

a) HF and HI

b) $HC_2H_3O_2$ and NH_3

c) $CH_3CH_2NH_2$ and $CH_3CH_2NH_3^+$

d) $NaCl$ and $NaOH$

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Creating a Buffer

There are 3 ways to form a buffer:

1) Mixing a _____ acid and its _____ base.

2) Mixing a _____ acid and a _____ base.

3) Mixing a _____ acid and a _____ base.

EXAMPLE: Which of the following combinations can result in the formation of a buffer?

a) 0.01 moles HClO (hypochlorous acid) and 0.05 moles of NaOH.

b) 0.01 moles HClO (hypochlorous acid) and 0.05 moles of HCl.

c) 0.01 moles HClO (hypochlorous acid) and 0.05 moles of NH_3.

d) 0.01 moles HClO (hypochlorous acid) and 0.001 moles of NaOH

<u>CONCEPT:</u> BUFFERS

PRACTICE: Which of the following combinations can result in the formation of a buffer?

    a)   50 mL of 0.10 M HF with 50 mL of 0.10 M NaOH.

    b)   50 mL of 0.10 M HNO_2 with 25 mL of 0.10 M $Ca(OH)_2$.

    c)   50 mL of 0.10 M CH_3CO_2H with 60 mL of 0.10 M NaOH.

    d)   50 mL of 0.10 M HF with 30 mL of 0.10 M NaOH.

PRACTICE: A buffer solution is comprised of 50.0 mL of a 0.100 M $HC_2H_3O_2$ and 60.0 mL of a 0.100 M $NaC_2H_3O_2$. Which of the following actions would completely destroy the buffer?

    a) Adding 0.003 mol $HC_2H_3O_2$

    b) Adding 0.007 mol $Ca(C_2H_3O_2)_2$

    c) Adding 0.005 mol NaOH

    d) Adding 0.004 mol HCl

    e) Adding 0.001 mol HCl