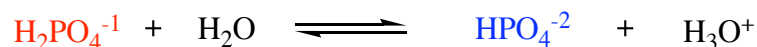


EXAMPLES OF BUFFER PREPARATION

Acid	pK _a	Base	pK _b
phosphoric	2.12	triethylamine	2.99
pyruvic	2.49	ethylamine	3.19
lactic	3.86	dimethylamine	3.27
benzoic	4.19	methylamine	3.44
acetic	4.75	trimethylamine	4.19
carbonic	6.37	ammonia	4.75
dihydrogen phosphate	7.21	TRIS	5.92
hydrogen carbonate	10.3	pyridine	8.75
hydrogen phosphate	12.7	aniline	9.37

1. Prepare a 0.100 M buffer solution at pH 7.00.

Use dihydrogen phosphate and its conjugate base (hydrogen phosphate) since its pK_a is closest to desired pH.



$$\% \text{ base} = \frac{10^{(7.00-7.21)}}{1 + 10^{(7.00-7.21)}} \times 100\% = 38 \%$$

$$[\text{base}] = 0.100 \text{ M} \times 0.38 = 0.038 \text{ M} \quad [\text{acid}] = 0.100 \text{ M} \times 0.62 = 0.062 \text{ M}$$

Then prepare a solution with each of these molarities using NaH₂PO₄ and Na₂HPO₄.

2. Prepare a 0.05 M buffer solution at pH 8.00.

Use TRIS·H⁺ and its conjugate base (TRIS) since its pK_a is closest to desired pH.

$$\% \text{ base} = \frac{10^{(8.00-8.08)}}{1 + 10^{(8.00-8.08)}} \times 100\% = 45 \%$$

$$[\text{base}] = 0.050 \text{ M} \times 0.45 = 0.0225 \text{ M} \quad [\text{acid}] = 0.050 \text{ M} \times 0.55 = 0.0275 \text{ M}$$