Lecture II

PROBLEM 1: PREPARATION OF A BUFFER SOLUTION AND TEST

1) Prepare a Buffer Solution

Calculate the pH of a buffer solution prepared by dissolving 0.1 mole of cyanic acid, HCNO, and 0.5 mole of sodium cyanate, NaCNO, in enough water to make 0.5 L of solution. For HCNO, $K_a=2.0x10^{-4}$.

2) Add a strong base to a Buffer Solution. Will the pH change?

Calculate the pH of the buffer solution after 0.02 mole of NaOH has been added to it.

PROBLEM 2 (BUFFER SOLUTION FOR DNA/RNA)
How much Tris-Acetate-EDTA (TE buffer) stock buffer (3.25 M) is required to make 400 ml of solution that has a concentration of 250 mM? How much water?

PROBLEM 3 (BUFFER SOLUTION FOR PROTEINS)
You wish to make 3 reactions [redacted] with the specified amounts of protein. The remainder of each reaction consists entirely of buffer. The source of your protein is a stock solution that has a concentration of 0.5 mg/ml. What is the volume of stock solution required for each reaction (column 3). What is the volume of buffer required (column 4)?

Reaction number	Amount of protein (μg)	Volume of protein solution (μl) required	Volume of buffer solution (μl) required	Final Volume (ml)
1	2			1
2	25			2.5
3	100			4