Laboratory Report

Reaction Well	1	2	3	4	5
Solution	Blank Sample Distilled Water	Test Sample A Skim Milk	Test Sample B Skim Milk	Test Sample C Skim Milk	Reference CaCl₂
Initial color with HNB indicator					
Number of drops of EDTA added					
Corrected volume of EDTA	—				
Millimoles of calcium	—				
Milligrams of calcium	—				

1. For each sample in wells 2–5, subtract the number of drops of EDTA added to the "blank" from the number of drops of EDTA added to each test or reference solution, respectively. This is the "corrected volume of EDTA" required to titrate the calcium in each test or reference sample. Record the results in the table.

2. Use the following equation to calculate the number of millimoles of calcium ion present in each test and reference solution, respectively. Record the results in the table. **Note:** The equation assumes that 25 drops of EDTA solution are equal to 1 mL.

$$\begin{bmatrix} \text{Millimoles} \\ \text{of calcium} \end{bmatrix} = \begin{bmatrix} \text{Corrected volume} \\ \text{of EDTA added} \\ \text{(drops)} \end{bmatrix} \times \begin{bmatrix} \dfrac{1\ \text{mL}}{25\ \text{drops}} \end{bmatrix} \times \begin{bmatrix} \text{Molarity of EDTA} \\ \text{(millimoles/mL)} \end{bmatrix}$$

3. Use the atomic mass of calcium to calculate the number of milligrams of calcium present in each test and reference solution, respectively. Record the results in the table. **Hint:** The units for atomic mass are grams per mole, which can also be expressed as milligrams per millimole.

4. Based on the number of milligrams of calcium in 1.0 mL of each test solution A, B, C, calculate the amount of calcium in milligrams that would be present in one cup (240 mL) of skim milk. Report both the individual values for the three samples and the mean (average value).

5. Calculate the average deviation from the mean for test samples A, B and C.

6. Report the amount of calcium in one cup of milk in the following form: **(mean) ± (average deviation)**. Don't forget the units and the number of significant figures.

7. The average deviation is an indicator of the precision of an experimental procedure. Comment on the precision of your results and sources of experimental error that affect the precision.

8. The federal government has set a Recommended Daily Allowance (RDA) for calcium of 1200 mg per day for adolescents and young adults. Based on your results, what percent of the daily requirement would one cup of milk provide? Compare this result with the value reported on the **Nutrition Facts** label for the carton of skim milk.

9. Accuracy is determined by comparing the results obtained for the reference sample versus its actual or known value. The amount of calcium in the reference solution (0.050 M $CaCl_2$) is 2.0 mg per mL. Comment on the accuracy of this method for determining the amount of calcium in a sample.