LAD F2 **Molarity and Dilution** Name_____

Procedure A: Preparing solutions from a solid:

Prepare a 0.35 M sodium carbonate solution using the solid sodium carbonate and the volumetric flask you have been given. Write out a brief bulleted **procedure** in the space below. Below your procedure clearly present any formulas and calculations used. When your solution is complete, transfer the solution to the large beaker on the center lab bench. Rinse your flask and continue with Procedure B.

Calculations *(Clearly presented.)*

Lab Procedure

(Not a calculation explanation, you've shown that already to the left, a lab procedure. These bullets are only a suggestion, you may need more or less than provided.)

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Procedure B: Preparing dilute solutions from stock solutions:

Prepare a 0.185 M $CoCl_2$ solution using the 3.0 M stock solution of $CoCl_2$ and the volumetric flask you have been given. Rinse out your volumetric flask from the first procedure. Write out a brief bulleted **procedure** in the space below. Below your procedure clearly present any formulas and calculations used. Transfer some of your solution to the appropriate test tube (correct group #) on the center lab bench. Leave the remainder of your solution in the flask, on your tray.

Calculations *(Clearly presented.)*

Lab Procedure

(Not a calculation explanation, you've shown that already to the left, a lab procedure. These bullets are only a suggestion, you may need more or less than provided.)

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1. For Procedure A, compared to the 0.35 M sodium carbonate solution that you were attempting to prepare, would the *actual molarity* of the solution you prepared be larger, smaller, or no different if

   a) you calculated the molar mass of sodium carbonate using the formula $NaCO_3$ instead of the correct formula? *Justify.*

$$Measured\ Mass = M \times Vol\ of\ Flask \times MM(g)$$

   b) you were weighing out your salt, and some if it landed on the balance pan, but not in your weighing dish? *Justify*.

$$\frac{Actual\ mass \times \frac{1mol}{MMg}}{Vol\ of\ Solution\ in\ Flask} = M$$

   c) you filled your volumetric flask to the top, beyond the line on the neck of the flask? *Justify.*

$$\frac{Actual\ mass \times \frac{1mol}{MMg}}{Vol\ of\ Solution\ in\ Flask} = M$$

   d) you did not tare the balance after you set the weighing dish on the balance? *Justify.*

$$\frac{Actual\ mass \times \frac{1mol}{MMg}}{Vol\ of\ Solution\ in\ Flask} = M$$

   e) a small rubber stopper had fallen into your flask before you started your lab procedure, and you couldn't get it out, so you decided to move on and proceed as if it weren't even there? *Justify.*

$$\frac{Actual\ mass \times \frac{1mol}{MMg}}{Vol\ of\ Solution\ in\ Flask} = M$$

   f) some of the salt stuck to the weighing dish and did not get into the volumetric flask? *Justify.*

$$\frac{Actual\ mass \times \frac{1mol}{MMg}}{Vol\ of\ Solution\ in\ Flask} = M$$

2. For Procedure B, if you ignored the dilution equation $M_{conc}V_{conc} = M_{dilute}V_{dilute}$, because you prefer ratios, so you set your dilution equation up like this: $\frac{M_{conc}}{V_{conc}} = \frac{M_{dilute}}{V_{dilute}}$ Calculate the volume of stock solution you would think you should measure out. *Comment on your calculated value using this incorrect formula compared to what you calculated on page 1, and how that would affect the actual molarity that ended up in your flask..*

3. For Procedure B, compared to the 0.185 M cobalt(II) chloride solution that you were attempting to prepare, would the *actual molarity* of the solution you prepared be larger, smaller, or no different if

   a) the graduated cylinder were wet before you measure out the volume of the stock solution? *Justify.*

$$\frac{M_{conc} \times V_{conc}}{V_{dil}} = M_{dil}$$

   b) the volumetric flask were wet before you added the stock solution? *Justify.*

$$\frac{M_{conc} \times V_{conc}}{V_{dil}} = M_{dil}$$

   c) you read the top of the meniscus, instead of the bottom of the meniscus of the stock solution in the graduated cylinder? *Justify.*

$$\frac{M_{conc} \times V_{conc}}{V_{dil}} = M_{dil}$$