Section 8.4 – Least Measurable Quantity and Aliquot Measurements

Sometimes very small amounts of medication will be used, when this happens we need to know what the __________________________ amount that can be accurately __________________________ on a balance. Using the following formula:

\[
\frac{100 \times \text{balance sensitivity}}{\text{permissible % margin of error}} = \text{least measureable quantity}
\]

A pharmacy balance may not be able to weigh such a small quantity. When this happens you may use an ________________, which is a portion, fraction or part that is placed into a solution or mixture of other ingredients, to aid in measuring.

**Steps for Weight Aliquot Measuring:**

**Step 1:** Determine the least weighable quantity (LWQ)

**Step 2:** Determine the amount to be weighed. This must be equal to or larger than the LWQ. To calculate the amount of drug to weigh out, multiply by any whole number until you have a weighable quantity. The whole number used is called a factor.

**Step 3:** Determine the amount of diluent to add.

(a) Find the total amount of mixture (drug + mixture). The total amount of mixture is found by taking the amount of drug weighed out by some factor. For convenience use the factor from (step 2)

\[\text{drug weighed out} \times \text{factor} = \text{total amount of mixture}\]

(b) Calculate the amount of diluent needed by subtracting the amount of drug weighed out from the total amount of the mixture

\[\text{total amount of mixture} - \text{drug weighed out} = \text{amount of diluent}\]

**Step 4:** Combine the drug and diluent and mix thoroughly
Step 5: Determine the amount of mixture needed to provide the originally ordered amount by using the ratio-proportion method.

\[
\frac{x \text{ mg mixture}}{\text{amount of drug ordered}} = \frac{\text{total amount of mixture}}{\text{amount of drug weighed}}
\]

(total amount of mixture is Step 3a and the amount of drug weighed out is Step 2)

**Steps for Volume Aliquot Measuring:** (same steps as above)

**Step 1:** Determine the minimum volume that can be measured

**Step 2:** Determine the multiple of active ingredient that will provide the smallest volume that can be accurately measured.

**Step 3:** Determine the total volume of the mixture by multiplying the volume of active ingredient by the same multiple (factor) used in step 2.

**Step 4:** Determine the amount of diluent needed by subtracting the amount of active ingredient from the mixture total.

**Step 5:** Determine the amount of mixture needed to provide the originally ordered amount by using the ratio-proportion method.

Ex 1: Calculate the following

(a) You need to measure 125mg magnesium sulfate for a product you are compounding. The sensitivity rating of the balance is 10mg and there is an acceptable margin of error is 4%. What is the minimum weighable quantity?

(b) The sensitivity rating of your balance is 6mg and the acceptable margin of error is 3.5%. What is the least weighable quantity?
Ex 2: Calculate the following

(a) 20mg Drug A
3.5% margin of error allowed
Torsion balance with a sensitivity of 4mg
use the multiple of 6 for the diluents

a. least weighable quantity:_________________________

b. amount of drug:_______________________________

c. amount of mixture:____________________________

d. amount of diluents:___________________________

e. amount of aliquot:____________________________

(b) 5 mg Drug B
3% margin of error allowed
Torsion balance with sensitivity of 5mg
use the multiple of 35 for the diluents

a. least weighable quantity:_________________________

b. amount of drug:_______________________________

c. amount of mixture:____________________________

d. amount of diluents:___________________________

e. amount of aliquot:____________________________
(c) 0.5mL Drug L
1.0mL is the minimum volume that can be accurately measured
use the multiple 4 for the diluent

a. amount of drug:____________________________

b. amount of mixture:________________________

c. amount of diluents:________________________

d. amount of aliquot:________________________

(d) 0.3mL Drug M
0.5mL is the minimum volume that can be accurately measured
use the multiple of 5 for the diluent

a. amount of drug:____________________________

b. amount of mixture:________________________

c. amount of diluents:________________________

d. amount of aliquot:________________________