

Worksheet 13: Final Exam Review I

1. Name the general steps in a chemical analysis.

Solution:

1. Formulating the question
2. Selecting analytical procedures
3. Sampling
4. Sample preparation
5. Analysis
6. Reporting and interpretation
7. Drawing conclusions

2. What is the difference between a quantitative analysis and a qualitative analysis?

Solution:

Quantitative analysis tells us how much of a chemical substance is present, while qualitative analysis tells us what is present.

3. Would you expect a pure chocolate bar or a piece of chocolate with a macadamia nut in the middle to be more homogeneous?

Solution:

The pure chocolate bar would be more homogeneous, while the macadamia nut piece would be heterogeneous.

4. What is the definition of weight percent?

Solution:

$$\text{Weight percent} = \frac{\text{mass of solute}}{\text{mass of total solution or mixture}} \times 100\%$$

5. How is the definition of parts per million or parts per billion similar to or different from the definition of weight percent?

Solution:

It is the same except that you multiply by one million or one billion instead of 100%.

6. What equation can be used to determine volumes and concentrations resulting from dilution procedures?

Solution:

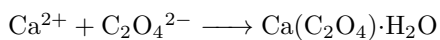
$$C_1V_1 = C_2V_2$$

7. What is the name for chemical analysis based on weighing a final product?

Solution:

Gravimetric analysis

8. If you mix 1.00 g of CaCl_2 , which has a formal mass of 110.98, with 1.15 g of $\text{Na}_2\text{C}_2\text{O}_4$, which has a formal mass of 134.00, which is the limiting reagent given the equation below and the fact that it takes place in water?

**Solution:**

Oxalate is the limiting reagent

9. What is the difference between a serial and a parallel dilution? What are the advantages of each?

Solution:

A serial dilution is one in which the concentration decreases by the same amount in each successive step. A parallel dilution is one in which the concentration of a single stock decreases by different amounts.

A serial dilution is easy to make and can cover a required concentration range uniformly. It also makes use of the same glassware multiple times.

A parallel dilution can be less wasteful if you only need a later concentration in the serial scheme. There is no chance of a mistake in one parallel dilution step ruining later steps.