

Mid-Term
1045 Lab

Study guide for 1045 lab mid-term.

Lab one: density and significant figures:

See hand-out sheets on significant figures which were given out on first day of lab.

Practice problems included

Know density formula $D = m/v$ and how to solve for density, mass and volume.

How to find volume:

$$V = \text{length} \times \text{width} \times h$$

Volume by water displacement

Spectroscopy:

Know how to plot values of concentration and % absorbance on a graph.

y-axis is the % absorbance

x-axis is the concentration in g/ml

you may be asked to set up your own scale for each axis

Percent composition

Look over the hand-out data sheet given in class.

Know how to determine:

Mass of metal used

Mass of oxide produced

Mass of oxygen

% of metal in oxide

% of oxygen in oxide

Know reaction of Mg plus oxygen

Reaction of Mg with nitrogen

How did we get rid of the magnesium nitride?

% of water in a hydrate

Know how to calculate the theoretical % of water in say: $\text{MgSO}_4 \cdot 7 \text{H}_2\text{O}$

Look over the hand out data sheet given in class

How to find mass of hydrate

Mass of anhydrous salt

Mass of water lost

% of water in hydrate

Analysis of potassium chlorate

Study hand out data sheet given in class (study entries 1-10) to get % of chlorate in unknown mixture.

Synthesis of aspirin:

Study the hand out sheet that has sample problem along with data sheet.

Mid term (1045 L)

1. The density formula; know how to solve for all three variables. Know how to find volume by a) $V = l \times w \times h$ and by b) water displacement.
2. Measure the length of a wire using significant figures. A meter stick is provided on the paper.
3. Question on density
4. – 6. Calculations using significant figures. (Multiply, divide; add and subtract (don't use significant figures, use decimal places. Know how to round off.
5. From the % composition lab:

Given: mass of crucible and lid

Mass of crucible, lid and metal

After heating:

Mass of crucible, lid and oxide

What is the mass of the oxide

What is the mass of oxygen that combined with the metal

How did we get rid of the metal nitride (Mg_3N_2)

6. Water of hydration lab

How did you determine the mass of water in the hydrate

I will give you the formula of a hydrate with atomic weights. Determine the theoretical % of water in the hydrate. (Google it if you can't figure this out)

7. Given:

Mass of crucible and lid

Mass of crucible lid and hydrate

Mass of hydrate

Mass of crucible lid and anhydrous salt (after heating)

What is the mass of the anhydrous salt ?

8. Here is a sample from % of KClO_3 in a mixture:

Weight of chlorate 6.837 grams

Weight of residue after heating 2.459 grams

Calculate the % of oxygen in this chlorate. (Hint: first find the mass of oxygen given off) See actual data from the hand out sheet given in class.

9. Given the equation for the preparation of aspirin (see lab)

How would you convert 15 grams of salicylic acid to moles

How many moles of aspirin would we have obtained using the above (see balanced equation).

Suppose we had 0.45 moles of aspirin. How many grams would this be?

What was the phosphoric acid used for?

Suppose our theoretical yield was 7.00 grams and our % yield was 85%. What would have been our actual yield?

10. Using a graph provided and a hint how to do the scale for each axis, and using a chart giving concentration and % absorbance, plot the data. Then determine the concentration of an unknown solution if the % absorbance is given.