**Spectrophotometry Reading Guide Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Spectrophotometers are used to determine the “optical density” of a solution. Relate this to concentration (molarity).
2. How are wavelength and the energy of EMR related? Rate the following from low energy to high energy: UV, IR, Visible
3. Explain why your eye perceives objects as certain colors and why the perceived color of a leaf is green in the summer and red in the fall.
4. Define transmittance and absorption.
5. Use Bohr’s model to explain why each element, and therefore each chemical species, has a specific set of energy levels that it can absorb.
6. Explain the information provided by an absorption spectrum and explain how one determines the optimal wavelength to analyze a sample with.
7. Once an optimal wavelength is selected, a monochromatic light source is used to analyze the sample with a single EMR wavelength. Discuss the three factors that will influence the intensity of the light wave as it passes through the sample.
8. Compare and contrast measuring transmittance versus absorption.
9. What role does a blank play during spectrophotometric analysis?
10. Why is absorption a preferred measurement over percent transmittance for determining solute concentration in a solution?
11. Define Beer’s Law and provide the equation relating absorbance to concentration, labeling each variable.
12. If A = abc shows a linear relationship between absorbance (A) and concentration (c), relate Beer’s equation to an equation that represents a line, y=mx+b.
13. What is a calibration (standard) curve and how is it utilized in spectroscopy?
14. How can you check the linear relationship of your standard curve to assure proper calibration?
15. Complete the “Evaluation of Linearity” portion of the note packet.
16. Read through the spectrophotometry summary, paying particular close attention to the instrumentation section. Draw a diagram that describes all of the components of a spectrophotometer. Google some help if necessary.
17. Identify 6 possible sources of error encountered with spectrophotometers. Make sure you discuss those associated with the cuvette, the light source, the solvent/blank, standard prep, and sample prep.