**Problem Set 1: Due Sunday August 30, 2015** Total Time required: ~ 50 min

**Some useful definitions:**

*Estimate* - give the answer to about an order of magnitude.

*Sketch* - you need not numerically calculate the plotted values, just try to reproduce its general features. However, take care in representing certain 'landmarks', such as inflection points, etc. Fully label the axis with units and scale.

\* A problem that is somewhat difficult – you will have to apply knowledge from the lecture to answer the question.

1. (4 pts, 5 min) What would happen if ribosomes were inhibited in cells? What could the cell not do?

2. (4 pts, 5 min) What would happen if a eukaryotic cell was missing the golgi apparatus? What could the cell not do?

3. (4 pts, 10 min) A small virus like particle is isolated that is able to reproduce without the need to infect host cells. Name two fundamental properties that this particle must have that a virus does not.

4. (5 pts, 5 min) Viruses that have double stranded RNA as their genetic information do not require conversion of the RNA to DNA for reproduction. What activity must be provided by the virus that is not found in the host cell?

5. (5 pts, 5 min) What is the normal charge (most stable state) for a Mg ion? Be sure to justify your answer by discussing the distribution of electrons in shells.

6. (8 pts, 10 min)

i) Add the correct hydrogen atoms to the drawing on the right, briefly justify your answer.

ii) Identify any/all chiral centers in this molecule.

iii) Does this molecule contain an aromatic group? If so, indicate by circling the group.

7\*. (5 pts, 10 min) The chemical structures of the drugs Dexedrine and Benzedrine are the same, and shown on the right. Both of these drugs have the identical physical properties, such as melting point, molecular weight, etc. The dose of Dexedrine is 5mg/day, but the dose of Benzedrine is 10 mg/day. Additional side effects are seen when patients take Benzedrine. Why is twice as much Benzedrine required for the same biological effect and why are there reduced side effects with Dexedrine? [Hint: Is there a chiral center in this compound?]

