This homework is due on Wednesday, March 24, 2008, at classtime. Late homework is not accepted.

1. (14 points) Fill in the missing information in the following table. Don’t forget to fill in the missing information on the left as indicated by blank lines.

<table>
<thead>
<tr>
<th>Nucleus</th>
<th>Protons</th>
<th>Neutrons</th>
<th>Electrons</th>
<th>Mass Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>$^8_4\text{Be}$</td>
<td>4</td>
<td>$8 - 4 = 4$</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>$^{110}_{46}\text{Pd}$</td>
<td>46</td>
<td>$110 - 46 = 64$</td>
<td>46</td>
<td>110</td>
</tr>
<tr>
<td>$^{140}_{56}\text{Ba}$</td>
<td>56</td>
<td>84</td>
<td>56</td>
<td>$56 + 84 = 140$</td>
</tr>
</tbody>
</table>

2. (4 points) Which isotope would you expect to have the larger mass – a Rh atom with 59 protons and 59 neutrons (my mistake) or an Ag atom with 58 protons and 58 neutrons? 

**Rh has 45 protons and 59 protons with a mass number of 104**

**Ag has 47 protons and 58 protons with a mass number of 105**

You would expect Ag to have the larger mass.

3. (6 points) Complete the following nuclear decay processes by filling in the blanks. Be sure to include symbols, atomic numbers, and mass numbers for each blank.

$$^{113}_{47}\text{Ag} \rightarrow ^{113}_{48}\text{Cd} + ^0_{-1}\text{e}$$

$$^{50}_{27}\text{Co} \rightarrow ^{50}_{26}\text{Fe} + ^0_{+1}\text{e}$$

$$^{158}_{74}\text{W} \rightarrow ^{154}_{72}\text{Hf} + ^4_2\text{He}$$

$$^{19}_{10}\text{Ne} \rightarrow ^{19}_{9}\text{F} + ^0_{+1}\text{e}$$

4. (4 points) Predict whether each nuclide below would be radioactive or not. If so, indicate which of the three criteria are met.

$$^{47}_{24}\text{Cr}$$ Z not bigger than 83; # neutrons (47-24)= 23, # protons = 24 so number of neutrons is less than number of protons; Radioactive because it meets criterion 2.

$$^{88}_{39}\text{Y}$$ Z not bigger than 83; # neutrons (88-39)=49, # protons = 39; both numbers of neutrons and protons is odd; Radioactive because it meets criterion 3.