Physics 111 Homework Solutions Collected on Monday
9/15

Thursday, September 10, 2014
Chapter 14
Questions
- None
Multiple-Choice
-None
Problems
- None

Thursday, September 10, 2014
Chapter 14
Questions
14.1 We have an initial charge of +15 e- and when we remove 20 protons, the charge decreases to -5 e-. Then removing 5 e- makes the system neutral with a charge of 0 e-.

14.2 Since both the charge and mass has to be conserved we have \( ^{127}_{81}X \rightarrow ^{0}_{-1}e^+ + ^{127}_{82}Y \). Thus there are 82 protons in the nucleus (we converted a neutron from the original nucleus into a proton) and 127 – 82 = 45 neutrons in the nucleus.

Multiple-Choice
14.9 C

Problems
1. The number of e- is given by :
\[
\frac{1e^-}{1.6 \times 10^{-19} C} \times 1C = 6.25 \times 10^{18} e^-.
\]

The mass of these e- is given by :
\[
\frac{9.11 \times 10^{-31} \text{kg}}{e^-} \times 6.25 \times 10^{18} e^- = 5.69 \times 10^{-12} \text{kg}.
\]

2. The number of e- is roughly given by :
\[
\frac{1}{2} \left[ \frac{M_{\text{Earth}}}{2M_{\text{proton}}} \right] = 9 \times 10^{50} e^-.
\]