

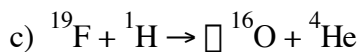
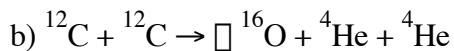
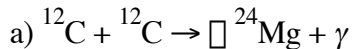
Astronomy 45

Introduction to Astrophysics

Problem Set 7 - Due April 14

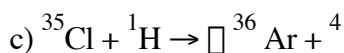
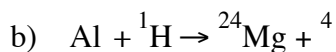
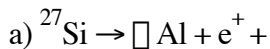
1. What is the relationship between the mean kinetic energy and the mean potential energy for a central potential varying as the n^{th} power of the distance: $V(r) = -kr^n$?
2. Assume that the solar luminosity is produced by the conversion of hydrogen to helium. The solar luminosity is 3.8×10^{33} ergs s^{-1} . What mass of hydrogen is converted to helium in each second?

3. Calculate the energy released or absorbed measured in MeV in the reactions



The masses of ^{12}C , ^{16}O , ^{19}F and ^{24}Mg are 12.00, 15.99491, 18.99840 and 23.98504 AMU respectively. Are the reactions exothermic or endothermic?

4. Complete the following reaction sequences:



The nuclear charges Z of Si, Al, Mg, Cl and Ar are respectively: 14, 13, 12, 17 and 18.