Name _____ Date _____

Honors Physics Modern WS #6H

Period _____ Mrs. Nadworny

Binding Energy

Directions: Read online textbook pages 896 – 901. Solve the following problems using the GUESS method and proper significant figures. Be sure to show ALL work.

1. Which particle listed on the table has the opposite charge of, and is more massive than, a proton?

Subatomic Particle Table

Symbol	Name	Quark Content	Electric Charge	Mass (GeV/c^2)	Mass (u)
p	proton	uud	+1	0.938	1.0073
$\bar{p}$	antiproton	$\bar{u}\bar{u}\bar{d}$	–1	0.938	1.0073
n	neutron	udd	0	0.940	1.0087
λ	lambda	uds	0	1.116	—
Ω^-	omega	sss	–1	1.672	—

(A) neutron (B) omega (C) lambda (D) antiproton

2. A tritium nucleus is formed by combining two neutrons and a proton. The mass of this nucleus is 9.106×10^{-3} universal mass unit less than the combined mass of the particles from which it is formed. Approximately how much energy (in MeV) is released when this nucleus is formed?

3. A magnesium nucleus consists of thirteen neutrons and twelve protons an has a mass of 24.9800 universal mass units. The mass of a proton is 1.0073 universal mass units and the mass of a neutron is 1.0087 universal mass units.
   a. Calculate the mass defect of the nucleus.

   b. Calculate the binding energy of the nucleus.

4. When a nucleus is formed, it releases 1.34 MeV of energy. How large is the mass defect of the nucleus?

5. Calculate the binding energy of an isotope with a mass defect of 0.005291 u.

Answers in size order: 0.00144, 0.2207, 4.93, 8.48, 205