Dougherty Valley HS Chemistry
Nuclear Basics and Equations

Worksheet #6

Name: **Period:** **Seat#:**

1) A positively charged particle made up of two protons and two neutrons and released by a radioactive nucleus is the:	**2)** An electron released by a radioactive nucleus that causes a neutron to change into a proton is called a	**3)** The amount of time for half the atoms in a radioactive sample to decay is called
4) The process in which the nuclei of unstable atoms can become more stable by emitting particles and/or electromagnetic radiation is called	**5)** High-energy electromagnetic radiation released by a radioactive nucleus is called	**6)** What kind of decay is the breaking up of a radioactive element, more often than not resulting in the formation of a new nucleus.
7) What is it called when an atom is changed into another kind of atom that takes place during radioactive decay.	**8)** Is Alpha radiation a stream of positively or negatively charged particles?	**9)** Is Beta radiation a stream of positively or negatively charged particles?
10) Whenever an element undergoes _____ decay it turns into another element with an atomic number two less than before and mass number four less than before.	**11)** Whenever an element undergoes _____ decay, a neutron in the nucleus decays into a proton, and an electron.	**12)** Circle one: The more stable a nucleus is, the *longer* *shorter* its half-life will be.
13) Which type of radioactive decay can be stopped with a piece of paper?	**14)** Which type of radioactive decay can be stopped with a thin metal sheet?	**15)** Which type of radioactive decay can be stopped with a thick metal sheet?
16) Which type of radioactive decay travels at the speed of light?	**17)** Which type of radioactive decay is not affected by a magnetic field because it carries no charge?	**18)** An alpha particle is actually a nucleus of:
19) Where do beta particles originate from in the atom?	**20)** Radioactive decay processes occur until a _____ Element is formed	**21)** True or false? The half-life of a given isotope can be altered by heat, pressure, or some other physical means.

Fill in the missing symbol and identify the type of decay taking place.

	Reaction	Type of Decay
1	$^{3}_{1}H \rightarrow \_\_\_\_ + ^{0}_{-1}e$	
2	$^{232}_{92}U \rightarrow ^{228}_{90}Ra + \_\_\_\_$	
3	$^{144}_{58}Ce \rightarrow ^{144}_{59}\mathrm{Pr} + \_\_\_\_$	
4	$^{65}_{30}Zn \rightarrow \_\_\_\_ + ^{0}_{+1}e$	
5	$^{40}_{19}K \rightarrow ^{40}_{18}Ar + ^{0}_{+1}e$	
6	$^{7}_{4}Be^{*} \rightarrow ^{7}_{4}Be + \_\_\_\_$	
7	$^{1}_{0}n + ^{235}_{92}U \rightarrow ^{236}_{92}U^{*} \rightarrow ^{141}_{55}Cs + \_\_\_\_ + 3^{1}_{0}n + \_\_\_\_\_$	
8	$^{222}_{86}Rn \rightarrow \_\_\_\_ + ^{4}_{2}He$	
9	$^{129}_{53}I \rightarrow ^{129}_{54}Xe + \_\_\_\_$	
10	$^{1}_{1}H + ^{1}_{1}H \rightarrow \_\_\_\_ + ^{0}_{+1}e$	
11	$^{239}_{94}Pu \rightarrow \_\_\_\_ + ^{4}_{2}He$	
12	$^{15}_{8}O \rightarrow ^{15}_{7}N + \_\_\_\_$	

Write and/or complete the following transmutations, fission and fusion reactions.

1) Neutron initiated fission of U-235 releases 2 neutrons, forms Cs-144 and another nucleus.

2) Bombardment of Cl-35 with a neutron produces a sulfur-34 nucleus and another particle.

3) Neutron initiated fission of U-235 releases 4 β particles, forms Sr-90 and releases another nucleus.

4) Neutron initiated fission of U-235 releases 3 neutrons, one β, forms Br-87 and another nucleus.

5) Neutron initiated fission of Pu-239 gives three neutrons, La-145 and another nucleus.

6) Two tritium nuclei are fused to produce 2 neutrons and another nucleus.

7) An H-1 nucleus (protium) and a Li-7 nucleus are fused to produce He-4.

8) Tritium and deuterium are fused to produce a neutron and a new nucleus.

9) Bombardment of U-238 with C-12 produces an isotope of element 98 and 4 identical particles.