**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_\_\_\_**

**Nuclear Chemistry Test Review**

**Part I**

1) Define the following terms:

Radiation-

radioactive decay-

transmutation-

nuclear reaction-

2) Write the isotope symbols for each of the following elements.

a. Americium-288

b. Thorium-175

3) Write the isotope names for each of the following elements.

a. 157 N

b. 18674 W

4) How are mass number and the atomic number affected by the loss of a:

a. beta particle -

b. alpha particle -

c. gamma ray –

5) What is the difference between bombardment and emission?

6) What are the differences between a chemical reaction and a nuclear reaction?

7) What causes atoms to be radioactive?

8) What are the three most common types of radiation? What is the symbol, mass, charge, and penetrating power of each?

9) What causes beta radiation? (What happens to the subatomic particles)

10) What is the difference between nuclear fission and fusion?

11) What does E=mc2 stand for and represent? Who came up with it?

12) What are the transuranium elements? What is significant about them?

13) What is half-life? What does it measure?

14) What do half-life graphs typically look like? What trends do they follow?

15) What are some uses of nuclear chemistry?

**Nuclear Equations: Fill in the blanks with the appropriate answer.**

1. 23191Pa 🡪 42He + \_\_\_\_\_\_\_

2. 21084Po 🡪 0-1 β + \_\_\_\_\_\_\_\_\_\_

3. 23390Th 🡪 \_\_\_\_\_\_\_\_\_\_ + 0-1 β

*Write the nuclear equations:*

7. Uranium-235 decomposes naturally. As a result it produces a new element and an alpha particle emission.

**Half-Life Problems:**

1. Rh-111 has a half-life of 25.0 minutes. You have a sample of Rh-111 with a mass of 150.0g. The Rh-111 undergoes alpha decay.

a. Write the balanced nuclear equation.

b. How many grams of Rh-111 will remain after 6.25 half-lives have passed?

1. A sample of a radioactive isotope has a half-life of 14.6 days.
   1. If your sample has a mass of 4.75g, how much would remain after 82.4 days?