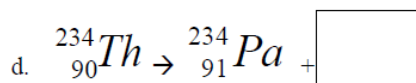
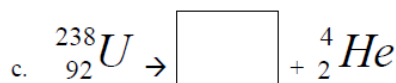
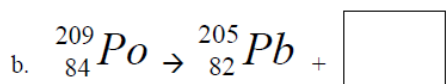
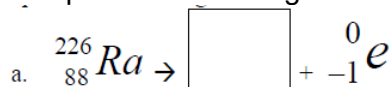


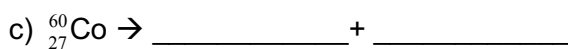
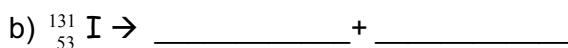
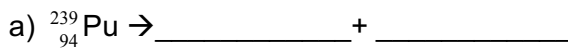
Name \_\_\_\_\_

NATURAL DECAY

1. Complete the following reactions:



2. Use Reference Table N to determine what type of decay each goes, and then write the nuclear reaction to form the correct products.



3. Write a balanced nuclear equation for the following:

a. Release of an  $\alpha$  particle by Po-210 \_\_\_\_\_

b.  $\beta^+$  emission from Al-24 \_\_\_\_\_

c. Release of a  $\beta^-$  particle from Pb-210 \_\_\_\_\_

1) Which particle has the greatest mass?

- \_\_\_\_\_
- 1) an alpha particle
  - 2) a beta particle
  - 3) a neutron
  - 4) a positron

2) Which list of nuclear emissions is arranged in order from the *least* penetrating power to the greatest penetrating power?

- \_\_\_\_\_
- 1) alpha particle, beta particle, gamma ray
  - 2) alpha particle, gamma ray, beta particle
  - 3) gamma ray, beta particle, alpha particle
  - 4) beta particle, alpha particle, gamma ray

3) Which group of nuclear emissions is listed in order of increasing charge?

- \_\_\_\_\_
- 1) alpha particle, beta particle, gamma radiation
  - 2) gamma radiation, alpha particle, beta particle
  - 3) positron, alpha particle, neutron
  - 4) neutron, positron, alpha particle

4) Which nuclear emission has no charge and no mass?

- \_\_\_\_\_
- 1) alpha particle
  - 2) beta particle
  - 3) gamma ray
  - 4) positron

5) Positrons and beta particles have

- \_\_\_\_\_
- 1) the same charge and the same mass
  - 2) the same charge and different masses
  - 3) different charges and the same mass
  - 4) different charges and different masses

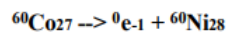
6) A beta particle may be spontaneously emitted from

- \_\_\_\_\_
- 1) a ground-state electron
  - 2) a stable nucleus
  - 3) an excited electron
  - 4) an unstable nucleus

7) Which equation represents a spontaneous nuclear decay?

- \_\_\_\_\_
- 1)  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
  - 2)  $\text{H}_2\text{CO}_3 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
  - 3)  ${}_{13}^{27}\text{Al} + {}_2^4\text{He} \rightarrow {}_{15}^{30}\text{P} + {}_0^1\text{n}$
  - 4)  ${}_{38}^{90}\text{Sr} \rightarrow {}_{39}^{90}\text{Y} + {}_{-1}^0\text{e}$

8) Given the nuclear reaction:



This reaction is an example of

- \_\_\_\_\_
- 1) fission
  - 2) fusion
  - 3) artificial transmutation
  - 4) natural transmutation