

**Work each of the following problems. SHOW ALL WORK.**

1. Write the symbolic notation for lead-207.



2. How many protons does lead-207 have? How do you know?

*Lead has 82 protons because that is its atomic number. All atoms of lead have 82 protons.*

---

3. How many neutrons does lead-207 have? How do you know?

*Lead-207 has 125 neutrons.*

---

*The atomic number is 82, which is the number of protons.*

---

*The mass number is 207, which is the total number of protons and neutrons.*

---

*The number of neutrons equals the mass number minus the atomic number.*

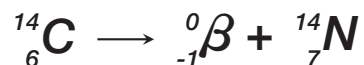
---

4. Complete the following table:

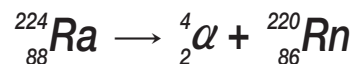
Isotope	Symbol	Mass #	Atomic #	# Protons	# Neutrons
boron-11	${}^{11}_5\text{B}$	11	5	5	6
cobalt-59	${}^{59}_{27}\text{Co}$	59	27	27	32
cesium-133	${}^{133}_{55}\text{Cs}$	133	55	55	78
chlorine-35	${}^{35}_{17}\text{Cl}$	35	17	17	18
argon-40	${}^{40}_{18}\text{Ar}$	40	18	18	22

Work each of the following problems. SHOW ALL WORK.

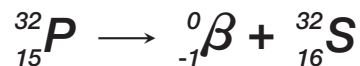
5. Write the element that is formed in the beta-minus decay of carbon-14.



6. Write the element that is formed in the alpha decay of radium-224.



7. Write the equation for the beta-minus decay of phosphorous-32.



8. Write the equation for the alpha decay of plutonium-238.

