

Name _____

Pd: _____

Date _____

Lab #10

Are you average?

Minutes: _____

Aim: To determine the average atomic mass of the element Pennium (Pn).

Define (include source): (14 points)

- Isotope:
- Average:
- Relative abundance:
- Atomic mass unit:
- Atomic mass:
- Mass number:

Materials: Samples of both isotopes of Pennium, electronic balance, weighing boat

Method:

1. Separate Pennium samples by date: Pre-1982 and Post-1982. **Don't use any from 1982.** These represent the two Pennium isotopes.
2. Enter the number of Pennium "atoms" in each sample in the data table.
3. Measure the total mass of each sample. Record in data table.

Data: (5 points)

Isotope	Number in sample	Total Mass
Pre-1982		
Post-1982		

Total Number of pennies: _____

Calculations.

1. Because each of the pennies is not uniform, we are going to use an average of the population to represent the mass number for that penny. This is not part of the calculation of average atomic mass.

Calculate the average mass of each isotope. (total mass \div number in sample). Show all work. Remember sig fig. (5 pts)

Pre-1982:

Avg mass = _____g

Post-1982:

Avg mass = _____g

Isotopes are named based on their atomic mass. For example, carbon isotopes with a mass number of 12amu are called Carbon-12. Carbon isotopes with a mass number of 13 amu would be Carbon-13, etc.

Name the two isotopes of Pennium based on their respective masses (from calculation number 1): (6 pts)

Pennium-_____ Pennium - _____

From this point forward, treat the pennies as isotopes of the element Pennium, with the mass in atomic mass units = to the mass measured in grams.

2. Determine the relative abundance (%) of each sample. (5 pts)
[(number in sample ÷ total number of pennies) x 100]

Pennium-_____: Percent = _____%

Pennium-_____: Percent = _____%

Summary of Results: Fill in below

Isotope	Average mass of isotope	Percent relative abundance
Pennium-_____		
Pennium-_____		

3. Calculate the weighted average atomic mass. Include formula, numerical set-up, and solution, with units. *NOTE: This is one of the few formulas you are expected to know which is NOT on the reference table!!!* (10 pts)

The Average Atomic Mass for Pennium: _____

4. Compare with accepted value for Pennium: 2.685 amu. Copy the formula from Table T; show the numerical setup; and answer. (5 pts)

Percent Error:

_____%

Questions:

1. Compare and contrast mass number and atomic mass. Both terms must be in the answer for credit.(5pts)
2. Why are the atomic masses on the periodic table decimals and not whole numbers?(5 pts)
3. Explain in terms of mass how pre-1982 and post-1982 pennies could be used to model isotopes of an element. Your answer must include the terms mass, element, and isotope.(5 pts)
4. Another class had to determine the atomic mass of the element Beanium. There are three isotopes of this element with their relative abundance are: Beanium-56 (20%), Beanium-60 (30%), and Beanium-61 (50%). Calculate the atomic mass of Beanium (see step 3 in calculation). Show all work, to include numerical set up and final answer. (5 pts)