Isotopes and Average Atomic Mass

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

Calculate average atomic mass by multiplying each isotope's mass by its fractional abundance and adding the products. A percentage of 25 percent is a fraction of 0.25.

1 A model element is 25 percent isotope of mass 10.0 u and 75 percent isotope of mass 12.0 u. What is its average atomic mass?

(1) 10.5 u

(2) 11.0 u

(3) 11.5 u

(4) 12.5 u

2 A student calculates an average of 36.5 u for a sample whose isotope masses are 34.0 u and 36.0 u. Explain why the result cannot be correct. [1]

Answer and work

3 One of two isotopes makes up 18.0 percent of a sample. What percentage is the other isotope?

(1) 18.0 percent

(2) 50.0 percent

(3) 72.0 percent

(4) 82.0 percent

4 A model sample contains equal numbers of atoms of masses 20.0 u and 22.0 u. Calculate its average atomic mass. [1]

Answer and work

Model Isotope Analyzer

Use the information below to answer the questions.

An instrument reports the composition of three samples of the same model element. Each sample contains two isotopes, of masses 62.0 u and 64.0 u.

Sample	62.0 u isotope (%)	64.0 u isotope (%)
P	90	10
Q	50	50
R	30	70

5 Which sample has the greatest average atomic mass?

(1) P

(2) Q

(3) R

(4) All three have the same mean.

6 Calculate the average atomic mass of sample R. Use both percentages from the table. [1]

Answer and work

7 Explain why the average atomic mass of sample P is closer to 62.0 u than to 64.0 u. [1]

Answer and work

8 Another sample has average atomic mass 63.0 u. Which listed sample has the same composition in this two-isotope model?

(1) P

(2) Q

(3) R

(4) None of them