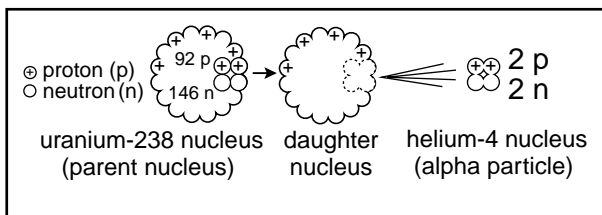


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Use the diagram below to answer question 1.



1 The diagram above illustrates a nuclear reaction in which uranium-238 emits an alpha particle. How many protons and neutrons will the daughter nucleus have?

- A 90 p and 144 n
- B 92 p and 142 n
- C 92 p and 150 n
- D 94 p and 148 n

2 In his latest dig, Dr. Butrell found an abundance of lead (Pb) in some ancient artifacts. What is the atomic number of Pb?

- A 80
- B 81
- C 82
- D 83

Use the chart below to answer questions 3 and 4.

Element	Atomic #	Isotope	Atomic mass of isotope	% abundance
hydrogen	1	hydrogen-1	1.01 amu	99.985
		hydrogen-2	2.01 amu	0.015
carbon	6	carbon-12	12.00 amu	98.90
		carbon-13	13.00 amu	1.09
		carbon-14	14.00 amu	0.01
oxygen	8	oxygen-16	15.99 amu	98.90
		oxygen-17	17.00 amu	0.038
		oxygen-18	18.00 amu	0.200
copper	29	copper-63	62.94 amu	69.17
		copper-65	64.93 amu	30.83

3 The chart shows isotopes of some common elements. Which property is used to name the isotopes?

- A Atomic number
- B Atomic mass
- C Mass number
- D Percent natural occurrence

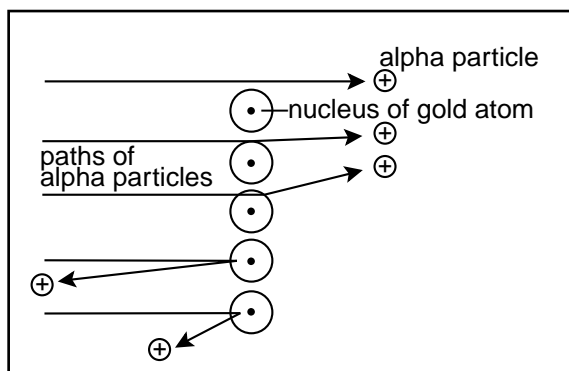
4 The atomic mass of an element is the weighted average mass of the isotopes of that element. Based on this definition, which of these does NOT show the correct atomic mass for an element?

- A Hydrogen: 1.008 amu
- B Carbon: 12.011 amu
- C Oxygen: 15.999 amu
- D Copper: 63.017 amu



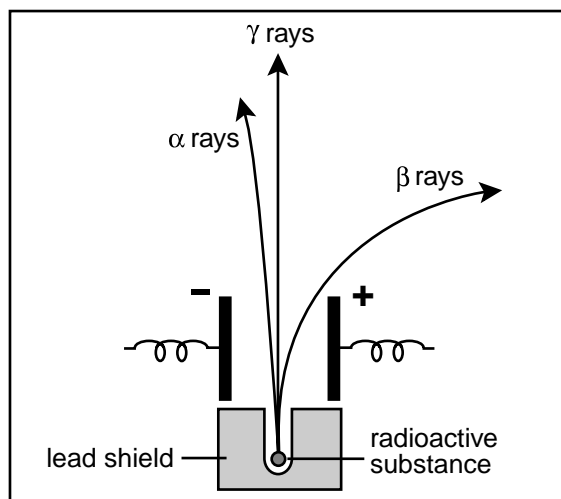
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Use the diagram below to answer question 5.



- 5 The diagram above shows the results of Rutherford's experiment in which he used a radioactive source to "shoot" alpha particles at a thin sheet of gold foil. Based on these results, what were Rutherford's conclusions?
- Atoms are solid matter with positive and negative charges scattered throughout.
 - Atoms are solid, positively charged matter with negatively charged electrons scattered throughout.
 - Atoms are mostly empty space with small, dense, positively charged centers.
 - Atoms are mostly empty space with small, dense, negatively charged centers.
- 6 The cathode ray tube is a key component of which of the following revolutionary inventions?
- Automobile
 - Fax machine
 - Television
 - Photocopier

Use the diagram below to answer question 7.



- 7 The diagram above shows how alpha, beta, and gamma rays are affected by two electrically charged plates. Based on the paths the rays follow, what are the respective charges of alpha, beta, and gamma rays?
- negative, positive, none
 - positive, negative, none
 - negative, none, positive
 - positive, none, negative
- 8 In the fourth century BC, Greek scholars rejected Democritus's ideas about the atom. This rejection was most likely based on —
- experimentation
 - government legislation
 - religious beliefs
 - the popularity of Aristotle's ideas on nature

