

- As the number of neutrons in the nucleus of an atom increases, the nuclear charge of the atom
  - decreases
  - increases
  - remains the same
- Which particles are referred to as nucleons?
  - protons, only
  - neutrons, only
  - protons and neutrons
  - protons and electrons
- Which particles are found in the nucleus of an atom?
  - electrons, only
  - neutrons, only
  - protons and electrons
  - protons and neutrons
- Which statement concerning elements is true?
  - Different elements must have different numbers of isotopes.
  - Different elements must have different numbers of neutrons.
  - All atoms of a given element must have the same mass number.
  - All atoms of a given element must have the same atomic number.
- In Rutherford's gold foil experiments, some alpha particles were deflected from their original paths but most passed through the foil with no deflection. Which statement about gold atoms is supported by these experimental observations?
  - Gold atoms consist mostly of empty space.
  - Gold atoms are similar to alpha particles.
  - Alpha particles and gold nuclei have opposite charges.
  - Alpha particles are more dense than gold atoms.
- What is the nuclear charge of an atom with a mass of 23 and an atomic number of 11?
  - 11 +
  - 12 +
  - 23 +
  - 34 +
- An atom that contains 35 protons, 45 neutrons, and 35 electrons has an atomic number of
  - 35
  - 45
  - 80
  - 115
- How many protons are in the nucleus of an atom of beryllium, Be?
  - 5
  - 2
  - 9
  - 4
- What is the atomic number of an element whose atoms each contain 47 protons, 60 neutrons, and 47 electrons?
  - 13
  - 47
  - 60
  - 107
- An ion with 5 protons, 6 neutrons, and a charge of 3+ has an atomic number of
  - 5
  - 6
  - 8
  - 11
- What is a possible mass number of a sodium atom, Na?
  - 1
  - 11
  - 12
  - 23
- Which atom has a mass of approximately two atomic mass units?
  - ${}^1_1\text{H}$
  - ${}^2_1\text{H}$
  - ${}^3_2\text{H}$
  - ${}^4_2\text{He}$
- In which list are the elements arranged in order of increasing atomic mass?
  - Cl, K, Ar
  - Fe, Co, Ni
  - Te, I, Xe
  - Ne, F, Na
- The nucleus of an atom of cobalt-58 contains
  - 27 protons and 31 neutrons
  - 27 protons and 32 neutrons
  - 59 protons and 60 neutrons
  - 60 protons and 60 neutrons
- Compared to an atom of  ${}^{12}_6\text{C}$ , an atom of  ${}^{14}_6\text{C}$  has
  - more protons
  - fewer protons
  - more neutrons
  - fewer neutrons
- Which atoms represent different isotopes of the same element?
  - ${}^{12}_6\text{C}$  and  ${}^{12}_7\text{C}$
  - ${}^{14}_7\text{N}$  and  ${}^{14}_7\text{N}$
  - ${}^{15}_8\text{O}$  and  ${}^{16}_8\text{O}$
  - ${}^{19}_9\text{F}$  and  ${}^{19}_{10}\text{F}$
- The average isotopic mass of chlorine is 35.5. Which mixture of isotopes (shown as percents) produces this average mass?
  - 50%  ${}^{12}\text{C}$  and 50%  ${}^{13}\text{C}$
  - 50%  ${}^{35}\text{Cl}$  and 50%  ${}^{37}\text{Cl}$
  - 75%  ${}^{35}\text{Cl}$  and 25%  ${}^{37}\text{Cl}$
  - 75%  ${}^{12}\text{C}$  and 25%  ${}^{13}\text{C}$