

- \_\_\_\_\_ 1) Isotopes are atoms that have the same number of protons but a different
- 1) number of electrons
  - 2) number of neutrons
  - 3) atomic number
  - 4) nuclear charge
- \_\_\_\_\_ 2) Isotopes of an element must have different
- 1) atomic numbers
  - 2) mass numbers
  - 3) numbers of protons
  - 4) numbers of electrons
- \_\_\_\_\_ 3) All isotopes of a given element must have the same
- 1) atomic mass
  - 2) atomic number
  - 3) mass number
  - 4) number of neutrons
- \_\_\_\_\_ 4) Atoms of every isotope of calcium have the same
- 1) atomic mass
  - 2) atomic number
  - 3) number of neutrons
  - 4) number of nucleons
- \_\_\_\_\_ 5) Atoms of  $^{16}\text{O}$ ,  $^{17}\text{O}$ , and  $^{18}\text{O}$  have the same number of
- 1) neutrons, but a different number of protons
  - 2) protons, but a different number of neutrons
  - 3) protons, but a different number of electrons
  - 4) electrons, but a different number of protons
- \_\_\_\_\_ 6) Which species contains only 12 nucleons (protons plus neutrons) in the nucleus?
- 1)  $^{12}_6\text{C}$
  - 2)  $^{52}_{24}\text{Cr}$
  - 3)  $^{24}_{12}\text{Mg}$
  - 4)  $^{23}_{11}\text{Na}$
- \_\_\_\_\_ 7) What is the symbol for an atom containing 20 protons and 22 neutrons?
- 1)  $^{42}_{20}\text{Ca}$
  - 2)  $^{40}_{20}\text{Ca}$
  - 3)  $^{42}_{22}\text{Ti}$
  - 4)  $^{40}_{22}\text{Ti}$
- \_\_\_\_\_ 8) Which nucleus contains the greatest number of neutrons?
- 1)  $^{31}_{16}\text{S}$
  - 2)  $^{32}_{16}\text{S}$
  - 3)  $^{31}_{15}\text{P}$
  - 4)  $^{32}_{15}\text{P}$
- \_\_\_\_\_ 9) In which pair of atoms do both nuclei contain the same number of neutrons?
- 1)  $^7_3\text{Li}$  and  $^9_4\text{Be}$
  - 2)  $^{40}_{19}\text{K}$  and  $^{40}_{17}\text{Cl}$
  - 3)  $^{40}_{20}\text{Ca}$  and  $^{38}_{18}\text{Ar}$
  - 4)  $^{14}_7\text{N}$  and  $^{16}_8\text{O}$
- \_\_\_\_\_ 10) Which symbols represent atoms that are isotopes of each other?
- 1)  $^{14}\text{C}$  and  $^{14}\text{N}$
  - 2)  $^{16}\text{O}$  and  $^{18}\text{O}$
  - 3)  $^{131}\text{I}$  and  $^{131}\text{I}$
  - 4)  $^{222}\text{Rn}$  and  $^{222}\text{Ra}$
- \_\_\_\_\_ 11) Element  $X$  has two isotopes. If 72.0% of the element has an isotopic mass of 84.9 atomic mass units, and 28.0% of the element has an isotopic mass of 87.0 atomic mass units, the average atomic mass of element  $X$  is numerically equal to
- 1)  $(72.0 + 84.9) \times (28.0 + 87.0)$
  - 2)  $(72.0 - 84.9) \times (28.0 + 87.0)$
  - 3)  $\frac{(72.0 \times 84.9)}{100} + \frac{(28.0 \times 87.0)}{100}$
  - 4)  $(72.0 \times 84.9) + (28.0 \times 87.0)$
- \_\_\_\_\_ 12) An element occurs as a mixture of isotopes. The atomic mass of the element is based upon
- 1) the masses of the individual isotopes, only
  - 2) the relative abundances of the isotopes, only
  - 3) both the masses and the relative abundances of the individual isotopes
  - 4) neither the masses nor the relative abundances of the individual isotopes
- \_\_\_\_\_ 13) The atomic mass of an element is defined as the weighted average mass of that element's
- 1) most abundant isotope
  - 2) least abundant isotope
  - 3) naturally occurring isotopes
  - 4) radioactive isotopes
- \_\_\_\_\_ 14) If 75.0% of the isotopes of an element have a mass of 35.0 amu and 25.0% of the isotopes have a mass of 37.0 amu, what is the atomic mass of the element?
- 1) 35.0 amu
  - 2) 36.0 amu
  - 3) 35.5 amu
  - 4) 37.0 amu