

REVIEW QUESTIONS

Chapter 3

- Complete each question below with an appropriate term:
 - Noble gases Un-reactive elements in the last group of the periodic table.
 - Alkaline-earth metals Elements in group 2 of the periodic table.
 - Transition metals Elements between the main group elements.
 - Halogens Elements in group 7 of the periodic table.
- Name and write symbol for each element described below:
 - Alkali metal in period 4: K, potassium
 - Halogen in period 2: F, fluorine
 - Alkaline-earth metal in period 3: Mg, magnesium
 - Metalloid in period 3: Si, silicon
 - Noble gas in period 5: Xe, xenon
- Complete each statement below with a suitable word or phrase:
 - The “soccer ball” model of the atom is associate with a scientist named John Dalton
 - Thomson discovered the electron in 1897.
 - Rutherford discovered that the atom was mostly hollow through the gold foil experiment.
 - The number of protons in an atom is called the atomic number
 - Isotopes of an atom have the same atomic number but different mass numbers

4. For each element below, use the information given to determine the number of protons, neutrons and electrons in its atom, and write shorthand notation for each.

a) Krypton (Kr) atomic number ($Z=36$); mass number ($A=84$)

$$p^+ = \underline{36} \quad n^0 = \underline{48} \quad e^- = \underline{36} \quad \text{Notation: } {}^{84}_{36}\text{Kr}$$

b) Barium (Ba) atomic number ($Z=56$); mass number ($A=137$)

$$p^+ = \underline{56} \quad n^0 = \underline{81} \quad e^- = \underline{56} \quad \text{Notation: } {}^{137}_{56}\text{Ba}$$

5. Complete the missing information in the table below:

Symbol	Ga	${}^{31}_{15}\text{P}$
Protons	31	15
Neutrons	39	16
Electrons	31	15
Mass number	70	31

6. An unknown element Q has the following isotopic data:

Isotope	Mass (amu)	Abundance (%)
1	80.0	60.0
2	84.0	30.0
3	82.0	10.0

Calculate the average atomic mass of this element.

$$\text{Avg atomic mass} = (80.0 \times 0.600) + (84.0 \times 0.300) + (82.0 \times 0.100) = 81.4 \text{ amu}$$

7. What is the relationship between each pair of elements shown below:

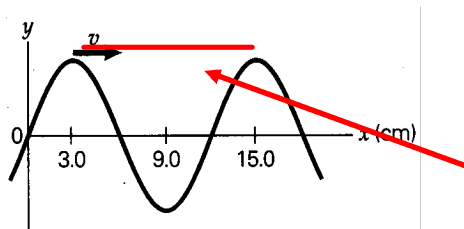
- a) One with 10 protons, 11 neutrons, 10 electrons and one with 11 protons, 10 neutrons and 11 electrons.

These two elements are different elements (different atomic numbers) that have the same mass (same mass numbers).

- b) One with 12 protons, 12 neutrons and 12 electrons and one with 12 protons, 14 neutrons and 12 electrons.

These two elements are isotopes of each other, since they have the same atomic number but different mass numbers.

8. Determine the wavelength in the diagram shown below:



Wavelength = 12.0 cm

9. Arrange the following electromagnetic radiation in increasing order of wavelength:

X-rays

Radiowaves

Visible light

Microwaves

X-rays < visible light < microwaves < radio waves
shortest longest

10. Arrange the following orbitals in increasing order of energy:

3p

4f

5s

3d

4p

3p < 3d < 4p < 5s < 4f

11. Identify each of the following elements from their electron configurations:



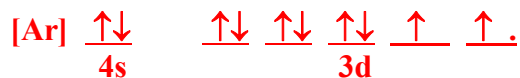
12. Shown below are excited states for some elements. Identify each element and write its ground state configuration:



13. Using only a periodic table, write the notations requested for each element below:



Nickel (Ni): (valence orbital notation)



14. Complete each statement below with a suitable word or phrase:

- A) Based on Bohr's model of atom, the electrons exist in energy levels around the nucleus.
- B) The arrangement of the electrons around the nucleus is called electron configuration
- C) A particle of light is referred to as a(n) photon
- D) The group number of representative elements represents the number of valence electrons
- E) The number of waves per unit of time is called frequency
- F) Electrons that exist in the same orbital must possess opposite spins
- G) When electrons descend from higher energy levels to lower ones they emit light of a particular wavelength