CA1 & CA3

Friday, September 24, 2021 1:15 PM

HW: ChemActivity 1 The Nuclear Atom

1. Complete the following table.

Isotope	Atomic Number Z	Mass Number A	Number of Electrons
$^{59}Co^{2+}$	27	59	25
^{14}N	7	7	7
^{7}Li	3	7	3
^{6}Li	3	6	3
$^{58}Zn^{2+}$	30	58	28
$^{19}F^{-}$	9	19	10

$IE = \frac{-kq_1q_2}{d}$, $\{q_1 = -1, q_2 > 0\}$

HW: ChemActivity 3 Coulombic Potential Energy

1. Which of the following systems will have the larger ionization energy? Show your work using the IE equation.
   a) an electron at a distance d_1 from a nucleus with charge +2
   b) an electron at a distance $2d_1$ from a nucleus with charge +1

a) $IE = \frac{-k \cdot -1 \cdot 2}{d_1} = \frac{2k}{d_1}$

b) $IE = \frac{-k \cdot -1 \cdot 1}{2d_1} = \frac{k}{2d_1}$

$\frac{2k}{d_1} \cdot \frac{2d_1}{k} = 4$

a will have the larger IE, at 4x that of b

2. Which of the following systems has the larger ionization energy? Use IE equation.
   a) an electron at a distance $5d_1$ from a nucleus with a charge of +6
   b) an electron at a distance $6d_1$ from a nucleus with a charge of +7

a) $IE = \frac{-k \cdot -1 \cdot 6}{5d_1} = \frac{6k}{5d_1}$

b) $IE = \frac{-k \cdot -1 \cdot 7}{6d_1} = \frac{7k}{6d_1}$

$\frac{6k}{5d_1} \cdot \frac{6d_1}{7k} = \frac{36}{35}$

a has the larger IE, at ~1.029 x that of b

$\frac{36}{36}$ times OR ~102.857%