Non Sibi High School

Andover's Chem 300: Accelerated/Honors Chemistry

Chapter 7, Review Quiz 1 Answers

1

Determine the number of protons, neutrons, and electrons in:

a. a neutral platinum-198 atom
b. $^{126}Te^{2-}$
c. $^{54}Cr^{3+}$

a. platinum-198 = ^{198}Pt: Pt = 78 p, 198 - 78 p = 120 n, neutral = 78 e^-
b. Te = 52 p, 126 - 52 p = 74 n, 52 p + 2 = 54 e^-
c. Cr = 24 p, 54 - 24 p = 30 n, 24 p - 3 = 21 e^-

2

Write a symbol that includes atomic number, mass number, and charge for the species with 51 protons, 72 neutrons, and 54 electrons.

51 p = Sb, mass number = 51 p + 72 n = 123, charge = 51 p - 54 e^- = 3-
symbol = $^{123}_{51}Sb^{3-}$

3

Copper has two naturally occurring isotopes, copper-63 and copper-65. Calculate the average atomic mass of copper using the information in the table below:

isotope	mass	% natural abundance
^{63}Cu	62.930	69.12%
^{65}Cu	64.928	30.88%

(62.930 amu)(0.6912) + (64.928 amu)(0.3088) = 63.55 amu

4

Write the complete electron configuration and specify the number of valence electrons for iodine.

$I = 53\,e^- : 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 \underline{5}s^2 4d^{10} \underline{5}p^5$, 7 valence electrons

5

Write the shorthand noble gas electron configuration and specify the number of valence electrons for zirconium.

$Zr = 40\,e^- : [Kr]\,\underline{5}s^2 4d^2$, 2 valence electrons

6

Write the shorthand noble gas electron configuration for:

a. As^{3-}
b. Sn^{2+} and Sn^{4+}

a. $As = 33\,e^- : [Ar]\,4s^2 3d^{10} 4p^3$
$As^{3-} = 36\,e^- : [Ar]\,4s^2 3d^{10} 4p^6$

b. $Sn = 50\,e^- : [Kr]\,\underline{5}s^2 4d^{10} \underline{5}p^2$
remove two valence 5p electrons, so $Sn^{2+} = 48\,e^- : [Kr]\,\underline{5}s^2 4d^{10}$
then remove two valence 5s electrons, so $Sn^{4+} = 46\,e^- : [Kr]\,4d^{10}$

7

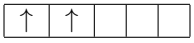
For each of the following, write the orbital diagram, determine the number of unpaired electrons, and state whether the atom or ion is paramagnetic or diamagnetic:

a. Te
b. V^{3+}

a. $Te = 52\,e^- : [Kr]\,5s^2 4d^{10} 5p^4$

2 unpaired electrons, paramagnetic

b. $V = 23\,e^- : [Ar]\,\underline{4}s^2 3d^3$
$V^{3+} = 20\,e^- : [Ar]\,3d^2$



2 unpaired electrons, paramagnetic

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