

Name (PRINT) KEY

1. Which of the following are **even** numbers? [3 pts]

- I. The number of neutrons in a ^{31}P atom II. The number of protons in a ^{31}K atom
III. The number of electrons in a N atom IV. The atomic number of Zn
V. The number of electrons in an iron (II) ion, Fe^{2+}
- a) IV only b) II and IV c) I and III d) III, IV, and V e) **I, IV, and V**

2. Name the following compounds. [5 pts]

Formula	Name
FeCl_3	iron(III) chloride
SF_6	sulfur hexafluoride
Na_2CO_3	sodium carbonate
$\text{Cu}(\text{NO}_2)_2$	copper(II) nitrite
CO	carbon monoxide

3. Write formulas for the following compounds: [4 pts]

Name	Formula
chromium(VI) oxide	CrO_3
potassium cyanide	KCN
tetraphosphorus decasulfide	P_4S_{10}
magnesium phosphate	$\text{Mg}_3(\text{PO}_4)_2$

4. **True or False.** [3 pts]

- a) The formula $\text{C}_6\text{H}_{12}\text{O}_6$ is an empirical formula.

FALSE, the empirical formula would be CH_2O .

- b) A cation is an ion with a net positive charge.

TRUE

c) The mass of a neutron and the mass of a proton are nearly equal in mass.

TRUE

5. The element oxygen consists of three naturally occurring isotopes: ^{16}O , ^{17}O , and ^{18}O . The atomic mass of oxygen is 16.0 amu. What can be implied about the relative abundances of these isotopes? [3 pts]
- a) More than 50% of all O atoms are ^{17}O .
 - b) Almost all O atoms are ^{18}O .
 - c) Almost all O atoms are ^{17}O .
 - d) The isotopes all have the same abundance (33.3%).
 - e) **The abundances of ^{17}O and ^{18}O are very small.**

6. The imaginary element X has the following natural abundances and isotopic masses. What is the atomic mass of X? SHOW WORK! Circle the correct answer. [3 pts]

Isotope	Isotope mass	Abundance
$^{24}_{12}\text{X}$	24.02 amu	30.0%
$^{26}_{12}\text{X}$	26.10 amu	70.0%

$$(0.300)(24.02 \text{ amu}) + (0.700)(26.10 \text{ amu}) = 25.48 \text{ amu}$$

- a) 25.06 amu b) 24.64 amu c) 50.00 amu **d) 25.48 amu** e) 12.00 amu
7. One **mole** of iron (Fe) is? Circle the correct answer. [2 pts]
- a) is heavier than one mole of lead (Pb).
 - b) is 77.0 g of iron.
 - c) is 26.0 g of iron.
 - d) weighs the same as one mole of Pb.
 - e) **none of these**

8. Calculate the **mass** (in g) of 0.00105 moles of krypton (Kr). [2 pts]

$$0.00105 \text{ mol Kr} \times \frac{83.80 \text{ g Kr}}{1 \text{ mol Kr}} = \mathbf{0.0880 \text{ g Kr}}$$

9. At 7:30 this morning, gold was selling at \$26.29 per gram. If you have 5.50×10^{19} atoms of gold (Au), are you rich? More specifically, how many **dollars worth of gold** do you have? SHOW YOUR WORK!!! [4 pts]

$$5.50 \times 10^{19} \text{ atoms Au} \times \frac{1 \text{ mol Au}}{6.022 \times 10^{23} \text{ Au atoms}} \times \frac{196.97 \text{ g Au}}{1 \text{ mol Au}} \times \frac{\$26.29}{1 \text{ g Au}} = \mathbf{\$0.473}$$

No, you are not rich!

$$1 \text{ mole} = 6.022 \times 10^{23} \text{ particles}$$