

last name _____

Scored grade (instructor use only!) _____

1. [4 points] What is the mass, in grams, of 2.30 moles of iodine tribromide? Circle the correct answer.

5.15×10^{-3}	6.27×10^{-3}	8.02×10^{-3}	0.0111	2.30	89.9	366.6
125	159	194	206.8	286.7	366.6	
446.5	476	659	843	1030		

$$2.30 \text{ mol} \times \frac{366.6 \text{ g}}{\text{mol}} = 843 \text{ g}$$

2. [6 pts] Fill in the table below:

Element Symbol	# protons	# neutrons	# electrons	mass #	charge
Fe	26	30	23 (=26-3)	56 (=26+30)	+3
O	8	9	10	17 (=8+9)	-2 (=8-10)

3. [10 pts] Give the correct name for each of the following. Spelling counts.

<u>sulfur trioxide</u>	SO ₃ ← note no charge; sulfite ion is SO ₃ ²⁻
<u>uranium(II) oxide</u>	**UO
<u>magnesium hydride</u>	**MgH ₂
<u>calcium hypochlorite</u>	**Ca(ClO) ₂
<u>phosphorus trichloride</u>	**PCl ₃

4. [10 pts] Give the correct chemical formula for each of the following.

<u>C₄H₁₀</u>	**butane
<u>Fe₂S₃</u>	**iron(III) sulfide
<u>KMnO₄</u>	**potassium permanganate
<u>Se₂S₆</u>	**diselenium hexasulfide
<u>Na₂C₂O₄</u>	**sodium oxalate

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5. [12 pts] Supply the symbol of the correct element for each of the following descriptions. In some cases there could be more than one acceptable answer; pick one.

- _____ A metal in Period 2. -Li, Be
- _____ The Period 4 alkaline earth element. -Ca
- _____ An element that appears as diatomic molecules. -H, N, O, F, Cl, Br, I
- _____ An element that forms cations of variable charge. -any transition metal except Ag or Zn, plus Ga, In, Tl, Sn, Pb, Bi, Po.
- _____ An element that does not form ionic compounds. -He, Ne, Ar, Kr, Xe, Rn, C, Si, B.
- _____ An element that forms both covalent and ionic compounds. -any nonmetal except Group 18, C, Si, B.

6. [18 pts] Clearly indicate whether each statement is TRUE or FALSE. If we can't tell which you mean, it's wrong.

true The value 0.0020420^{sig} has five significant figures.

false All diatomic elements are gases at room temperature. Br₂(l), I₂(s)

true **All isotopes of one element have the same number of protons. isotopes have same #p⁺, diff #n⁰

true All nonmetals are main-group elements. "main group" is groups 1, 2, 13-18.

false The most likely mass number for a phosphorus atom is 30.97. mass numbers must be whole numbers. 30.97 is average mass.

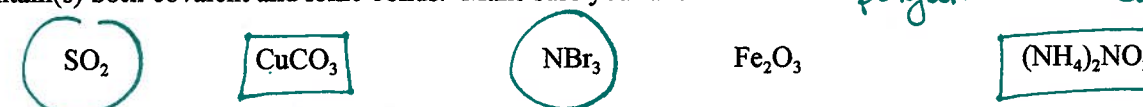
true 1.0 mole of O₂ contains 6.0×10^{23} molecules.

false Hydrogen carbonate anion carries a -2 charge. HCO₃⁻

true $1 \text{ m}^3 = 10^9 \text{ mm}^3$. $1 \text{ m} = 10^3 \text{ mm}$; $(1 \text{ m})^3 = (10^3 \text{ mm})^3 = 10^9 \text{ mm}^3$

true Together, the electrons and protons in an atom or ion determine the charge.
(-) (+)

7. [5 pts] In the list below, (a) circle all compounds that are covalent; (b) draw a square around any species that contain(s) both covalent and ionic bonds. Make sure your answer is clear. polyatomic ions contain covalent bonds.



8. [10 pts]**In the space below, write and balance the equation for the following reaction:
Ammonia and nitrogen monoxide react to produce nitrogen gas and water.

