

Name: _____

[28 pt] 1. Print and complete the names/formulas in the table. Indicate as ionic (I) or covalent (C), and use the corresponding nomenclature.

<u>Name</u>	<u>Ionic/covalent</u>	<u>Formula</u>
dinitrogen tetroxide	_____	_____
sulfur hexafluoride	_____	_____
sulfur trioxide	_____	_____
zinc oxide	_____	_____
silver chloride	_____	_____
lithium sulfide	_____	_____
potassium nitride	_____	_____
_____	_____	CBr ₄
_____	_____	MgBr ₂
_____	_____	KBr
_____	_____	CO
_____	_____	SCl ₆
_____	_____	ClO ₂ (g)
_____	_____	AlCl ₃

[16 pt.] 2. Draw Lewis structures for a) Cl₂, b) H₂, c) CCl₄, and d) CH₄.

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[15 pt.] 3. Consider the carbonate ion (CO_3^{2-}).

- a. Draw the skeleton structure with central atom C.
- b. How many total valence electrons? _____
- c. Draw one correct Lewis structure.

- d. How many lone pairs on the central atom? _____
- e. How many atoms are bonded to the central atom? _____
- f. How many electron charge clouds are around the central atom? _____
- g. What is the molecular geometry (3D shape)? _____
- h. Are the bonds polar (yes/no)? _____
- i. Is carbonate ion polar or non-polar? _____
- j. Are there any resonance structures? If so, draw one. _____

[15 pt.] 4. Consider sulfur dioxide (SO_2).

- a. Draw the skeleton structure with central atom S.
- b. How many total valence electrons? _____
- c. Draw one correct Lewis structure.

- d. How many lone pairs on the central atom? _____
- e. How many atoms are bonded to the central atom? _____
- f. How many electron charge clouds are around the central atom? _____
- g. What is the molecular geometry (3D shape)? _____
- h. Are the bonds polar (yes/no)? _____
- i. Is sulfur dioxide polar or non-polar? _____
- j. Are there any resonance structures? If so, draw one. _____

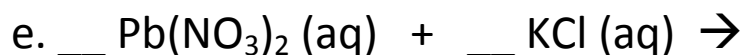
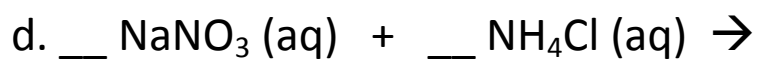
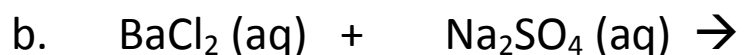
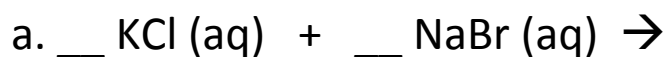
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[24 pt.] 5. Balance the following reactions.



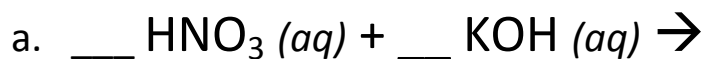
Name: _____

[20 pt.] 6. Use the solubility guidelines to determine if any of the following are precipitation reactions. If so, complete the right side and balance the equation. If not, write “n.r.” (no reaction).

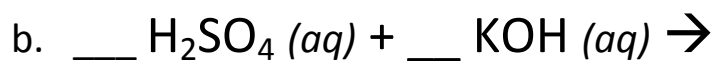


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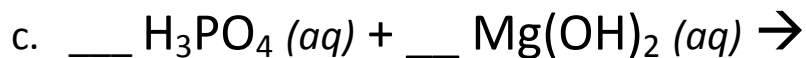
[16 pt.] 7. Complete and balance the neutralization reactions. List all spectator ions for each reaction.



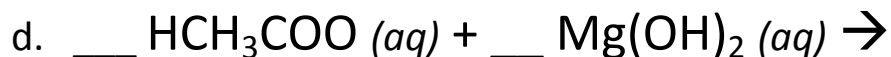
Spectator ions:



Spectator ions:



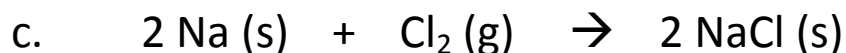
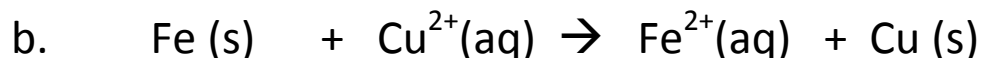
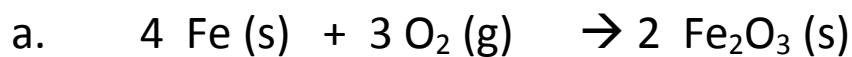
Spectator ions:



Spectator ions:

Name: _____

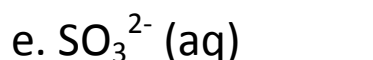
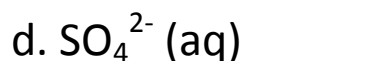
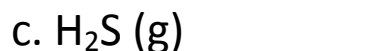
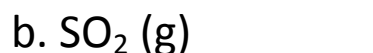
[6 pt.] 8. Circle the **reducing agent** in the following redox reactions:



[8 pt.] 9. Predict whether the following covalent bonds are polar or non-polar using electronegativity difference:



[10 pt.] 10. Give the oxidation number for sulfur in the following:

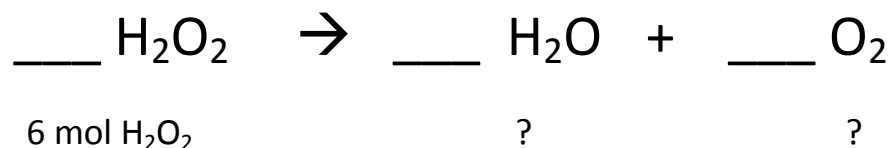


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11. [10 pts, 192-E3-1]

a. **Balance** the below equation for peroxide (H_2O_2) decomposition.

b. Calculate **how many moles of products (water and oxygen)** are produced when 6 mol of H_2O_2 decomposes.



12. [15 pts, 193-E3-2]

For the below (already balanced) equation:



a. Calculate the **theoretical yield in grams of $\text{Fe}(\text{C}_6\text{H}_5\text{O})_3$** given 0.103 grams of phenol ($\text{C}_6\text{H}_5\text{OH}$) reacts with excess FeCl_3 .

b. What is the **percent yield** if an experiment produces an actual yield of 0.118 grams of $\text{Fe}(\text{C}_6\text{H}_5\text{O})_3$?

$\text{Fe}(\text{OH})_3$ theoretical yield: _____

$\text{Fe}(\text{OH})_3$ percent yield: _____

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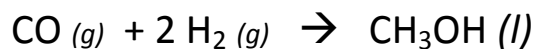
13. [20 pts, 131E1practice-#11] 75.0 kg of hydrazine and 75.0 kg oxygen are reacted as below in the **unbalanced** reaction. What is the limiting reactant? What is the theoretical yield for NO₂?



Limiting reactant: oxygen
NO₂ theoretical yield: 72.0 kg

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[20 pt.] 14. Determine the limiting reactant when 37 g of carbon monoxide gas is reacted with 6.5 g H₂ using the balanced combustion equation below. Show your work, and write your answers below.



- What is the **limiting reactant**?
- What is the **theoretical yield for CH₃OH**?
- An experiment makes 28 g CH₃OH. What is the **percent yield**?

Limiting reactant: CO

Theoretical yield: 42 g CH₃OH

Percent yield: 71%

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15. **Balance** the below equation. What is the **limiting reactant** when 50.0g of propane (C_3H_8) reacts with 30.0 g oxygen? What is the **theoretical yield for CO_2** ? How many grams of **excess reactant** remain?



Limiting reactant: _____

CO_2 theoretical yield: _____

Excess reactant: _____

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[20 pt., 193-E3-3] 16. In the below (already balanced) equation, 0.530 g of cetane ($C_{16}H_{34}$) reacts with 2.52 g of oxygen.



- What is the **limiting reactant**?
- What is the **theoretical yield for CO_2** ?
- How many grams of **excess reactant** remain?

Limiting reactant: _____
 CO_2 theoretical yield: _____
grams of excess reactant: _____

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Table of solubility guidelines for ionic compounds.

Soluble	Exceptions
Ammonium compounds (NH_4^+)	None
Lithium compounds (Li^+)	None
Sodium compounds (Na^+)	None
Potassium compounds (K^+)	None
Nitrates (NO_3^-)	None
Perchlorates (ClO_4^-)	None
Acetates (CH_3CO_2^-)	None
Chlorides (Cl^-)	Ag^+ , Hg_2^{2+} , and Pb^{2+} compounds
Bromides (Br^-)	
Iodides (I^-)	
Sulfates (SO_4^{2-})	Ba^{2+} , Hg_2^{2+} , and Pb^{2+} compounds

