

CHM 106
Quiz I

Rank the following compounds in order of increasing melting and boiling points and explain your answer.

<u>Compound</u>	<u>Structure</u>
Chlorobenzene	C_6H_5Cl
Phenol	C_6H_5OH
Toluene	$C_6H_5CH_3$

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Quiz 2

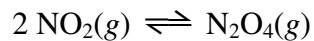
Concentrated phosphoric acid contains 1437.1 g of H_3PO_4 per liter of aqueous solution. The density of phosphoric acid is 1.70 g / mL and the molar mass of H_3PO_4 is 97.10 g / mol.

1. What is the molarity of concentrated phosphoric acid?

2. In order to perform an experiment, 0.10 M phosphoric acid is needed. What volume of concentrated H_3PO_4 is required to make 5.00 L of 0.10 M phosphoric acid solution?

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Quiz V

In the gas phase, nitrogen dioxide is in equilibrium with dinitrogen tetroxide:



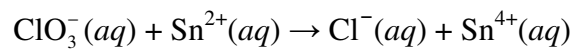
1. Write an equilibrium expression that relates the concentrations of reactants and products to the equilibrium constant.

2. At 400 K, the equilibrium constant for this reaction is $K_{\text{eq}} = 1.92 \times 10^{-2} \text{ L / mol}$. What does this tell you about the position of the equilibrium?

3. At equilibrium, the reaction vessel contains $[\text{NO}_2] = 0.012 \text{ M}$. What is the concentration of $\text{N}_2\text{O}_4(g)$?

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Quiz VI

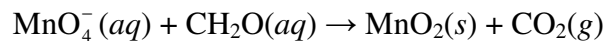
In acidic solution, chlorate reacts with tin (II) ions to produce chloride and tin (IV) ions:



1. Assign oxidation states to all atoms.
2. What atom is getting reduced? What atom is getting oxidized?
3. Using the method of half-reactions, write a balanced chemical equation for this reaction.

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Quiz VII

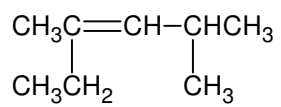
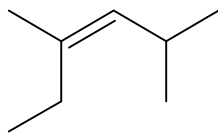
Permanganate reacts with formaldehyde to produce manganese (IV) oxide and carbon dioxide:



1. Assign oxidation states to all atoms.
2. Identify which reagent reacts as an oxidizing agent and which reagent reacts as a reducing agent.
3. Using the method of half-reactions, balance this equation.
4. How many moles of permanganate are necessary to produce 100.0 g of $\text{CO}_2(g)$? The molecular weight of CO_2 is 44.00 g / mol.

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Quiz VIII

1. Provide an unambiguous, systematic name for the following compound, shown as both a line-angle drawing and a structural formula:



2. Using a line-angle drawing or structural formula, draw 3-ethyl-2,2-dimethyl-4-heptyne.

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Quiz IX

For each question, draw the structure of an organic molecule with the desired functional group that has *exactly* five carbon atoms. Provide an unambiguous, systematic name for each molecule.

1. Ketone

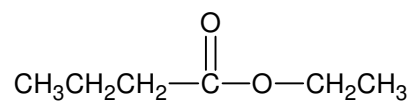
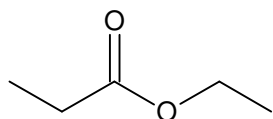
2. Carboxylic acid

3. Alcohol

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Quiz X

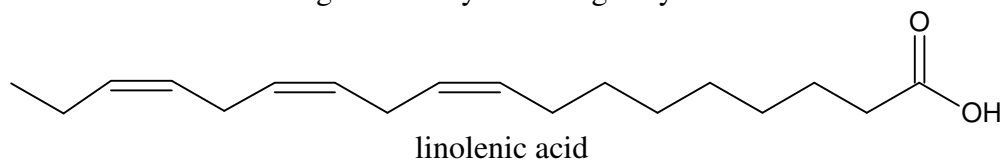
1. Draw the structure of the compound 1-amino-4-bromobenzene.

2. Provide an unambiguous, systematic name of the following compound, shown as both a line-angle drawing and a structural formula.



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Quiz 11

Linolenic acid is an 18-carbon long commonly occurring fatty acid.



1. Draw the structure of the triglyceride formed from glycerol (1,2,3-propanetriol) and three molecules of linolenic acid.

2. Is this lipid saturated or unsaturated? How can you tell?

3. Would you expect this lipid to be a solid (fat) or liquid (oil)? Explain.