## **CHEM 454: Organometallic Chemistry**

## Topic: 18-Electron Rule

<b>:</b>		_Roll No	_Submission date:
Problems: Application of the 18-electron rule			
1. Determine the oxidation state of each M. Identify the 1st-row transition metal and draw the			
structure.			
a.	M(CO)(CS)(PPh₃)₂Br		
b.	[M(CO) <sub>7</sub> ] <sup>+</sup>		
c.	$[(\eta^3-C_3Ph_3)(\eta^4-C_4H_4)M(NH_3)_2]$	]+	
2. Determine the oxidation state of each M. Identify the 2nd-row transition metal and draw the			
structure.			
a.	[M(CO) <sub>3</sub> (NO)] <sup>-</sup>	(linear NO)	
b.	$(\eta^4-C_8H_8)M(CO)_3$		
с.	$[M(CO)_3(PMe_3)]^-$		
3. Determine the charge, n, for each of the following compounds.			
a.	[Ru(CO) <sub>4</sub> (SiMe <sub>3</sub> )] <sup>n</sup>		
b.	$[(\eta^6 - C_6 H_6)_2 Ru]^n$		
с.	$[(\eta^3 - C_3H_5)V(CNMe)_5]^n$		
	Deternstructua.  Deternstructua.  b.  c.  Deterna.  b.  c.  Deterna.  b.	Problems: App  Determine the oxidation state of eastructure.  a. M(CO)(CS)(PPh <sub>3</sub> ) <sub>2</sub> Br  b. [M(CO) <sub>7</sub> ] <sup>+</sup> c. [(η <sup>3</sup> -C <sub>3</sub> Ph <sub>3</sub> )(η <sup>4</sup> -C <sub>4</sub> H <sub>4</sub> )M(NH <sub>3</sub> ) <sub>2</sub> Determine the oxidation state of eastructure.  a. [M(CO) <sub>3</sub> (NO)] <sup>-</sup> b. (η <sup>4</sup> -C <sub>8</sub> H <sub>8</sub> )M(CO) <sub>3</sub> c. [M(CO) <sub>3</sub> (PMe <sub>3</sub> )] <sup>-</sup>	Determine the oxidation state of each M. Identify the 1st-restructure.  a. M(CO)(CS)(PPh <sub>3</sub> ) <sub>2</sub> Br  b. [M(CO) <sub>7</sub> ] <sup>+</sup> c. [(η <sup>3</sup> -C <sub>3</sub> Ph <sub>3</sub> )(η <sup>4</sup> -C <sub>4</sub> H <sub>4</sub> )M(NH <sub>3</sub> ) <sub>2</sub> ] <sup>+</sup> Determine the oxidation state of each M. Identify the 2nd-structure.  a. [M(CO) <sub>3</sub> (NO)] <sup>-</sup> (linear NO)  b. (η <sup>4</sup> -C <sub>8</sub> H <sub>8</sub> )M(CO) <sub>3</sub> c. [M(CO) <sub>3</sub> (PMe <sub>3</sub> )] <sup>-</sup> Determine the charge, n, for each of the following compourance in [Ru(CO) <sub>4</sub> (SiMe <sub>3</sub> )] <sup>n</sup> b. [(η <sup>6</sup> -C <sub>6</sub> H <sub>6</sub> ) <sub>2</sub> Ru] <sup>n</sup>