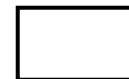
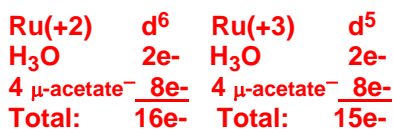
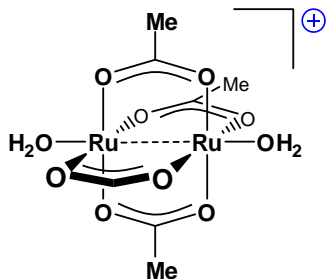


Homework # 1: Due: February 14, 2008

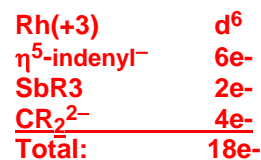
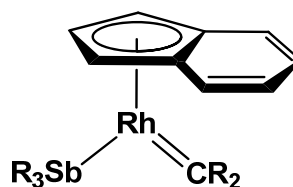
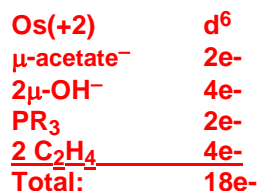
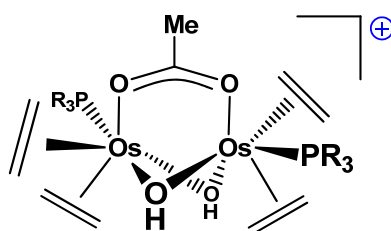
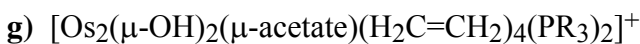
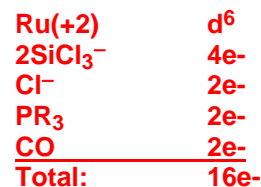
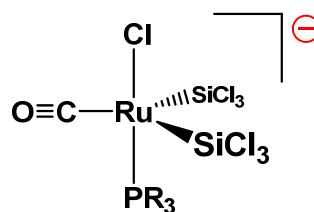
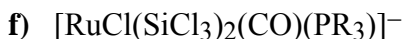
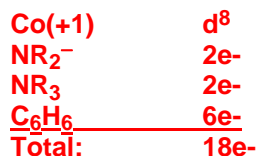
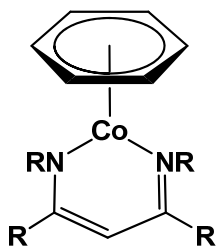
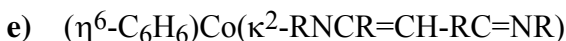
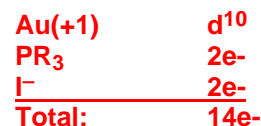
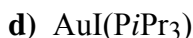
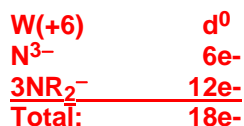
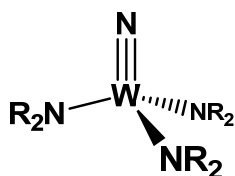
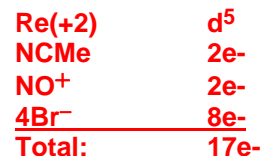
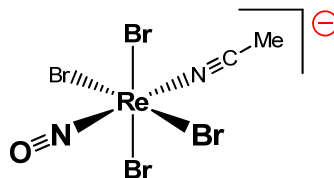
Check the box to the right if you want your graded homework to be placed out in the public rack outside Prof. Stanley's office. Otherwise you will have to pick up your homework from Prof. Stanley in person:

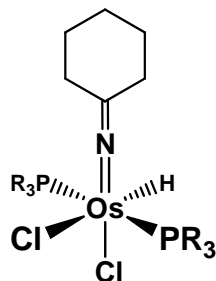
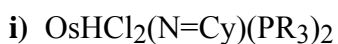


1. (38 pts) Sketch out a structure showing the geometry about the metal center as accurately as possible and clearly show the electron counting for the complexes below. Phosphine ligand abbreviations are defined in your notes (phosphine ligand section). All the examples below are from the 2007-08 Cambridge Crystallographic Database (available from Prof. Stanley or Tigerware).

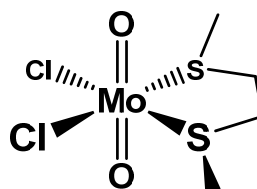
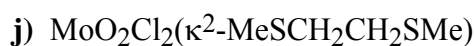


*This is a mixed oxidation state system with an average Ru oxidation state of +2.5 via resonance. The dashed line between the Ru represents this resonance.*

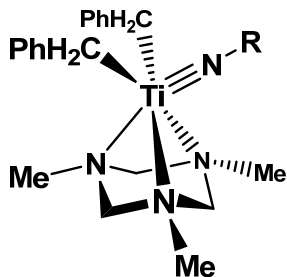
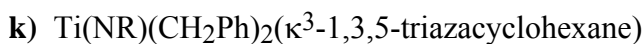




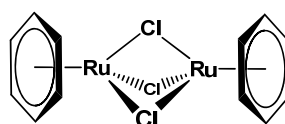
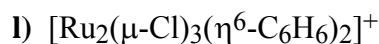
$\text{Os}(+4)$	$d^4$
$\text{NR}_2^-$	$4e^-$
$2\text{Cl}^-$	$4e^-$
$\text{H}^-$	$2e^-$
$2\text{PR}_3$	$4e^-$
<b>Total:</b>	<b><math>18e^-</math></b>



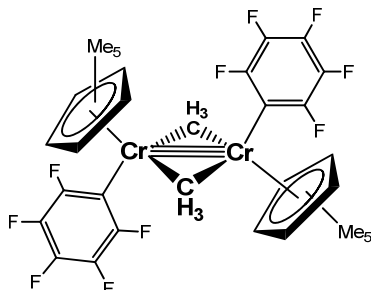
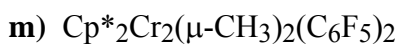
$\text{Mo}(+6)$	$d^0$
$2\text{O}^{2-}$	$8e^-$
$2\text{Cl}^-$	$4e^-$
$2\text{SR}_2$	$4e^-$
<b>Total:</b>	<b><math>16e^-</math></b>



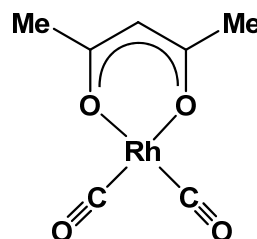
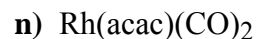
$\text{Ti}(+4)$	$d^0$
$\text{NR}^{2-}$	$6e^-$
$2\text{CR}_3^-$	$4e^-$
$3\text{NR}_3$	$6e^-$
<b>Total:</b>	<b><math>16e^-</math></b>



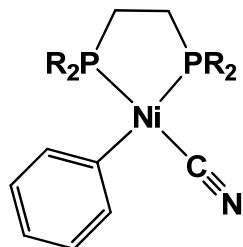
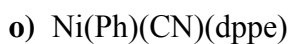
$\text{Ru}(+2)$	$d^6$
$\eta^6\text{-C}_6\text{H}_6$	$6e^-$
$3\mu\text{-Cl}^-$	$6e^-$
<b>Total:</b>	<b><math>18e^-</math></b>



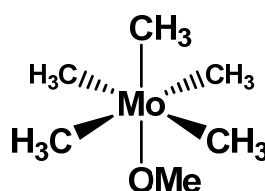
$\text{Cr}(+3)$	$d^3$
$\text{Cp}^-$	$6e^-$
$\text{C}_6\text{F}_5^-$	$2e^-$
$2\mu\text{-CR}_3^-$	$2e^-$
<b>Sub-total:</b>	<b><math>13e^-</math></b>
$3\text{Cr-Cr}$	$3e^-$
<b>Total:</b>	<b><math>16e^-</math></b>



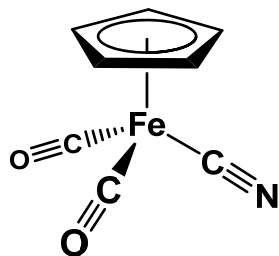
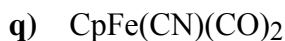
$\text{Rh}(+1)$	$d^8$
$\text{acac}^-$	$4e^-$
$2\text{CO}$	$4e^-$
<b>Total:</b>	<b><math>16e^-</math></b>



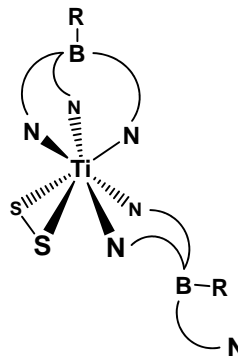
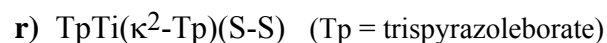
$\text{Ni}(+2)$	$d^8$
$\text{Ph}^-$	$2e^-$
$\text{CN}^-$	$2e^-$
$2\text{PR}_3$	$4e^-$
<b>Total:</b>	<b><math>16e^-</math></b>



$\text{Mo}(+6)$	$d^0$
$5\text{CH}_3^-$	$10e^-$
$\text{OMe}^-$	$4e^-$
<b>Total:</b>	<b><math>14e^-</math></b>



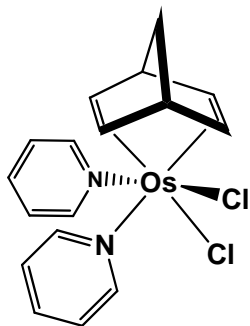
$\text{Fe}(+2)$	$d^6$
$\text{Cp}^-$	$6e^-$
$\text{CN}^-$	$2e^-$
$2\text{CO}$	$4e^-$
<b>Total:</b>	<b><math>18e^-</math></b>



$\text{Ti}(+4)$	$d^0$
$\text{S}_2^{2-}$	$4e^-$
$\text{Tp}^-$	$6e^-$
$\kappa^2\text{-Tp}^-$	$4e^-$
<b>Total:</b>	<b><math>14e^-</math></b>

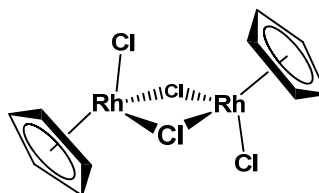
2. (12 pts) Propose an *18e- structure* for the following metal/ligand combinations. Use at least one of each metal and ligand listed. Complexes must be neutral. Don't use more than 2 metal centers. Clearly show your electron counting. Ligands are shown without charges, please indicate the proper ligand charge in your electron counting. Draw a reasonable structure showing the geometry about the metal center(s).

a) Os, norbornadiene, Cl, pyridine



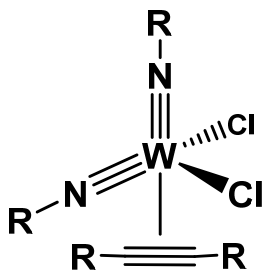
Os(+2)	d <sup>6</sup>
2 Cl <sup>-</sup>	4e-
2 pyridine	4e-
nbd	4e-
<b>Total:</b>	<b>18e-</b>

b) Rh, Cp, Cl



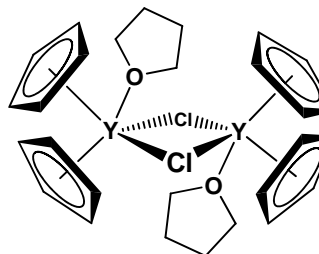
Rh(+3)	d <sup>6</sup>
Cp <sup>-</sup>	6e-
Cl <sup>-</sup>	2e-
2 μ-Cl <sup>-</sup>	4e-
<b>Total:</b>	<b>18e-</b>

c) W, Cl, NR, RC≡CR



W(+6)	d <sup>0</sup>
2 NR <sup>2-</sup>	12e-
2 Cl <sup>-</sup>	4e-
alkyne	2e-
<b>Total:</b>	<b>18e-</b>

d) Y, Cp, Cl, THF



Y(+3)	d <sup>0</sup>
2 Cp <sup>-</sup>	12e-
2 μ-Cl <sup>-</sup>	4e-
THF	2e-
<b>Total:</b>	<b>18e-</b>