

# CHEM 432 Practice Test 3

(1) The electron transfer rate is ~ the same rate as the self rxns and is 2 orders of magnitude faster than the ~~outer~~ ligand exchange rate. It is outer sphere.

(2)  $k_{11} = 1 \times 10^5 \text{ s}^{-1}$   
 $k_{22} = 5 \times 10^4 \text{ M}^{-1} \text{ s}^{-1}$   $f \approx 1$

$$K_{12} = ?$$

$$k_{12} = 4 \times 10^5 \text{ M}^{-1} \text{ s}^{-1}$$

$$k_{12} = \sqrt{k_{11} k_{22} K_{12} f_{12}}$$

$$4 \times 10^5 \text{ M}^{-1} \text{ s}^{-1} = \sqrt{(1 \times 10^5 \text{ s}^{-1})(5 \times 10^4 \text{ M}^{-1} \text{ s}^{-1}) K_{12}} \quad (1)$$

$$1.6 \times 10^{11} \text{ M}^{-2} = 5 \times 10^9 \text{ M}^{-2} K_{12}$$

$$\boxed{32 \approx K_{12}}$$

13) a)  $PPh_3$  Brønsted-Lowry, Lewis base

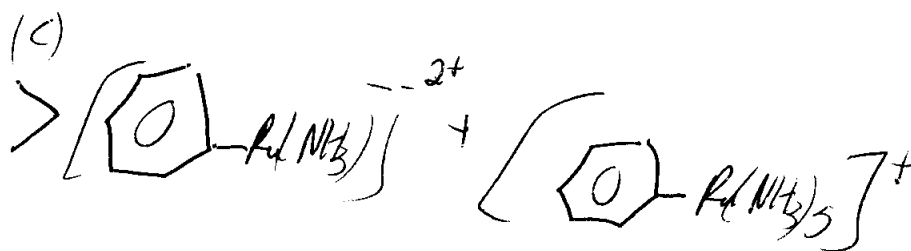
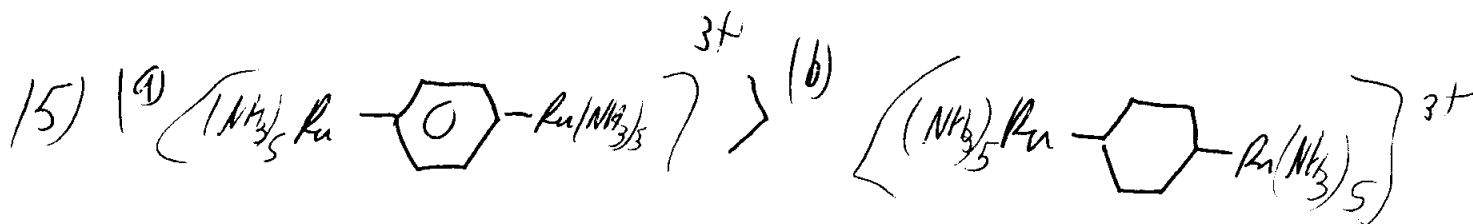
b)  $H_2SO_4$  Arrhenius, Brønsted-Lowry, Lewis acid

c)  $AlCl_3$  Lewis acid

d)  $SiO_2$  Lux Flood acid

14)

base	hardness
$I^-$	3.70
$Me_3N$	6.3
$F^-$	7.01
$NH_3$	8.2



(5 cont)

(a) is the fastest because the metals are held together

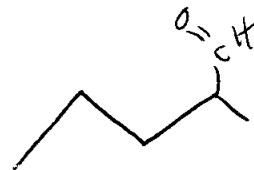
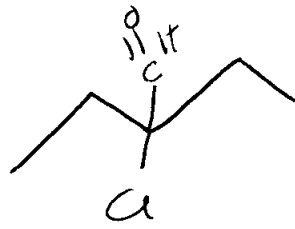
in the right orientation by the peroxide bridging ligand.

The bridging ligand is conjugated

(b) The bridging ligand is not conjugated, but  
the reactants are held in the right orientation

(c) the reactants must collide and electron transfer  
must occur before they can diffuse apart. This should  
be slow.

16)



possible products

