Quiz 2 Answers
Chem6C

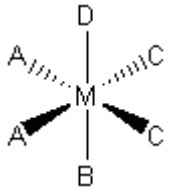
Name_____
PID number_____

Directions: You have 20 minutes. Three 3x5 index card is permitted. You will get a **0** on the quiz if a cell phone makes a noise, use of a graphing calculator, or cheating occurs. Good luck!

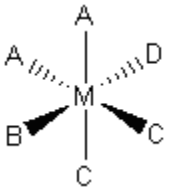
Put your answer in a box if provided

Useful info: Planks Constant $h=6.626\times10^{-34}$ J·s and Speed of Light in a vacuum $c= 3\times10^{8}$ m/s

1.) Is Compound A and Compound B enantiomeric Pairs? Yes or No (1 point)



Compound A



Compound B

No. They are superimposable mirror images of each other

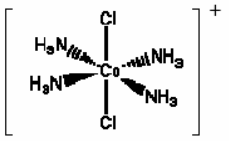
2.) Name or provide the formula for the following compounds. (2 points each).

a.) $[CoCl(NO_2)(NH_3)_4]Cl$
tetraamminechloronitrocobalt(III) chloride

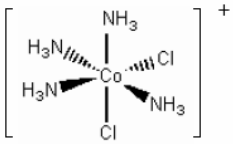
b.) potassium tetrachloropalladate(II)
$K_2[Pd(Cl)_4]$

3.) Name the two following **Geometric** isomers (2 points each)

MA_4B_2 –two possible geometric isomers



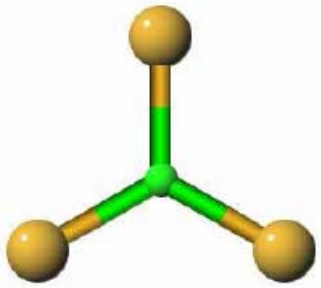
trans-tetraamminedichlorocobalt(III)ion



cis-tetraamminedichlorocobalt(III) ion

4.) What is the coordination number of the following Lewis Acid? (1 point)

3



BF_3

5.) Answer the following (1 point each)

6

a.) The lanthanide shift occurs in what period (row)?

b.) Circle one

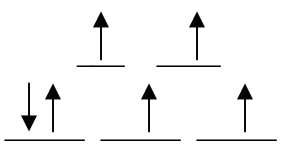
Does the density (increase) or decrease due to the lanthanide shift?

6.) Circle the metal with the larger radius. Hint (pay attention to valence shell occupancy) (1 point each)

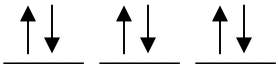
a.) V and (Nb)

b.) (Zn) and Cu (this answer is due to the full vacancy of S and d shells)

7.) Cyanide ligands produce strong crystal field splittings in an octahedral complex. Hydroxide (OH) ligands produce weak crystal field splittings in an octahedral complex. Draw the two different electron configurations of a low spin d^6 Co^{3+} complex. Use the five d orbitals with the triply degenerate (T_{2g}) and doubly degenerate (e_g) energy states. (2 Points)



Hydroxide (OH) splitting (high spin)



Cyanide splitting (Low Spin)

8.) The $[Ti(H_2O)_6]^{3+}$ compound absorbs 580 nm light (yellow region) (2 points)

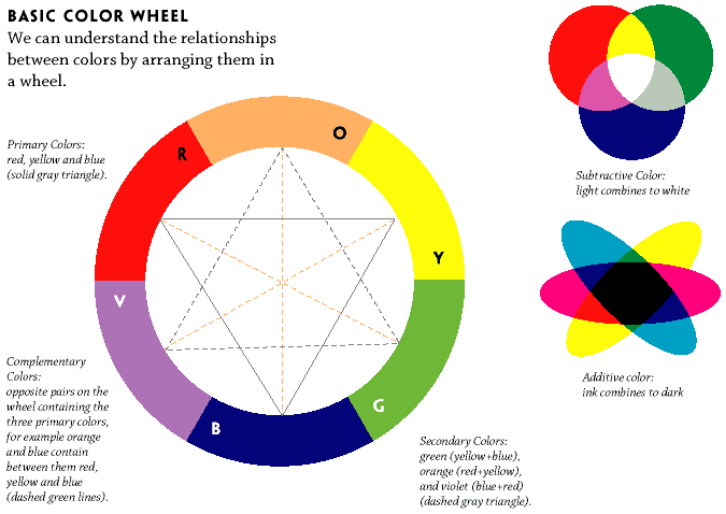
a.) Calculate the splitting energy of this octahedral compound.

$E=hC/\lambda$

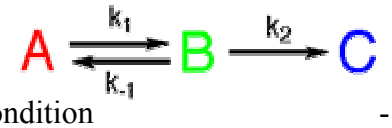
$(6.626x10^{-34}\ J\cdot s)*(3x10^{8}\ m/s)/5.80x10^{-7}m = 3.427x10^{-19}J$

b.) Estimate the color of this compound.

Violet or intense blue



9.) Fill in the following table given the reaction below and approximate the rate conditions (fast, medium-fast, medium, and slow) which would satisfy the pre-equilibrium approximation? The steady state approximation?



Pre-equilibrium Condition -

K_1	fast
K_{-1}	fast
K_2	slow

Steady-State Approximation

K_1	Medium-fast
K_{-1}	fast
K_2	slow

For more info on this problem See
http://www.ch.cam.ac.uk/magnus/kinetic.html