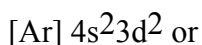


Transition Metals' and Coordination Compounds' Problem Set (8)

1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt									

58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

- Give the most common oxidation states for:
 - Titanium
 - Manganese
 - Cobalt
 - Copper
 - Zinc
- The electron configuration for titanium may be represented in the following two ways:



Write the electronic configuration in both of these forms for Cr, Mn, Fe and Ni.

NOTE: You may find it extremely helpful to go to the Library and check out one of the 2 copies of King (**Ionic Reactions and Separations: Experiments in Qualitative Analysis.** (Harcourt Brace Jovanovich: Austin) © 1973) that is On Reserve. You may also find it extremely helpful to use a traditional chemistry textbook that is on the shelves for check-out, there, as well, unless you have one of your own that was NOT published for the ACS.

3. Now write the electronic configuration in both forms for Cr^{2+} , Mn^{2+} , Fe^{3+} and Ni^{2+} .
4. Give the most common oxidation states for:
 - A. Chromium
 - B. Gold
 - C. Silver
 - D. Hg
 - E. Iron
 - F. Platinum
5. Write the electronic configurations in the formats described above in Question # 2 for the following:
 - A. Fe
 - B. Fe^{2+}
 - C. Fe^{3+}
 - D. Sc
 - E. Sc^{3+}
6. What volume of 18 M sulfuric acid could be prepared from the sulfur dioxide produced from smelting 5 tons of cuprous sulfide, assuming that only 50% of the SO_2 produced can be converted to the acid?
7. Explain using balanced chemical reactions and your own words how Zn protects nails from rusting.
8. Name the following compounds:
 - A. Cu_2O
 - B. CuO
 - C. CuCO_3
 - D. CuSO_4
 - E. CuS
 - F. ZnO
 - G. ZnCO_3
 - H. ZnSO_4
 - I. AgNO_3
 - J. AgCl
9. Which transition metals are magnetic? Why?
10. What is the difference between paramagnetism, diamagnetism and ferromagnetism? How does ferromagnetism work?

11. Write the chemical formulas for the following:

- a. dichloroaurate(I) ion
- b. tetrachloronickelate(II) ion
- c. tetracyanonickelate(II) ion
- d. hexaamminecobalt(III) ion
- e. dicyanoargentate(I) ion
- f. tetrachloroplumbate(II) ion
- g. tetrachloroplatinate(II) ion
- h. hexaaquacopper(II) ion
- i. diaquatetrachlorocuprate(II) ion
- j. pentaquaamminecopper(II) ion
- k. triaquatrchlorocuprate(II) ion
- l. dicyanotetraaquairon(III) ion
- m. oxalatotetraamminenickel(II) ion
- n. potassium hexacyanomanganate (III) ion
- o. triamminetrichlorochromium(III)
- p. diamminetetraaquacobalt(II) chloride

12. Write the names of the following coordination compounds:

- a. $[\text{Zn}(\text{NH}_3)_4]^{2+}$
- b. $[\text{Fe}(\text{CN})_6]^{4-}$
- c. $[\text{CuCl}_4(\text{H}_2\text{O})_5]^{2+}$
- d. $[\text{FeF}_6]^{4-}$
- e. $[\text{Cu}(\text{NH}_3)(\text{H}_2\text{O})_5]^{2+}$
- f. $[\text{PbCl}_2\text{Br}_2]^{2-}$
- g. $\text{K}[\text{Cr}(\text{NH}_3)_2\text{Cl}_2\text{Br}_2]$
- h. $[\text{Cr}(\text{NH}_3)_2(\text{H}_2\text{O})_2\text{Br}_2]^+$
- i. $[\text{Cu}(\text{NH}_3)_4][\text{Pt}(\text{Cl})_4]$
- j. $\text{K}[\text{PtNH}_3\text{Cl}_5]$
- k. $[\text{Co}(\text{Cl}(\text{NH}_3)_3(\text{H}_2\text{O})_2)]\text{Br}$
- l. $[\text{Ni}(\text{NH}_3)_6]^{2+}$
- m. $[\text{CrCl}_3(\text{NH}_3)_3]^0$
- n. $[\text{Mn}(\text{C}_2\text{O}_4)_4]^{3-}$
- o. $[\text{Co}(\text{H}_2\text{O})_4(\text{NH}_3)_2]\text{Cl}_2$
- p. $[\text{Co}(\text{en})_2(\text{H}_2\text{O})_2]_2(\text{SO}_4)_3$