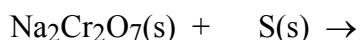
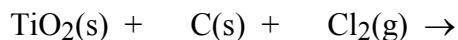
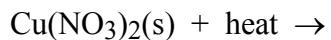
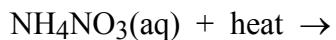
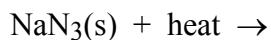


Chemistry 2500 Exam Four

Name _____

1. (48 points) Complete and balance each reaction shown below. Use smallest integer values possible for coefficients. Assume the requisite temperature for those that need it.



2. (10 points) Give the name (not the symbol) of the element with the atomic number shown.

39:

40:

41:

42:

43:

44:

45:

46:

47:

48:

3. (9 points) Name the following complexes.

- a) $[\text{Zn}(\text{en})_2]\text{Br}_2$
- b) $\text{Na}[\text{Fe}(\text{H}_2\text{O})_2(\text{C}_2\text{O}_4)_2]$
- c) $[\text{Co}(\text{en})_2\text{Cl}_2]$

4. (9 points) Write the chemical formulae for the following complexes. (The abbreviation “en” may be used for ethylenediamine.)

- a) pentaqua**br**omomanganese(III) nitrate
- b) potassium hexacyanoferrate(II)
- c) sodium tetrachloro(ethylenediamine)cobaltate(III)

5. (8 points) Ortho-phenanthroline, $\text{C}_8\text{H}_6\text{N}_2$, is a bidentate ligand, commonly abbreviated “phen”. Use a d-orbital diagram to explain why $[\text{Fe}(\text{phen})_3]^{2+}$ is diamagnetic while $[\text{Fe}(\text{phen})_2(\text{H}_2\text{O})_2]^{2+}$ is paramagnetic.

6. (8 points) Between the two complexes, hexacyanoferrate(III) and tetrachloroferrate(III), which is more likely to be high-spin and which is more likely to be low-spin? Explain your answer.

7. (8 points) Hydrogen azide reacts with diiodine in a 2:1 molar ratio. Deduce the products and give a complete and balanced reaction.