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5.111 Principles of Chemical Science  
Fall 2008

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## INSTRUCTIONS AND LOGISTICS FOR 5.111 FINAL EXAM

**FINAL (300 points):** Approximately 140 points of the final exam covers lectures #27-36 (transition metals and kinetics), associated reading, problem sets #9-10, and the extra problem set. Approximately 160 points of the final exam covers lectures #1-26 and associated reading, and problem sets #1-8. Exam is closed book and closed notes. Paper or electronic dictionaries are not allowed. A list of physical constants, equations, and a periodic table without electron configurations will be supplied. Bring your calculator. Please note that bringing calculators with any relevant physical or chemical information is cheating. The one and only exception is that if your calculator includes values for extremely common fundamental physical constants like  $c$  and  $h$  and  $m_e$ , it is acceptable to use it. No constants that are commonly defined in terms of fundamental constants (for example, the Rydberg constant or the Bohr radius) are acceptable. It is your responsibility to make sure that no unacceptable information is available on your calculator. Quantitative solutions to problems must have the correct number of significant figures. Full credit will only be awarded if your work is presented clearly, contains correct units, and is intelligible.

Equations that you are responsible for are the same as those for the hour exams. See instructions for Exams 1, 2, and 3. For the new material, you are required to know that  $I^-$ ,  $Br^-$ ,  $Cl^-$  are weak field ligands, that  $F^-$ ,  $OH^-$ ,  $H_2O$  are weak to intermediate field ligands, and that  $NH_3$ ,  $CN^-$ ,  $CO$  are strong field ligands. Equations that you need to know include those for calculating electron d-counts, CFSE,  $E=h\nu$ ,  $c=\lambda\nu$ ,  $\Delta E = E_{a,r} - E_{a,r}$ .