

Chem 155 Homework #9 Due at the start of class on **FRIDAY MARCH 4**

Reading: Chapter 16, begin Chapter 17 (note—you should try to read ALL of chapter 17 before the last day of lecture).

Chapter 15 Problems: for review
15.31

Chapter 16 Problems:

16.5

16.8

16.10

16.12

16.16

16.17

16.18

Additional Problems:

1) A quantum cascade laser is a laser that emits light when electrons make transitions between levels in artificial quantum wells grown in a semiconductor chip. Treat the energies as a 1D 'particle-in-an-infinite-box' problem and assume the laser action occurs between the $n=3$ and $n=2$ levels in wells that are 2.5 nm wide. What wavelength of light is emitted? What part of the spectral region is this? *Suggest how a chemist might use such a laser to make a measurement of chemical relevance.*

2) Discuss the experimental evidence supporting the existence of molecular orbitals. Explain how a chemist might measure the energy of an electron in a particular molecular orbital.