Characteristics of functional groups in IR spectra: Fill in the following chart with up to three shared peaks that are characteristic of a functional group. Some locations are best reported as ranges.

Functional Group	Location	Intensity	Breadth
e.g., carboxylic acid	*~2500-3500*	*Weak*	*Very broad*
e.g., aldehyde	*~2720-2750*	*Very weak*	*Moderate*
Alkane			
Aromatic			
Alkene			
Alcohol			
Phenol			
Carboxylic acid			
Ketone			
Aldehyde			
Ester			

Answer the following questions:

5. What effect does conjugation (alternating pi bonds) have on the location of C=O peaks? First find all examples of the C=O functional groups and then determine which peak they all share. Then compare that peak within a functional group between the conjugated and unconjugated examples to determine the effect of conjugation. Each C=O containing functional group has two conjugated examples and two unconjugated examples. Explain, using specific examples.

6. How can you distinguish an alkene from an aromatic using IR spectra? Explain, using specific examples.

7. How can you distinguish alcohols, phenols, and carboxylic acids from one another using IR spectra? Explain, using specific examples.

8. How can you distinguish an aldehyde from a ketone using IR spectra? Explain, using specific examples.

9. How can you distinguish a carboxylic acid from an ester using IR spectra? Explain, using specific examples.