Assign one of the structures A – J presented on page 2 to each of the IR spectra provided (1 – 10). Base your assignment on one or more key frequencies, according to guidelines presented in the recitation notes and on p. A19–A31 of your textbook. Especially useful are p. A19 and A20. For each spectrum do the following:

1. Mark key absorption frequencies in the spectrum, and associate each with a specific bond (e.g. O–H, C=O). Keep in mind that there are usually only one or two key bands in each spectrum, although in some cases you might observe up to three. Do not label the alkane C–H stretch, since these bands are present in most organic compounds.

2. Assign a letter from the structures given (A – J). There is only one structure per spectrum.

3. Identify the main functional group present in the structure (i.e. ketone, alcohol, etc.).

4. Provide approximate frequency values for the bands you labeled in the spectrum (in cm\(^{-1}\)), and identify their shape (broad, medium, or narrow) and intensity (weak, medium, or strong).

Each of the above items is worth 2.5 points, for a total of 10 points per question.

EXAMPLE

<table>
<thead>
<tr>
<th>MOLECULE ASSIGNED</th>
<th>MAIN FUNCTIONAL GROUP</th>
<th>KEY BANDS</th>
<th>Approximate frequency</th>
<th>Shape</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Carboxylic acid</td>
<td>O–H</td>
<td>3000</td>
<td>broad</td>
<td>strong</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C=O</td>
<td>1700</td>
<td>medium</td>
<td>strong</td>
</tr>
</tbody>
</table>

INCOMPLETE OR UNCLEAR ANSWERS WILL RECEIVE NO CREDIT.
MOLECULE ASSIGNED: _____ MAIN FUNCTIONAL GROUP: ________________________________

KEY BANDS:

Bond: ______ Approximate frequency: ______ Shape: ________ Intensity: ________
Bond: ______ Approximate frequency: ______ Shape: ________ Intensity: ________
Bond: ______ Approximate frequency: ______ Shape: ________ Intensity: ________

GRADE ___________
MOLLECULE ASSIGNED: _____  MAIN FUNCTIONAL GROUP: _______________________

KEY BANDS:

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________

GRADE ______________

MOLLECULE ASSIGNED: _____  MAIN FUNCTIONAL GROUP: _______________________

KEY BANDS:

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________

GRADE ______________
SPECTRUM 4

MOLECULE ASSIGNED: _____  MAIN FUNCTIONAL GROUP: ______________________________________

KEY BANDS:

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________ 
Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________ 
Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________

GRADE _______________

SPECTRUM 5

MOLECULE ASSIGNED: _____  MAIN FUNCTIONAL GROUP: ______________________________________

KEY BANDS:

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________
Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________
Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ___________

GRADE _______________
SPECTRUM 6

MOLECULE ASSIGNED: _____
MAIN FUNCTIONAL GROUP: ______________________________________

KEY BANDS:

- Bond: _______ Approximate frequency: _______ Shape: ______________ Intensity: ______________
- Bond: _______ Approximate frequency: _______ Shape: ______________ Intensity: ______________
- Bond: _______ Approximate frequency: _______ Shape: ______________ Intensity: ______________

GRADE ______________

SPECTRUM 7

MOLECULE ASSIGNED: _____
MAIN FUNCTIONAL GROUP: ______________________________________

KEY BANDS:

- Bond: _______ Approximate frequency: _______ Shape: ______________ Intensity: ______________
- Bond: _______ Approximate frequency: _______ Shape: ______________ Intensity: ______________
- Bond: _______ Approximate frequency: _______ Shape: ______________ Intensity: ______________

GRADE ______________
SPECTRUM 8

MOLECULE ASSIGNED: _____  MAIN FUNCTIONAL GROUP: ________________________________

KEY BANDS:

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ________

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ________

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ________

GRADE ______________

SPECTRUM 9

MOLECULE ASSIGNED: _____  MAIN FUNCTIONAL GROUP: ________________________________

KEY BANDS:

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ________

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ________

Bond: ______  Approximate frequency: ______  Shape: ___________  Intensity: ________

GRADE ______________
MOLECULE ASSIGNED: _____  MAIN FUNCTIONAL GROUP: __________________________

KEY BANDS:

Bond: _____  Approximate frequency: _______  Shape: ___________  Intensity: __________

Bond: _____  Approximate frequency: _______  Shape: ___________  Intensity: __________

Bond: _____  Approximate frequency: _______  Shape: ___________  Intensity: __________

GRADE ________________