Strategy

1. Try to get a molecular formula.
   a. more than likely, the molecular weight of our unknown is 94 (M^+ seen on the mass spectrum as m/z = 94). If the mass is 95, a nitrogen must be present. Although the IR absorbance for an N-H bond shows in a similar region as does an OH, an OH absorbance is broad while an N-H absorbance is more defined (sharp) - see textbook page 444. If a nitrogen atom was included by mistake, there is no structure that exists that matches the carbon NMR.
   b. other than C and H, what other atoms are in our molecule?
      i. M^+ is even, so even number of nitrogens (probably zero)
      ii. IR shows an OH stretch at 3300 cm^{-1} and no C=0 near 1700 cm^{-1}
      iii. Halogens not seen in mass spectrum
   c. to find molecular formula, assuming only C, H and O
      i. Subtract one oxygen from 94 (94 - 16 = 78) and add C and H into 78.

      $C_5H_{18}O$ - not possible (try working through the degree of unsaturation, and prove it to yourself)
      C_6H_6O - looks like a winner
      C_7O - mass > 94 - can't work

2. Degree of unsaturation = 4

3. If degree of unsaturation is equal to or greater than 4, a benzene ring is likely

4. Carbon NMR shows 4 signals in the C=C region - this could be a benzene ring that has an element of symmetry so that it has 4 electronically unique carbons.