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Chapter One, Problem C

Worksheet, step one: The formula contains N, so we need to remember that each N brings with it an extra H. For calculating IHD, H count is 4, and the IHD = 4. All of the H's are attached to carbon.

$C_5H_6N_2$
16, t (2) the
22, t
119, s (2)

Worksheet, step two: With so much unsaturation and N in the formula, we should suspect a nitrile. This is confirmed when we find a nitrile in Table C4, at 117.5. We have two nitriles, at 119, s. Each nitrile has a triple bond, so an IHD = 2. We have two nitriles, so this accounts for the IHD = 4.

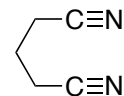
Table C.4 Chemical Shifts of Substituted Alkenes (ppm from TMS)

<p>122.0 115.0 Br</p>	<p>133.7 117.5 Cl</p>	<p>126.1 117.4 Cl</p>	<p>153.2 84.2 OCH₃</p>	<p>141.7 167.6 20.2 OCCH₃ O</p>
<p>136.4 136.0 CHO</p>	<p>138.5 196.9 129.3 COCH₃ O</p>	<p>128.0 173.2 COOH</p>	<p>128.7 129.9 COOCH₃</p>	<p>122.3 144.1 COOCH₃</p>
<p>107.7 137.8 CN</p>	<p>Br 104.7 132.7 H CH₃</p>	<p>15.3 108.9 129.4 Br CH₃ H H</p>	<p>137.5 63.4 OH</p>	
<p>133.8 165.1</p>	<p>129.3 150.7</p>			

Worksheet, step three: There are no more heteroatoms.

Worksheet, step four: There is only one more carbon, a $-CH_2-$.

Worksheet, step five: There is only one way to assemble the structure.



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