Chapter 15 – Answers to questions (for in-chapter questions)

1  a but-1-ene,  b 2-methylpropene,  c cyclopentene

2  a CH₃CH=CH₂CH₂CH₃,  b CH₂=CHCH=CH₂,  c (CH₃)₂C=CH(CH₃)₂.

3  a The bromine atoms in cis-1,2-dibromoethene are on the same side of the double bond, so there is an uneven distribution of electrons in the molecule. The bromine atoms in the trans isomer are on opposite sides so the charge cancels out, therefore the molecule is not polar.

 b The cis molecule has a higher boiling point because the molecule is polar so dipole-dipole interactions can occur.

c

4 Single bonds can rotate freely, so the molecules are identical.

5  a CH₃CH₂Cl,  b The hydrogen

6  a CH₃CHOH,  b CH₂ClCH₂OH,  c CH₂CH₃.

7  a CH₃CHClCH₂Cl,  b CH₃CH₂CH₂CH₃.

8  CH₂=CHCH=CH₂ or CH₂=C=CHCH₃

9  a CH₃CH₂CHBrCH₃,

 b

10 a CH₃CH=CHCH₃,  b CH₃CH₂CH₂CH₂CH₃.

11 a CH₃CH₂CH₃,  b CH₃CH₂CHOHCH₃,  c CH₃CHOHCH₂OH,  d CH₃CHBrCHBrCH₃.

12

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\begin{align*}
\text{CH} & \text{CH}_2 \quad \text{and} \quad \text{CH} \quad \text{CN} \\
\text{C}_3\text{H}_5 & \quad \text{n} & \quad \text{n}
\end{align*}
\]
13 The bulky side groups prevent the chains from moving over each other as easily, making the polymer less flexible and more brittle.

14 There are strong intermolecular forces between chains of poly(propenonitrile) due to the polar C–N side groups.