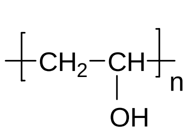
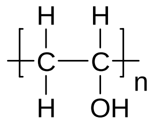
Answers to suggested problems in Chapter 14

14.1b

 or 

Note: make sure you include brackets (or parentheses) and "n"

14.2

a. 100 g/mol
b. 100 g/mol
c. 226 g/mol
d. 192 g/mol

14.3 4800

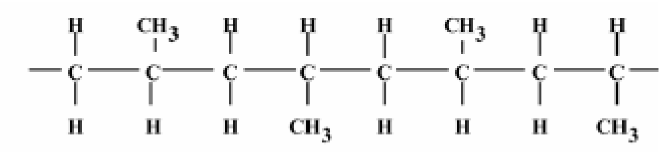
14.4

a. 42 g/mol
b. 631,000 g/mol

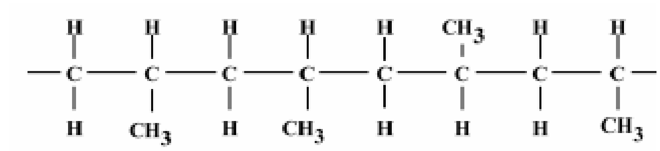
14.11

2D-drawing representation:

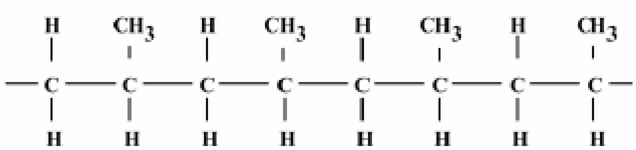
SYNDIOTACTIC: **CH_3**'s perfectly alternate "up" and "down"



ATACTIC: **CH_3**'s are randomly "up" and "down"

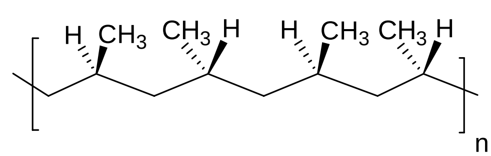


ISOTACTIC: All **CH_3**'s are "up" (same)

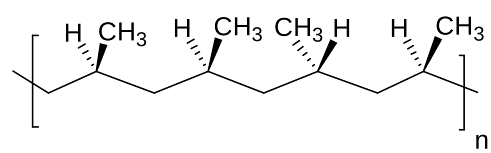


3D-drawing representation:

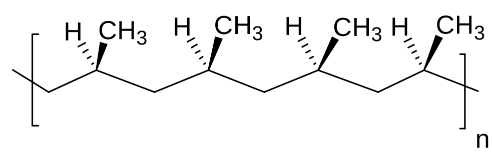
CH_3's perfectly alternate "forward" (solid wedge) and "back" (dashed wedge)



CH_3's are randomly "forward" (solid wedge) and "back" (dashed wedge)



CH_3's are all "forward" (solid wedge). Alternatively, all **CH_3**'s could be "back" (dashed wedge)



14.3

(a) Thermoplastic polymers (thermoplastics) melt (soften) when heated and harden when cooled; they can be melted (softened) and reshaped. Thermosetting polymers cannot be melted and reshaped; once they are “hardened” (in this case, they harden because they were cured/crosslinked), they cannot be melted (softened) with heat. (Note, if you heat a thermosett to the point it melts, it has undergone *decomposition* so that chemical bonds are actually being broken).

(b) Thermoplastic polymers are linear or branched (not crosslinked). Thermosetting polymers are covalently (chemically) crosslinked (networked).

14.22

With increasing MW, the polymer chains become longer and so it is too difficult for regions of these “big” chains to “detangle” and then align themselves into ordered crystalline domains.