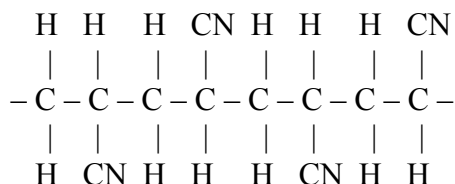
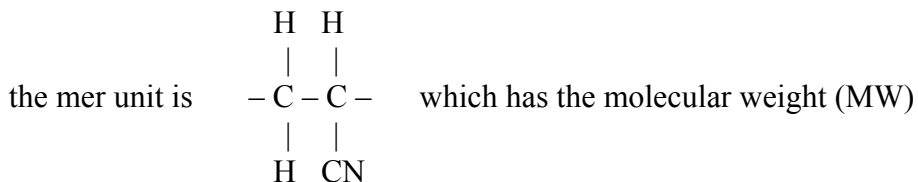


3.091 Fall Term 2002
Homework Quiz #11A
 solution outline

- (a) Acrylonitrile, $\text{H}_2\text{C}=\text{CH}-\text{CN}$, can be reacted by addition polymerization to form polyacrylonitrile (PAN). Draw a segment of syndiotactic PAN showing four repeat units.



- (b) What is the molecular weight in g/mol of PAN for which the degree of polymerization, n , is 3091?



$$(3 \times 12 \text{ for C}) + (3 \times 1 \text{ for H}) + (1 \times 14 \text{ for N}) = 53 \text{ g/mol}$$

$$\therefore \text{MW}(\text{PAN}_{3091}) = 3091 \times 53 = 1.64 \times 10^5 \text{ g/mol}$$

- (c) For molecules of comparable molecular weight, which melt do you expect to be **more viscous**: linear PAN or branched PAN? Explain.

branched should be more viscous -- side chains can become entangled restricting easy movement of molecules past one another