Formula Sheet

Molar masses:

Number average molecular weight:

$$\bar{M}_n = \frac{\sum n_x M_x}{\sum n_x}$$

Weight average molecular weight:

$$\bar{M}_w = \frac{\sum n_x M_x^2}{\sum n_x M_x}.$$

Dispersity:

$$Đ = \frac{\bar{M}_w}{\bar{M}_n}$$

Step growth polymerization:

Ratio of monomers and functional groups (r < 1):

$$r = \frac{N_{A,0}}{N_{B,0}}.$$

Initial total number of monomers:

$$N_0 = \frac{N_{A,0} + N_{B,0}}{2}$$

Conversion of functional groups for perfect stoichiometry (if not, then equation holds only for the limiting reagent):

$$p = \frac{N_{A,0} - N_A}{N_{A,0}} = \frac{N_{B,0} - N_B}{N_{B,0}}$$

Degree of polymerization (Carothers equation):

$$\bar{X}_n = \frac{N_0}{N} = \frac{1 + r}{1 + r - 2rp}.$$