Equation (12.2) of Page 3.

$$\theta_{CL} = \frac{\text{Deflection of L from tangent drawn at C } (LL')}{l_L}$$

$$= \frac{\text{Moment of } M/EI \text{ diagram between C and L about L}}{l_L}$$

$$= \frac{1}{l_L}\left\{\left(\frac{A_L \bar{x}_L}{EI_L}\right) + \frac{1}{2}\left[\frac{M_L}{EI_L}\right] . l_L . \frac{1}{3} l_L + \frac{1}{2}\left[\frac{M_c}{EI_L}\right] l_L . \frac{2}{3} l_L\right\}$$

$$\theta_{CL} = \frac{A_L \bar{x}_L}{EI_L l_L} + \frac{M_L l_L}{6EI_L} + \frac{M_c l_L}{3EI_L} \qquad (12.2)$$

Equation (12.3) on Page 3 & 4

$$\theta_{CR} = \frac{\text{Deflection of R from tangent drawn at C } (RR')}{l_R}$$

$$= \frac{\text{Moment of } M/EI \text{ diagram between C \& R about R}}{l_R}$$

$$= \frac{A_R \bar{x}_R}{EI_R l_R} + \frac{M_R l_R}{6EI_R} + \frac{M_C l_R}{3EI_R} \qquad (12.3)$$

Equation (12.5) Page 4

$$M_L\left(\frac{l_L}{I_L}\right)+2M_c\left(\frac{l_L}{I_L}+\frac{l_R}{I_R}\right)+M_R\left(\frac{l_R}{I_R}\right)$$

$$=-\frac{6A_R\bar{x}_R}{I_R l_R}-\frac{6A_L\bar{x}_L}{I_L l_L} \qquad (12.5)$$

Equations (12.6) on Page-6
& (12.7)

$$\Delta_L = \theta_{CL} + \theta_{CR} \qquad (12.6)$$

$$\Delta_L = \frac{A_L \bar{x}_L}{E I_L l_L} + \frac{A_R \bar{x}_R}{E I_R l_R} \qquad (12.7)$$

Equation (12.8) on Page-6

$$a_{21} = \frac{l_L}{6 E I_L}$$

$$a_{22} = \frac{l_L}{3 E I_L} + \frac{l_R}{3 E I_R} \qquad (12.8)$$

$$a_{23} = \frac{l_R}{6 E I_R}$$

Equation (12.9) on Page 8

$$\Delta_L + a_{21} M_L + a_{22} M_C + a_{23} M_R = 0 \qquad (12.9)$$

Equation (12.10) on Page 8

$$\frac{A_R \bar{x}_R}{E I_R l_R} + \frac{A_L \bar{x}_L}{E I_L l_L} + M_L \left(\frac{l_L}{6 E I_L} \right) + M_C \left(\frac{l_L}{3 E I_L} + \frac{l_R}{3 E I_R} \right) + M_R \left(\frac{l_R}{6 E I_R} \right) = 0$$

Or

$$M_L \left(\frac{l_L}{I_L} \right) + 2 M_C \left(\frac{l_L}{I_L} + \frac{l_R}{I_R} \right) + M_R \left(\frac{l_R}{I_R} \right) = - \frac{6 A_R \bar{x}_R}{I_R l_R} - \frac{6 A_L \bar{x}_L}{I_L l_L} \qquad (12.10)$$

Equation (12.11) on Page 8

$$M_L (l_L) + 2 M_C (l_L + l_R) + M_R (l_R) = - \frac{6 A_R \bar{x}_R}{l_R} - \frac{6 A_L \bar{x}_L}{l_L} \qquad (12.11)$$

Equation (1) on Page-9

$$2M_B(10+10) + M_C(10) = -\frac{6A_R\bar{x}_R}{l_R} - \frac{6A_L\bar{x}_L}{l_L} \quad \text{— (1)}$$

Equation on Page-10

$$40\,M_B - 150 = -\frac{6\times83.33\times5}{10} - \frac{6\times125\times5}{10} - \frac{6\times83.33\times5}{10}$$

Equation (1) on Page-14

$$\theta_A = \frac{M_B \ell_L}{6EI_L} + \frac{M_A \ell_L}{3EI_L} + \frac{A(\bar{x}_L)_R}{EI_L \ell_L} \qquad (1)$$

Equation (3) on Page-14

$$2M_A\left[\frac{L'}{\infty} + \frac{10}{2I}\right] + M_B\left[\frac{10}{2I}\right] = -\frac{6A_R\bar{x}_R}{2I.10} \qquad (3)$$

or

$$20M_A + 10M_B = \frac{6\times(166.67)\times5}{10}$$

Equation (5) Page-15

$$M_A\left[\frac{10}{2I}\right] + 2M_B\left[\frac{10}{2I} + \frac{5}{I}\right] = -\frac{6\times166.67\times5}{2I\times10} - \frac{6\times20.837\times2.5}{I\times5}$$

$$5M_A + 20M_B = -250 - 62.5$$

$$= -312.5 \qquad (5)$$