Problem 7-4

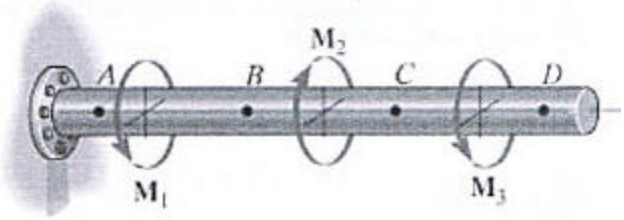
Three torques act on the shaft. Determine the internal torque at points A, B, C, and D.

Given:

$M_1 = 300$ N·m

$M_2 = 400$ N·m

$M_3 = 200$ N·m



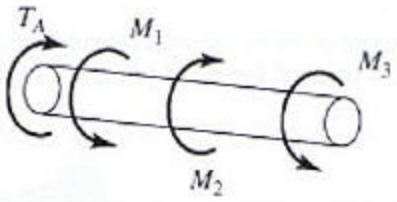
Solution:

Section A:

$\Sigma M_x = 0;$ $\quad -T_A + M_1 - M_2 + M_3 = 0$

$T_A = M_1 - M_2 + M_3$

$T_A = 100.00$ N·m

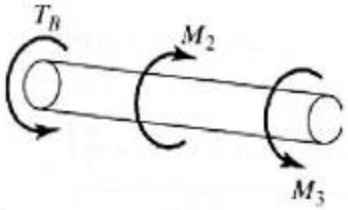


Section B:

$\Sigma M_x = 0;$ $\quad T_B + M_3 - M_2 = 0$

$T_B = -M_3 + M_2$

$T_B = 200.00$ N·m

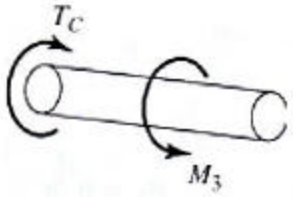


Section C:

$\Sigma M_x = 0;$ $\quad -T_C + M_3 = 0$

$T_C = M_3$

$T_C = 200.00$ N·m



Section D:

$\Sigma M_x = 0;$ $\quad T_D = 0$