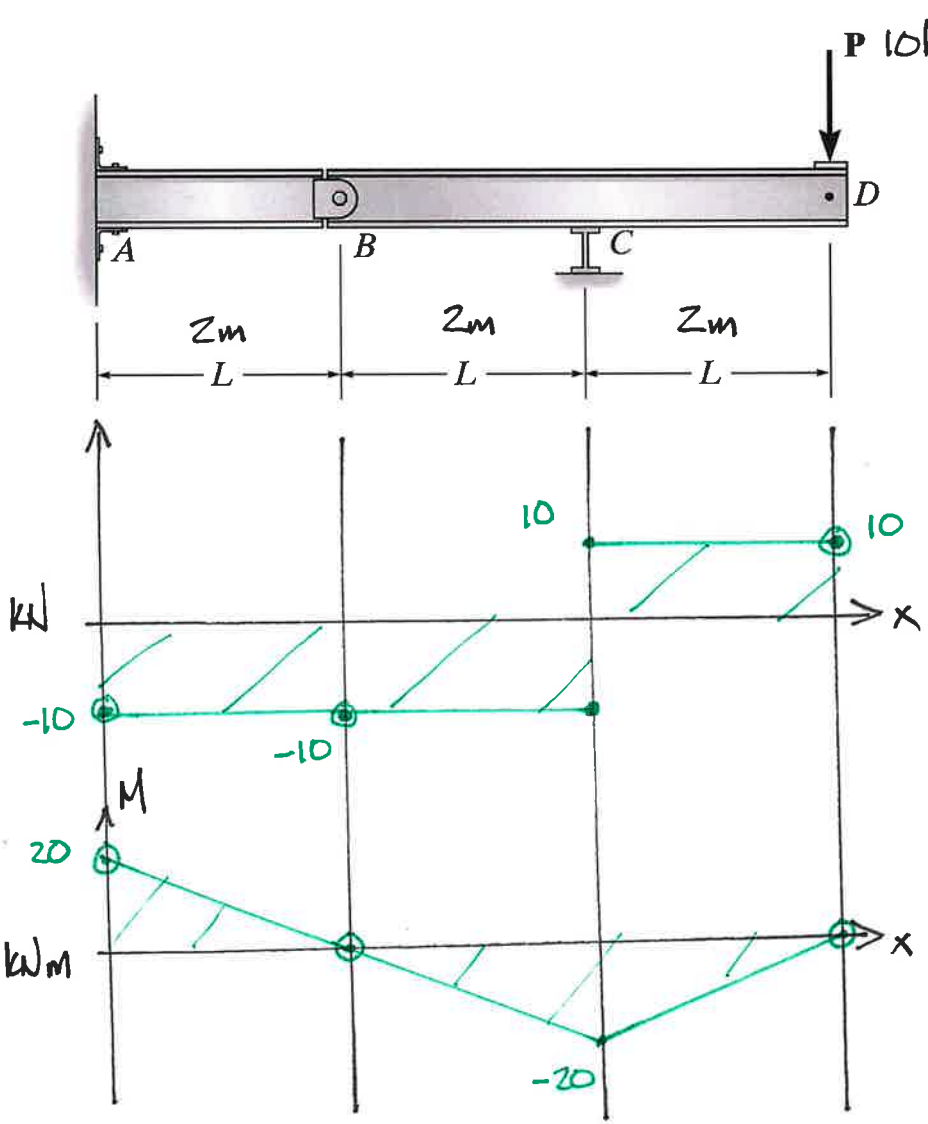
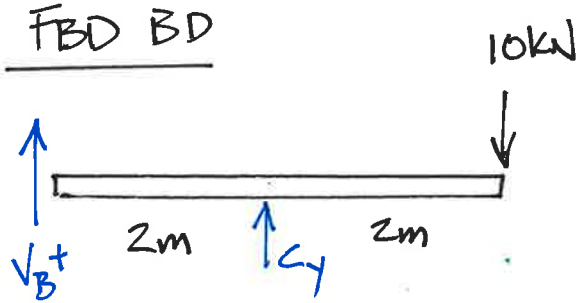
**Example 7b-6:** Use the conjugate beam method to determine the slope and displacement at point *D*. Assume that *EI* is constant.



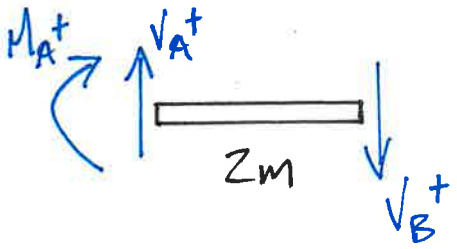

FBD BD




$\circlearrowleft + \sum M_C = 0 = -V_B(2m) - 10kN(2m)$ $\quad V_B = -10kN$

$+\uparrow \sum F_y = 0 = V_B + C_y - 10kN$ $\quad C_y = 20kN$

FBD AB



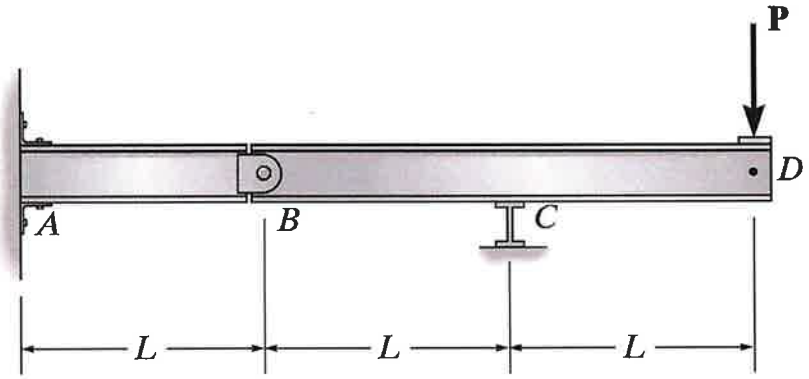

$\circlearrowleft + \sum M_A = 0$

$= -M_A - V_B(2m)$

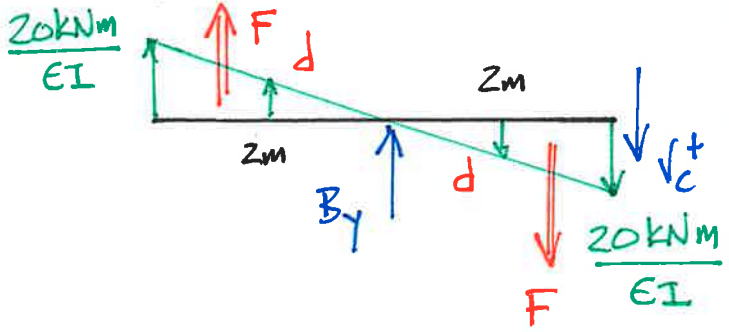
$M_A = 20kNm$

$+\uparrow \sum F_y = 0 = V_A - V_B$ $\quad V_A = -10kN$

**Example 7b-6:** Use the conjugate beam method to determine the slope and displacement at point *D*. Assume that *EI* is constant.



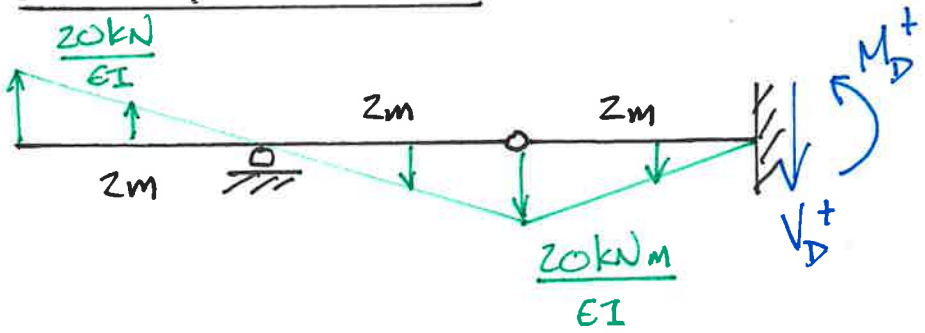

FBD ABC




$$F = \frac{1}{2}(2m)\frac{20kNm}{EI}$$

$$d = \frac{2}{3}(2m) = \frac{4}{3}m$$

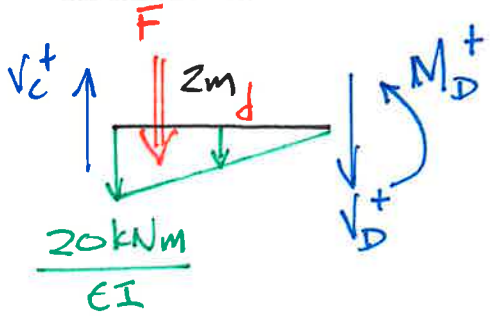
CONJUGATE BEAM




$$\circlearrowleft^+ \Sigma M_B = 0 = -Fd - Fd - V_C(2m)$$

$$V_C = -\frac{80kNm}{3EI}$$

FBD CD




$$\circlearrowleft^+ \Sigma M_D = 0 = M_D + Fd - V_C(2m)$$

$$M_D = -\frac{80kNm^3}{EI} \Rightarrow V_D$$

$$+\uparrow \Sigma F_y = 0 = V_C - F - V_D$$

$$V_D = -\frac{140\ kNm^2}{3EI} \Rightarrow \theta_D$$