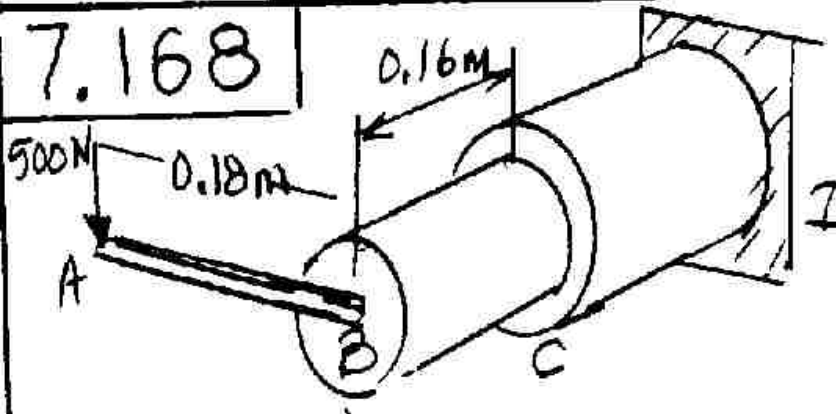
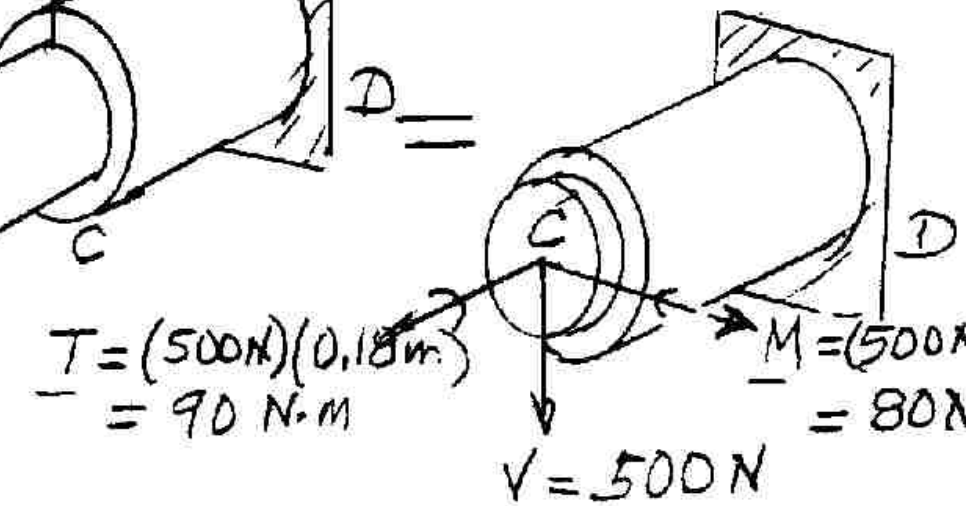
7.168



Just to the left of C:



$T = (500N)(0.18m) = 90\ N\cdot m$

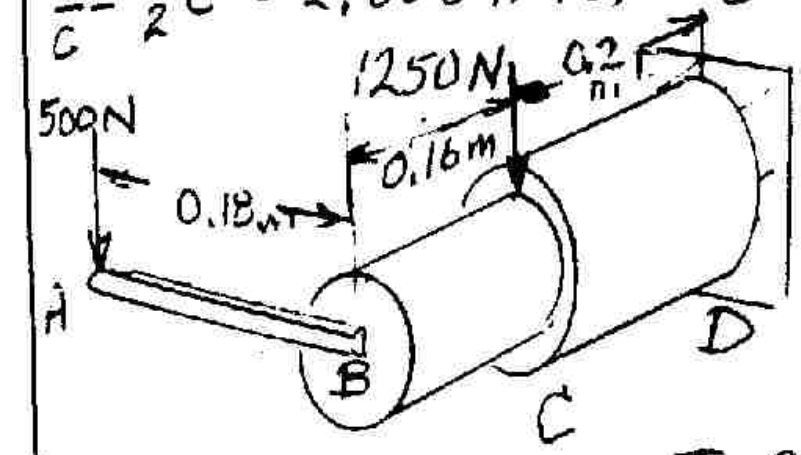
$M = (500N)(0.16m) = 80\ N\cdot m$

$V = 500\ N$

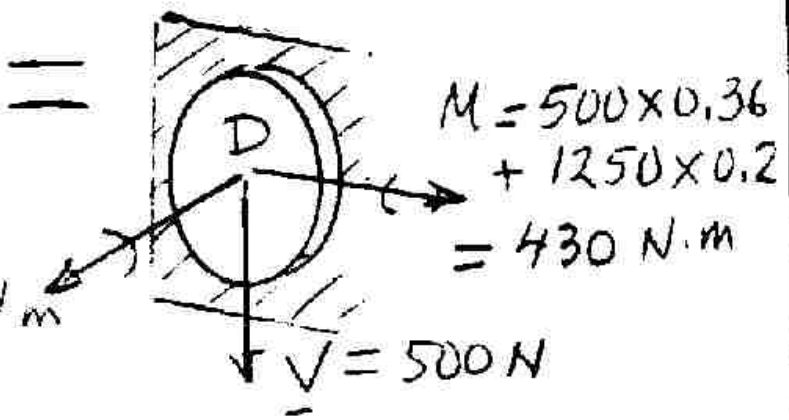
Eq. (7.31) with $\tau_{all} = 60\ MPa$:

$$\frac{J}{c} = \frac{\sqrt{M^2+T^2}}{\tau_{all}} = \frac{\sqrt{(80)^2+(90)^2}}{60\times10^6} = 2.0069\times10^{-6}$$

$$\frac{J}{c} = \frac{\pi}{2}c^3 = 2.0069\times10^{-6}, \quad c = 10.851\ mm, \quad d_{BC} = 21.7\ mm$$



Just to the left of D:



Eq. (7.31) with $\tau_{all} = 60\ MPa$:

$$\frac{J}{c} = \frac{\sqrt{M^2+T^2}}{\tau_{all}} = \frac{\sqrt{(430)^2+(90)^2}}{60\times10^6} = 7.3220\times10^{-6}$$

$$\frac{J}{c} = \frac{\pi}{2}c^3 = 7.3220\times10^{-6}, \quad c = 16.705\ mm, \quad d_{CD} = 33.4\ mm$$