

1-24

Divide the weight by 2 since there are two frames

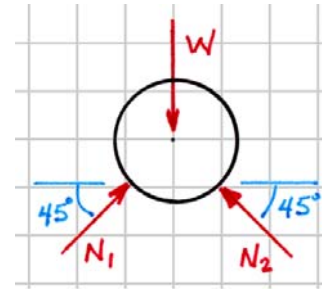
$$W = 200(9.81)/2 = 981 \text{ N}$$

Then from a free-body diagram of the drum

$$\rightarrow \Sigma F_x = 0: \quad N_1 \cos 45^\circ - N_2 \cos 45^\circ = 0$$

$$\uparrow \Sigma F_y = 0: \quad 0.4N_1 \sin 45^\circ + N_2 \sin 45^\circ - 981 = 0$$

$$N_1 = N_2 = 693.672 \text{ N} \cong 694 \text{ N} \dots\dots\dots \text{Ans.}$$



Finally from a free-body diagram of one leg

$$\curvearrowleft \Sigma M_C = 0: \quad 1T - 1A - 0.8N_2 = 0$$

$$\rightarrow \Sigma F_x = 0: \quad T + C_x + N_2 \sin 45^\circ = 0$$

$$\uparrow \Sigma F_y = 0: \quad A + C_y - N_2 \cos 45^\circ = 0$$

where by symmetry (or from overall equilibrium)

$$A = 981/2 = 490.5 \text{ N} \dots\dots\dots \text{Ans.}$$

and then

$$T = 1045.4376 \text{ N} \cong 1045 \text{ N} \dots\dots\dots \text{Ans.}$$

$$C_x = -1535.94 \text{ N} \cong 1536 \text{ N} \leftarrow \dots\dots\dots \text{Ans.}$$

$$C_y = 0 \text{ N} \dots\dots\dots \text{Ans.}$$

