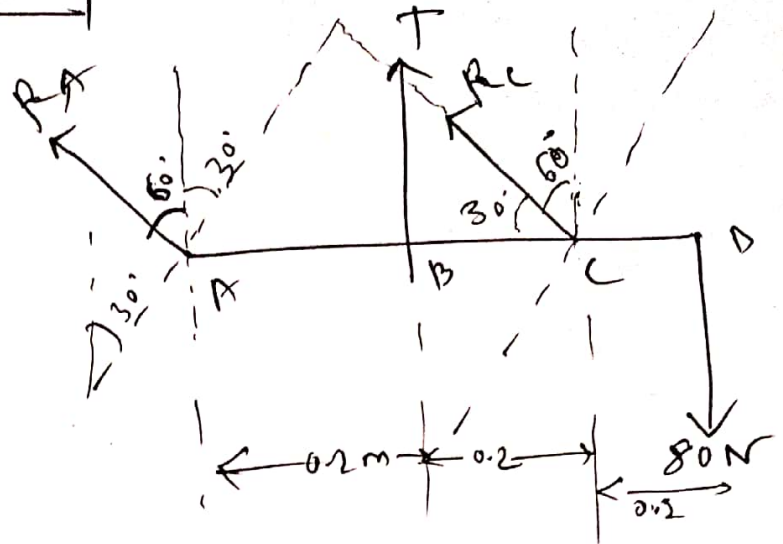


# Prblm 1

$$\rightarrow \sum F_x = 0$$

$$\Rightarrow -R_A \sin 60^\circ - R_C \sin 60^\circ = 0$$

$$\Rightarrow R_A = -R_C \quad \text{--- (1)}$$



$$\uparrow \sum F_y = 0$$

$$\Rightarrow R_A \cos 60^\circ + T + R_C \cos 60^\circ - 80 = 0 \quad [\text{from (1)}]$$

$$\Rightarrow \boxed{T = 80 \text{ N}} \quad (\text{Ans})$$

$$\uparrow \sum M_A = 0$$

$$\Rightarrow T \times 0.2 + R_C \times 0.4 \times \sin 30^\circ - 80 \times 0.6 = 0$$

$$\Rightarrow 80 \times (0.2 - 0.6) + R_C \times 0.4 \times 0.5 = 0$$

$$\Rightarrow \boxed{R_C = 160 \text{ N}} \quad (\text{Ans})$$

~~$R_A = 160 \text{ N}$~~

$\therefore \boxed{R_A = -160 \text{ N}}$  i.e. the direction is opposite as shown in the figure. (Ans)

$$\therefore T = 80 \text{ N} \quad \uparrow 90^\circ$$

$$\therefore R_A = 160 \text{ N} \quad \searrow 30^\circ$$

$$\therefore R_C = 160 \text{ N} \quad \nearrow 30^\circ$$

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## Problem 2

In triangle ACD  $AC = CD = 250 \text{ mm}$ ,

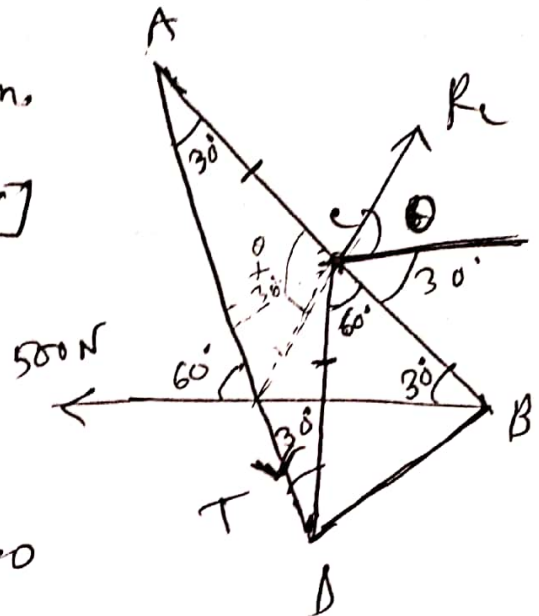
$$\therefore \angle CAD = \angle CDA = 30^\circ \quad [\because \angle ACD = 120^\circ]$$

Moment At C —

$$\sum M_C = 0$$

$$\Rightarrow T \times 250 \sin 30^\circ - 500 \times 200 \sin 30^\circ = 0$$

$$\Rightarrow \boxed{T = 400 \text{ N}}$$



According to Lami's theorem —

$$\frac{T}{\sin(60^\circ + 180^\circ - 30^\circ - 0 - 30^\circ)} = \frac{500}{\sin(60^\circ + 0)} = \frac{R_c}{\sin 120^\circ}$$

$$\Rightarrow \frac{400}{\sin(180 - 0)} = \frac{500}{\sin(60 + 0)}$$

$$\Rightarrow \theta = 49.1^\circ$$

$$\therefore R_c = \frac{400 \times \sin 120^\circ}{\sin 49.1^\circ} = 458.2575 \text{ N}$$

$$\therefore R_c = 458.2575 \text{ N at } 49.1^\circ$$

$$\therefore T = 400 \text{ N}$$

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