

Sol:

Torque due to F_1 $\tau_1 = |\vec{r}_1| \cdot |\vec{F}_1| \cdot \sin 90^\circ = 0.5 \times 10 \times 1 = +5 \text{ Nm}$
(anticlock) ✓

Due to F_2 , $r_2 = 30 \text{ cm} = 0.3 \text{ m}$

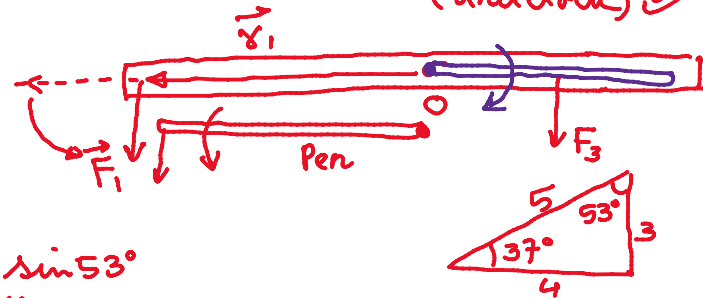
$\theta = 180 - 53^\circ$

~~$\tau_2 =$~~

$\sin \theta = \sin(180 - 53^\circ)$
 $= \sin 53^\circ$

$\tau_2 = r_2 \cdot F_2 \cdot \sin \theta = 0.3 \times 25 \times \sin 53^\circ$

$= 0.3 \times 25 \times \frac{4}{5} = -6 \text{ Nm (clockwise)}$



Due to F_3 $\tau_3 = r_3 \cdot F_3 \cdot \sin \theta$ $r_3 = 0.1 \text{ m}$, $\theta = 90^\circ$

$\tau_3 = 0.1 \times 15 \times \sin 90^\circ = -1.5 \text{ Nm (clockwise)}$

Due to F_4

$\tau_4 = r_4 \cdot F_4 \cdot \sin \theta = 0.5 \times 20 \times \sin 37^\circ = 0.5 \times 20 \times \frac{3}{5}$

$\tau_4 = +6 \text{ Nm (anticlockwise)}$

anticlockwise = +ive Torque
clockwise = -ive Torque

$\tau = \tau_1 + \tau_2 + \tau_3 + \tau_4 = (+5) + (-6) + (-1.5) + (+6)$

$\tau = 3.5 \text{ Nm}$