

8 (b)

(i)

$$v = 0.2\omega$$

$$\frac{dv}{dt} = 0.2 \frac{d\omega}{dt}$$

$$a = 0.2\ddot{\theta}$$

$$I\ddot{\theta} = \text{Torque}$$

$$0.08 \left(\frac{a}{0.2} \right) = (T_2 - T_1) 0.2$$

$$2a = T_2 - T_1$$

$$6g - T_2 = 6a$$

$$T_1 - 4g = 4a$$

$$2g - (T_2 - T_1) = 10a$$

$$2g - (2a) = 10a$$

$$a = \frac{g}{6}$$

(ii)

$$6g - T_2 = 6 \left(\frac{g}{6} \right) \Rightarrow T_2 = 5g \text{ or } 49 \text{ N}$$

$$T_1 - 4g = 4 \left(\frac{g}{6} \right) \Rightarrow T_1 = \frac{14g}{3} \text{ or } 45.7 \text{ N}$$

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