Solutions

2.1

- $I = \tfrac{1}{2}mr^2 = \tfrac{1}{2} \times 6.0 \times 0.040 = 0.120$ kg $\cdot$ m^2.
- $\alpha = \tau / I = 3.6 / 0.120 = 30.0$ rad/s^2.

2.2

- $\omega = \alpha t = 150$ rad/s; $\theta = \tfrac{1}{2}\alpha t^2 = 375$ rad.
- $E = \tfrac{1}{2} I \omega^2 = 1350$ J $= \tau\theta = 3.6 \times 375$ ✓.

2.3

- $\alpha_f = -150/50 = -3.00$ rad/s^2, so $\tau_f = 0.120 \times 3.00 = 0.360$ N $\cdot$ m.

2.4

- Slide at $\mu_s g = 3.139$ m/s^2; tip at $gb/h = 9.81 \times 0.12 / 0.20 = 5.886$ m/s^2.
- $3.139 < 5.886$: it slides first, at 3.14 m/s^2.

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