

P. 258 # 32, 34 from College Physics text
P. 251 # 56, 57, 58, 65, 66 from red text

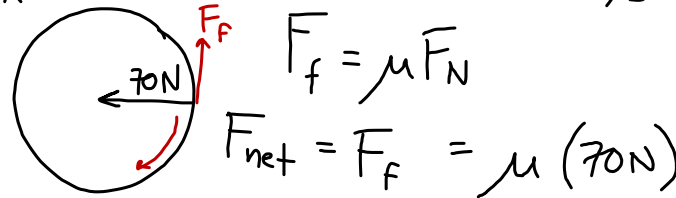


A potter's wheel having a radius of 0.50m and a moment of inertia of 12 kgm² is rotating freely at 50 rev/min. The potter can stop the wheel in 6.0s by pressing a wet rag against the rim and exerting a radially inward force of 70N. Find the coefficient of kinetic friction between the wheel and the wet rag.

$$\omega_i = \frac{50 \text{ rev} | 1 \text{ min} | 2\pi \text{ rad}}{\text{min} | 60 \text{ s} | 1 \text{ rev}} = 5.24 \text{ rad/s}$$

$$\omega_f = 0 \frac{\text{rad}}{\text{s}} \quad \alpha = \frac{\omega}{t} = \frac{5.24 \text{ rad/s}}{6 \text{ s}}$$

$$F_A = 70 \text{ N} \quad \alpha = .87 \text{ rad/s}^2$$



$$\tau = I\alpha \quad \tau = 12 \text{ kgm}^2 (.87 \frac{\text{rad}}{\text{s}^2})$$

$$\tau = F_f (.5 \text{ m})$$

$$\tau = \mu (70 \text{ N}) (.5 \text{ m}) = 12 \text{ kgm}^2 (.87 \frac{\text{rad}}{\text{s}^2})$$

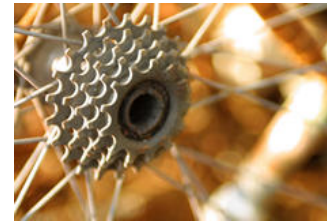
$$\mu = \frac{12 \text{ kgm}^2 (.87 \frac{\text{rad}}{\text{s}^2})}{70 \text{ N} (.5 \text{ m})}$$

$$\mu_k = .298$$

$$\mu_k = .3$$

$$r = .32 \text{ m}$$

34. A bicycle wheel has a diameter of 64 cm and a mass of 1.8 kg. Assume the wheel is a hoop with all of the mass concentrated at the rim (outside radius). The wheel is placed on a stationary stand and a resistive force of 120 N is applied tangent to the tire.

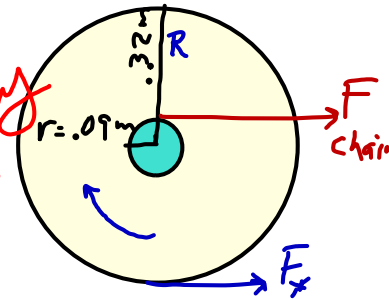


- a.) What force must be applied by the chain passing over a 9 cm sprocket in order to give an acceleration of 4.5 rad/s^2 ?
- b.) What force is required if you shift to a 5.6 cm diameter sprocket?

$$m = 1.8 \text{ kg} \quad F_f = 120 \text{ N}$$
$$R = .32 \text{ m} \quad r = .09 \text{ m}$$
$$F_{\text{chain}} = ?$$

Finish Monday
We'll

Hoop
 $I = mr^2$



P. 251 # 56

Rocko strikes a 0.058kg golf ball with a force of 272N and gives it a velocity of 62 m/s . How long was Rocko's club in contact with the ball?



57. A 0.145 kg baseball is pitched at 42 m/s. The batter hits it horizontally to the pitcher at 58 m/s.

a.) Find the change in momentum of the ball

b.) If the ball and bat are in contact for 4×10^{-4} s, what is the average force during contact?

