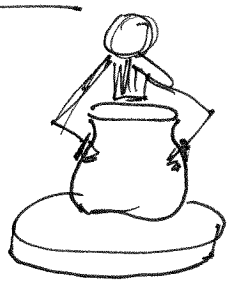
Chapter 10

## Problem 98



$r = 20\,cm$

$\omega = 10\,\frac{rev}{s}$

$F = 10N$

$\mu = 0.1$

Find the power needed to keep the wheel going.

The potter presses on the surface with a force of ~~10N~~ $F = 10N$. This is the normal force applied to the surface.

∴ The frictional force of the hands on the clay cylinder is

$$F_f = \mu N = (0.1)(10N) = \underline{1.0N}$$

Now Power is

$$P = \frac{E}{t} = \frac{F \cdot d}{t} = F\left(\frac{d}{t}\right) = F \cdot v$$

(d: distance, t: time, v: velocity)

With the angular velocity of $\omega = 10\,rev/s$

The angular velocity in rad/s is

$$\omega = \frac{10\,rev}{s}\left(\frac{2\pi\,rad}{rev}\right) = 62.8\,rad/s$$

And tangential velocity is

$$v_t = r \cdot \omega = (0.20\,m)(62.8\,rad/s) = 12.6\,\frac{m}{s}$$

Then $P = F_f \cdot v = (1.0N)(12.6\,m/s)$

$$\boxed{P = 12.6\,W}$$