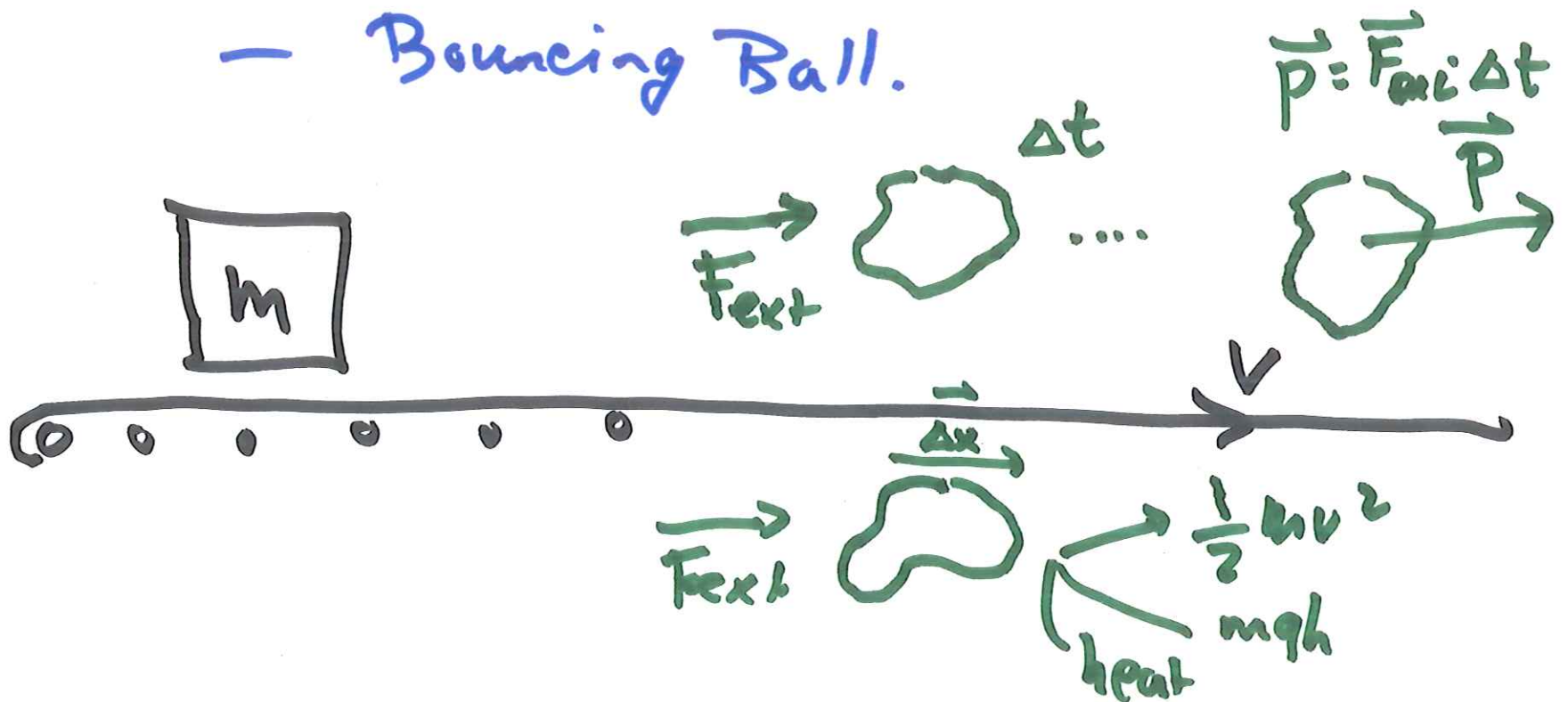# NYU Physics I — 2016-10-11

Agenda — Reading — statics torque
impulse collision.

— Comments on two, exams.

— Qs

— Bouncing Ball.

$$\vec{p} = \vec{F}_{ext} \Delta t$$

$$\vec{p}$$

$$\frac{1}{2} m v^2$$

$$mgh$$

heat

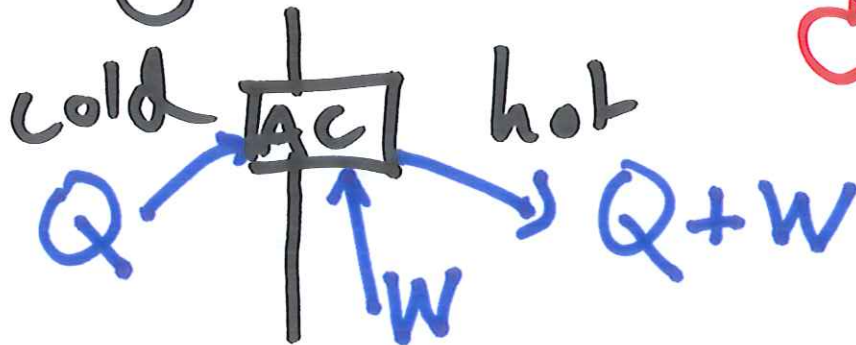$F = (3.6 \times)$ N $\qquad$ F = mg N

$\uparrow$
length

F = mg ✓

Box your actual answer.

Friction: sliding: $f = \mu N$

static: $f < \mu N$.

"efficiency" $\leftarrow$ Coefficient of Performance
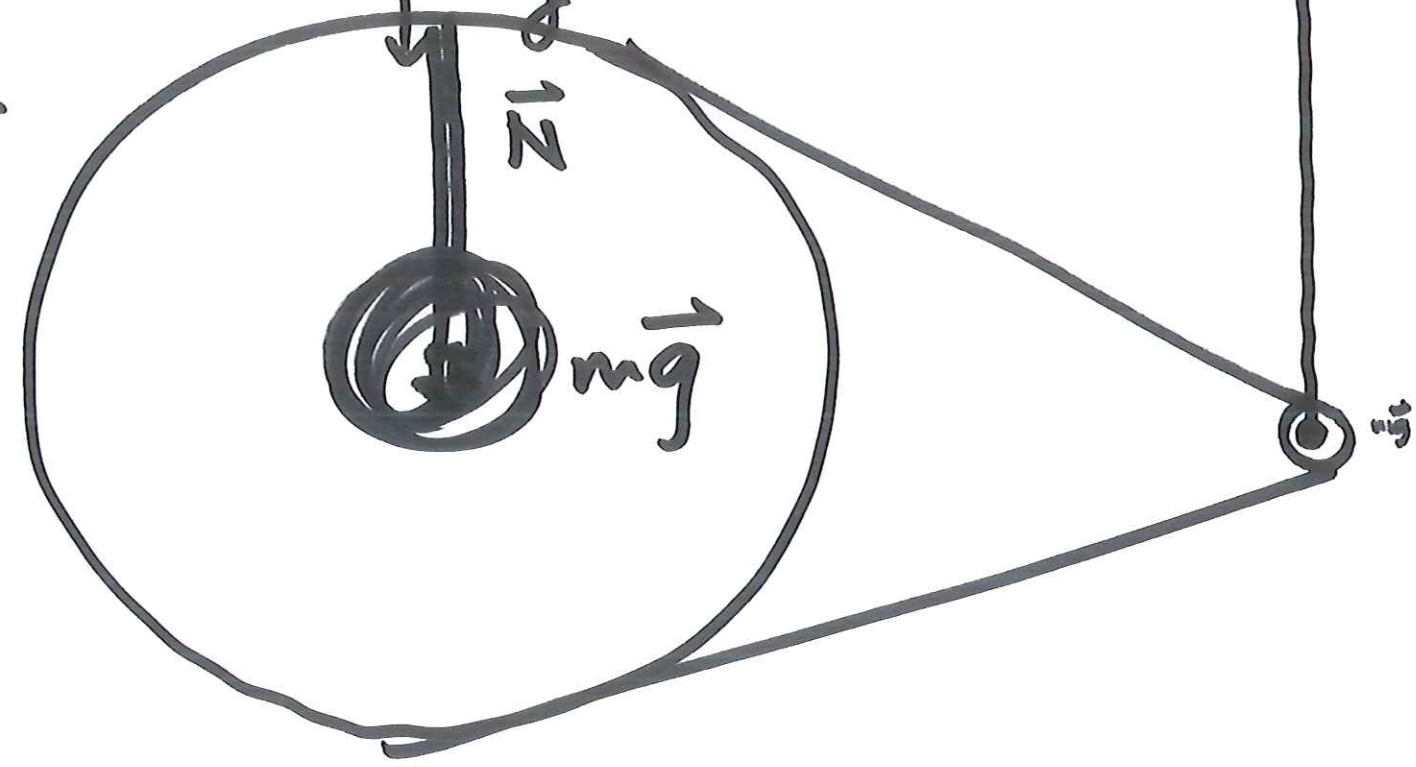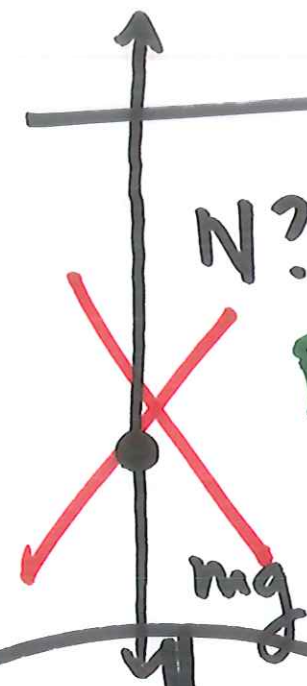C.O.P.

cold — | hot

AC

Q $\rightarrow$ Q + W

W

O pool ball.

not to scale

1.5 m

hard floor

in contact
for (1 ms???)

N?   AVERAGE
Free-body diagram
for duration of
contact.

$\bar{N}$

$\vec{N}$

$m\vec{g}$

$m\vec{g}$

$m\vec{g}$

while falling: Impulse: $\vec{F_g} \cdot \Delta t_{free} = \vec{P}_{contact}$

$$\sim mg \, (0.4s)$$

while in contact: $\sim \vec{N} \, (0.001s) = ~~\cancel{\vec{P}_{contact}}$

$$= -1.8 \, \vec{P}_{contact}$$

$$\left| \vec{N} \right| = 1.8 \, mg \, \frac{(0.4s)}{0.001s} \approx 10^3 \, mg$$

m = 0.2 kg   1 m/s →

one ball

m = 0.2 kg
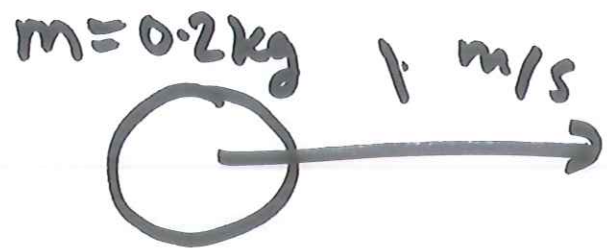
Average F.B.D.
for 5-ball during
(1-ms) collision.

$\vec{N}_{15}$ 5-ball → $\vec{N}_{c5} \simeq 200 N$
$m_5 \vec{g}$

PLAY POOL!

one ball.

←
$\vec{N}_{5c}$