

## Phys141 – Mon 10/3

- Today: Chapter 8 end + REVIEW

- **Administrative:**

**MONDAY** office hours 5.30pm-6.30pm in my office 3359  
AV Williams

**Exam Wed:** Review HW, labs, lecture notes

I put two "fake" HW on webassign that contain  
practice questions (you don't get points for it...)

Clickers count! Please register them.

No need to work through the skipped sections in the  
book!

This week: Lab # 6!!

## Mechanical Energy with nonconservative Forces

if friction is acting in a system:

$$\Delta E_{\text{mech}} = \Delta K + \Delta U = -f_k d$$

$\Delta U$  is the change in all forms of potential energy

If friction is zero, this equation becomes the same as  
Conservation of Mechanical Energy

$$\begin{aligned}\Delta E_{\text{mech}} &= 0 \\ \Delta K + \Delta U &= 0\end{aligned}$$

A cart on an air track is moving at 0.5 m/s when the air is suddenly turned off. The cart comes to rest after traveling 1 m. The experiment is repeated, but now the cart is moving at 1 m/s when the air is turned off. How far does the cart travel before coming to rest?

1. 1 m
2. 2 m
3. 3 m
4. 4 m
5. 5 m
6. impossible to determine

## Ways to transfer energy

a) Work



d) Matter transfer



b) Mechanical Waves (e.g. sound waves)



e) Electrical Transmission



c) Heat

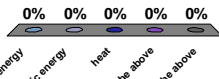


f) Electromagnetic radiation



A rock is dropped into a metal basket. The gravitational potential energy (explained in detail later) gets converted into another form of energy which may get converted further. Which form(s) of energy are involved

1. Kinetic energy
2. Acoustic energy
3. heat
4. All of the above
5. None of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

## Power

Power = Rate of energy transfer  
(energy transferred per unit time into/ out of system)

- In general, power can be expressed as

$$P = \frac{dE}{dt}$$

SI unit: Watt

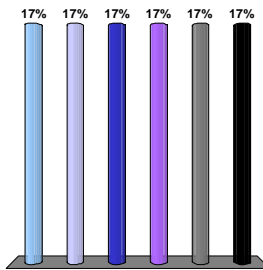
$$1 \text{ watt} = 1 \text{ joule} / \text{second} = 1 \text{ kg} \cdot \text{m}^2 / \text{s}^2$$

- The **power** generated by work (*due to a constant force*) is

$$P = \frac{dW}{dt} = F \cdot \frac{dr}{dt} = F \cdot v$$

A sports car accelerates from zero to 30 mph in 1.5 s. How long does it take for it to accelerate from zero to 60 mph, assuming the power of the engine to be independent of velocity and neglecting friction?

1. 2 s
2. 3 s
3. 4.5 s
4. 6 s
5. 9 s
6. 12 s



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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## REVIEW

- Will review a few example problems in class