Thursday, June 6/13
Physics 112/111

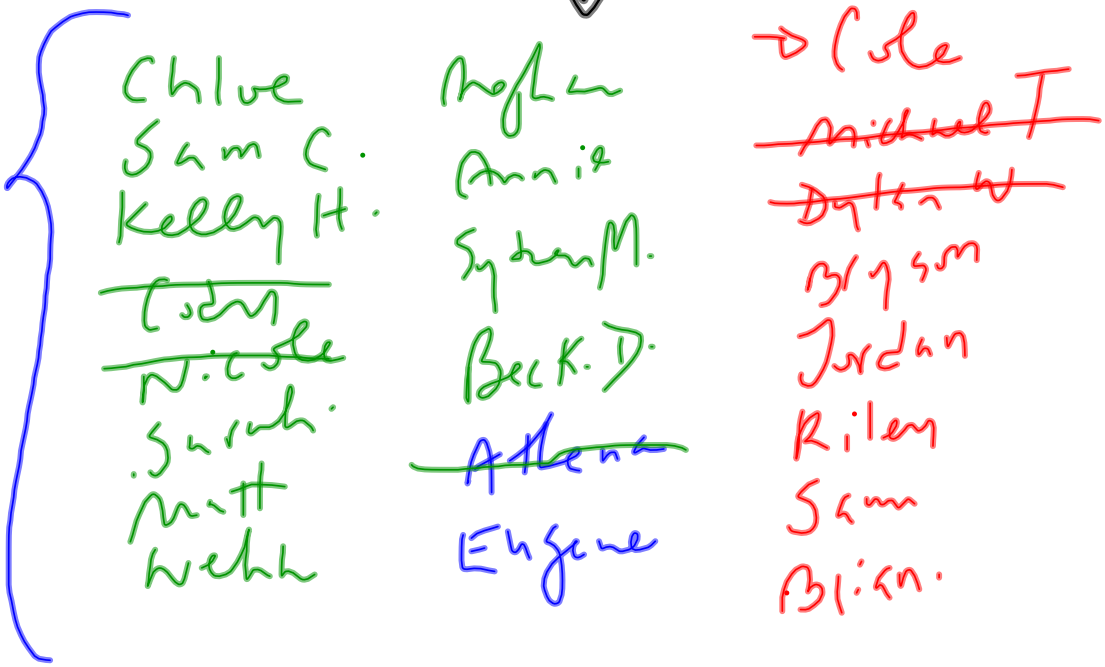
1. Optional Lab - Due Tomorrow

   Optional Quiz - Today (IS)

2. Questions re Exam?

3. Exam Review - MC

4. Exam Review - Problems
   - Answers: 21-30



P112 - P2 / P112/P111 P4

MC - 35

Prob - 10 — | Instructions are not followed.

N = W = mg

Kinematics ·

freely falling body · ⇑ or ⇓

C4 - force prob.

C5 - force prob.

impulse · $\vec{F}t = \Delta\vec{p} = m\Delta\vec{v} = m\vec{v}_f - m\vec{v}_i$

PE, h ⇐ efficiency. ·

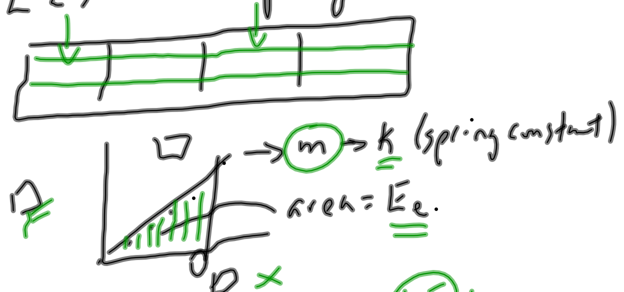
energy conservation. ←
($E_{ki} + E_{gi} + E_{ei} = \cdots$)

wave ·

Snell's Law

Lab - Force + Springs

Do on graph paper.



F = k x

F = 65 x
F = 47 x

Calculator! Degrees

⇒ Ruler

Exam Review
Problems

1. $\vec{v}_i = -41\ m/s$
2. $v = 3.00 \times 10^8\ m/s$
3. $h_f = 2.0m$ (* ref. level)
4. a) $\vec{a} = 0.17\ m/s^2$
   b) $F_{net} = +1.4N$
   c) $F_f = 0.60N$
5. $n_s = 1.60$
6. $E_{kf} = 5.5 \times 10^2\ J$ (* ref. level)
7. a) $\vec{a} = 2.0\ m/s^2$
   b) $d = 75m$
8. $W = 30.0J$
9. $P = 5.0 \times 10^3 W$
10. $t = 1.3 \times 10^2 s$
11. a) $t = 2.3s$
    b) $\vec{v}_f = -33 m/s$
12. $W = 1.8 \times 10^4 J$
13. $t = 0.839s$
14. $\angle R = 28.7°$
15. $\vec{F} = 12.3N$
16. $\vec{T} = +1.9 \times 10^2 N$ } Atwood's.
    $\vec{a}_1 = -3.0 m/s^2$
    $\vec{a}_2 = +3.0 m/s^2$
17. $Eff = 24\%$
18. $d = 2.0m$
19. $m = 1.6 \times 10^3 kg$
20. $W = 4.0 \times 10^3 J$

#21. $v_f = 8.9 m/s$

#22. $a = 5.0 m/s^2$

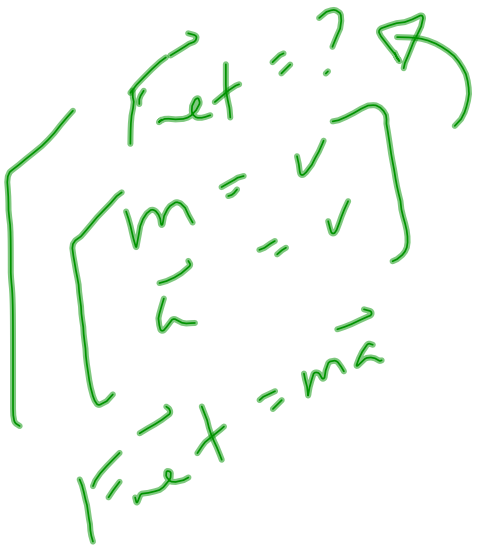
#23. $E_{gf} = 2.0 \times 10^2 J$

#24. $E_{kf} = 9.8 \times 10^2 J$

#25. $\angle c = 54.7°$

#26. $t = 5.0 s$

#27. $\vec{F} = -10N$



#28. 52%

#29. $\vec{F}_{net} = 16N$

#30 $E_0 = 24 J$

Prefixes.

$\frac{m}{s} \longleftrightarrow \frac{km}{h}$

$ms \rightarrow s$

$\Downarrow$

impulse.

$cm \leftrightarrow m$

$km \rightarrow m$

$MHz \rightarrow Hz$

$GHz \rightarrow Hz$.

$h, min \longleftrightarrow s$

Lab Format

Name(s):

Due Date:

Title: Experiment 34 - Speed of Light in "Glass"

Problem: How can the speed of light in "glass" be determined?

Apparatus: rectangular glass block, paper, 2 pins, ruler, protractor, cardboard

Procedure: Refer to Page 512 in the old red lab manual.

(7)

Gathering the Data:

Draw, label and submit diagrams for angles of incidence from 0^o to 60^o.

Complete Table 34-1. (14)

Solving the Problem:

Graph the sines of the angles of incidence versus the sines of the angles of refraction as directed in the lab handout. (4)

Determine the index of refraction of the "glass". Show your work. (2)

Calculate the speed of light in the "glass". Show your work. (2)

Exam: Outline - Chapter 8 and Chapter 9

- wave
- pulse/periodic waves
- types of waves
    - mechanical: transverse and longitudinal
    - electromagnetic: light, IR, UV, X-rays, etc.
      ($c = 3.00 \times 10^8$ m/s)
- crest/trough
- expansion/rarefaction
- amplitude, wavelength, frequency, period, wave speed
- wave behaviors
    - reflection ($\angle i = \angle r$)
    - refraction
        - index of refraction
        - 3 cases
        - spin-offs of Case #3 (critical angle, total internal reflection)
        - Snell's Law ($n_i \sin i = n_R \sin R$)

Exam: Outline - Chapter 6 and Chapter 7

- work (scalar quantity)
- three cases when work is not done
- positive and negative work
- energy (scalar quantity)
- types of energy: kinetic and potential (gravitational and elastic)
  - motion
  - position (reference level required)
  - condition
- work-kinetic energy theorem
- work-gravitational potential energy theorem
- Hooke's Law - applied force and restoring force
  - compression and extension
  - spring constant
  - elastic limit
- power (scalar quantity)
- efficiency
- conservation of energy: $E_{ki} + E_{gi} + E_{ei} = E_{kf} + E_{gf} + E_{ef}$

Exam: Outline - Chapter 4 and Chapter 5

- force (vector quantity)

- five examples: gravitational force (weight), applied, normal, force of friction (static and kinetic), tension

- coefficient of friction (static and kinetic) μ - no unit. $\mu < 1$

- contact/non-contact forces

- FBDs (free body diagram)

- state of equilibrium (F_{net} = 0 N, **v** = 0 m/s or **v** is uniform)

- Newton's Three Laws of Motion
  - 1st: $\mathbf{F_{net}} = 0$ N (Chapter 4) (Law of Inertia)
  - 2nd: $\mathbf{F_{net}} = m\mathbf{a}$ (Chapter 5)

    * May need kinematic equations in C5. Review Unit

  - 3rd: For every action there is an equal but opposite reaction.

- Atwood's Machine and Fletcher's Trolley ← L1

- momentum (vector quantity) $\vec{p}$

- impulse (vector quantity) $\vec{J}$

- impulse/momentum theorem $\vec{J} = \Delta\vec{p}$

~ 4 problems

C4
C5 → ① $\vec{J} = \Delta\vec{p}$

Exam: Outline - Chapter 2 and Chapter 3

1. physics mc .
2. kinematics/dynamics mc
3. frames of reference: fixed/moving mc
4. scalar quantity - magnitude only mc
5. conventional directions prob .
6. vector quantity - magnitude and direction mc
7. examples of scalar and vector quantities mc
8. graphical addition of vectors: tip-to-tail/parallelogram method mc
9. analytical addition of vectors
10. Level 1 - subtracting vectors
    - perpendicular components } mc
11. vocabulary: distance, position, displacement, time, mc
    speed, velocity, acceleration, etc.
12. symbols and units of physical quantities mc
13. types of motion: uniform/uniformly accelerated mc
14. position-time graphs
15. velocity-time graphs mc
    slope → acc .
    area ⇒ displ .
16. relationship between directions of velocity and acceleration

↑ $\vec{v}$ +ve, $\vec{a}$ -ve } slows down.
0 $\vec{v}$ -ve, $\vec{a}$ -ve } speeds up.

17. checklist for word problems prob .
18. motion equations ~~including derivations~~ prob .
19. acceleration due to gravity prob .
20. freely falling bodies prob .

Problems : kinematic equations
* freely falling body.

~2 prob