

## Physics 112

Friday, January 8/16

<http://mvhs-sherrard.weebly.com/>  
Textbook - ISBN

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1. Return -> Test - Unit 3
  2. Final Exam - Topics
    - Format
    - 12 Problems - See Next Page
  3. Exam - Review Problems (84)
  4. Review Problem #1 (Impulse-Momentum)
  5. Wave Behaviors - To Be Continued
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Physics 112 - Topics - Final Exam

C2 and C3 - Kinematics  $a, k, u, m, n, M$

- > SI base/derived units and prefixes
- > significant digits
- > rearranging equations  $\vec{v}$  constant
- > uniform/uniformly accelerated motion  $\vec{a}$  constant
- > types of quantities (scalar and vector)  $\vec{v}, v$
- > resultant
  - minimum/maximum values
  - tip to tail/parallelogram methods  $R$ , sketch, analyt.
  - graphical/analytical methods
- > velocity-time graphs
  - time or velocity from the graph
  - maximum velocity/speed
  - acceleration/average acceleration (slope)
  - displacement/distance (area)
  - time stopped/reversed direction
- > comparison of velocity and acceleration directions to determine if an object speeds up or slows down
  - $\vec{v} \oplus$  slow down
  - $\vec{a} \ominus$
- > kinematic equations
- > freely falling body problems
  - $\downarrow$  or  $\uparrow$   $\vec{a} = -9.80 \text{ m/s}^2$

C4 - Dynamics  $\rightarrow$  Velocity that is constant

- > types of forces or on object at rest
- > FBDs  $\vec{w}, \vec{N}, \vec{F}_g, \vec{F}_t, \vec{T}$
- > force problems (constant velocity)  $\uparrow$  (or at rest) (\* FBD)

C5 - Dynamics - object here accelerates

- > Newton's Three Laws of Motion
  - inertia
  - net force and acceleration  $\textcircled{1} F_{\text{net}} = m\vec{a}$
  - action/reaction forces  $\textcircled{2} F_{\text{net}} = m\vec{a}$  + kinematic eq.
- > force problems (acceleration)
- > momentum  $\vec{p} = m\vec{v}$  FBD  $\rightarrow$   $\textcircled{3} F_{\text{net}} = m\vec{a}$  and individual forces
- > impulse
- > impulse-momentum theorem  $\vec{F} \Delta t = \Delta \vec{p} \parallel \vec{F}_t = m\vec{v}_f - m\vec{v}_i$
- > Atwood's machine/Fletcher's trolley

C6  $\rightarrow$  Energy and Types of Energy, Work, P, Eff

- > work (done, not done, positive/negative)
- > types of energy (kinetic, gravitational, elastic)
- > reference line/zero line
- > Hooke's Law
- > force vs extension graph (spring constant)  $F = kx$   $\leftarrow$  Slope
- > work-energy theorems  $W = \Delta E_g, W = \Delta E_k$
- > power
- > efficiency

C7 - Law of Conservation of Energy

- > energy conservation  $E_{K_i} + E_{g_i} + E_{e_i} = E_{K_f} + E_{g_f} + E_{e_f}$

C8 and C9

- > pulse/wave waves
- > types of waves
- > parts of a wave
- > measures of a wave regions  $A, f, \lambda, v$
- > wave problems  $v = f\lambda, v = \frac{\lambda}{T}, v = \frac{\lambda}{T}, f = \frac{1}{T}$
- > wave behaviors
  - boundary behaviors
  - reflection
  - diffraction (light)
  - refraction
    - index of refraction
    - speed of light in a medium
    - Snell's law
    - three cases
    - critical angle
    - total internal reflection

multiple choice = 35  
problems = 12

## Physics 112 - 12 Problems

1. find  $\vec{R}$  analytically (1)  $\rightarrow$  rubric
2. freely falling body (1)  $\uparrow$  or  $\downarrow$   $\vec{a} = -9.80 \text{ m/s}^2$
3. C4 force problem (1)  $\vec{v} = 0$  or  $\vec{v}$  const. (FBD)
4. C5 force problem (2)  $\vec{a}$  | (FBD), motion eq.
5. impulse - momentum (1)  $\vec{F}, t, m, \vec{v}_i, \vec{v}_f$ .  
 $\vec{J} = \Delta \vec{p}$   $\vec{J} = \vec{p}_f - m\vec{v}_i$
6. work-kinetic energy theorem (1)  $F, d, m$   
 $W = \Delta E_k$
7. work-gravitational energy theorem (1)  
 $W = \Delta E_g$   $F, d, m, h_i, h_f$
8. Hooke's Law/elastic energy (1)  
 $F = kx, E_e = \frac{1}{2} kx^2$
9. energy conservation problem (1)  
 $E_{ki} + E_{gi} + E_{ei} = E_{kf} + E_{gf} + E_{ef}$
10. wave problem (1)  $v = \frac{d}{t} = \frac{\lambda}{T} = f\lambda$   $f = \frac{1}{T}$
11. refraction problem (1)

Snell's Law:  $n_i \sin i = n_r \sin R$



P112 - Rev. Prob. # 1

A 0.115 kg hockey puck is at rest. A hockey player makes a slap shot, exerting a force of 30.0 N on the puck for 0.16 s. With what speed does the puck head toward the goal?

$$m = 0.115 \text{ kg}$$

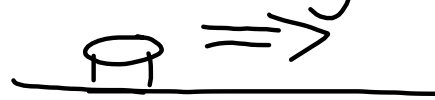
$$\vec{v}_i = 0 \text{ m/s}$$

$$\vec{F} = +30.0 \text{ N}$$

$$t = 0.16 \text{ s}$$

$$\vec{v}_f = ?$$

$$wh \rightarrow v_f$$



$$\vec{J} = \Delta \vec{p}$$

$$\vec{F}t = m\vec{v}_f - \cancel{m\vec{v}_i}$$

$$\vec{v}_f = \frac{\vec{F}t}{m}$$

$$\vec{v}_f = \frac{(+30.0)(0.16)}{0.115}$$

$$\vec{v}_f = +42 \text{ m/s}$$

A final velocity

The final speed is 42 m/s.

# Physics 122

Friday, January 8/16

<http://mvhs-sherrard.weebly.com/>

1. **Experiment 8.1 - Kepler's Laws -> 4 Days Late**

Worksheets

Text: Page 608, #1-4

Page 623, #23-27, 30

Text: Page 614, #5-8

Page 623, #28, 29

2. Worksheet - SHM

3. Test - Unit 2 -> Horizontal Projectile

Projectile Fired At an Angle

Circular Motion, Banked/Unbanked

Planetary Motion

SHM - Mass on a Spring

Pendulum

**\* Wednesday, Jan. 13/16**

Problems only

4. Final Exam - Topics

- Format

5. Unit 3 - Electrostatics and Electric Current

## Physics 122 - Topics - Final Exam

### Unit 1

- > force problems
  - push/pull
  - suspended objects
  - **incline plane**
- > static torque
  - **horizontal or involving an angle**
- > relative velocity
- > collisions/explosions
  - 1 D
    - simple
    - elastic/inelastic
  - **2D**

### Unit 2

- > projectiles
  - horizontal
  - **fired at an angle**
    - no trig (L2)
    - **trig (L1)**
- > circular motion
  - **horizontal circular motion, banked/unbanked curves**
  - ~~vertical circular motion (L1)~~
- > **Law of Universal Gravitation and planetary motion**
- > SHM
  - pendulum
  - **mass on a spring**

### Unit 3

- > electrostatics
    - electrical charges
    - transfer of charge between identical objects
    - **electric force - Coulomb's Law**
      - 2 charges
      - **3 charges**
        - **in a line**
        - ~~involves angle(s) (L1)~~
    - **electric fields**
      - **strength**
      - diagrams
      - **electric field strength**
    - electric potential energy
    - electric potential difference
  - > electric current
    - conventional current/electron flow
    - circuit symbols
    - open/closed circuits
    - ammeters/voltmeters
    - resistance in a wire
    - **Ohm's Law**
    - circuits
      - series
      - parallel
      - **complex/combination**
      - **VIR chart**
    - power
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multiple choice = 30  
problems = 11



## Science 10

<http://mvhs.nbed.nb.ca/>

Friday, January 8/16

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1. Assignment: Oh, What a Tangled Web We Weave  
1 Day Late
  2. Return Monday -> Quiz - Ecology to Food Webs
  3. Article: Keeping Threatened Amphibian Species Afloat  
- Pass in for Marking Monday, Jan. 11/16
  4. Sustainability
- 
5. Types of Substances
  6. Cycling of Organic Matter
  7. Biogeochemical Cycles
  8. The Carbon Cycle
  9. The Nitrogen Cycle
  10. The Oxygen Cycle
  11. Fertilizers and Their Effects on Ecosystems
  12. Paradigm Shifts