Physics 112
Monday, May 30/16

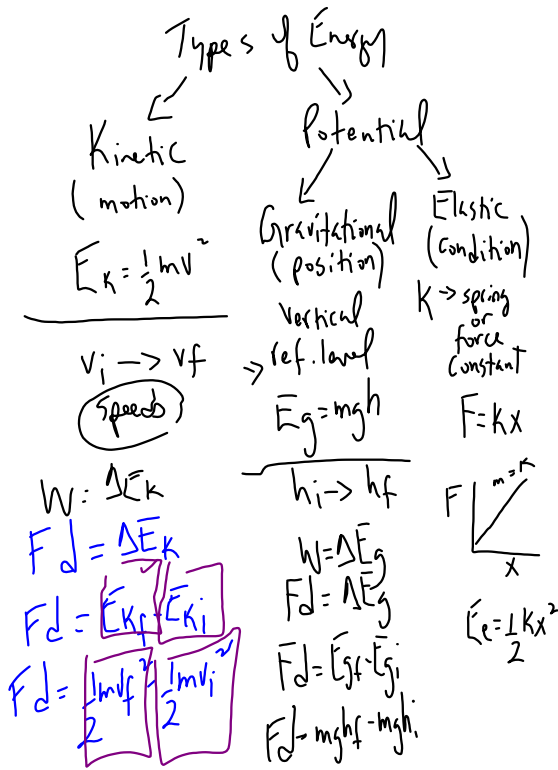http://mvhs.nbed.nb.ca/

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IS Today - Potential Grad Meeting - Main Theatre

1. Assignment -> Investigation 6-A Force and Spring Extension
   -> Optional
   -> 1 Day Late

2. Assignment: U3 - S2 and S3 -> Tuesday, May 31

3. Check -> Worksheet - C7 Page 287 PP 1-4, 6-7

4. Worksheet - Extra Practice - Conservation of Energy

5. Test - Unit 3 -> Friday

6. Final Exam - Topics and Format -> To Be Continued

7. Worksheet - Exam Review - Problems

8. Unit 4 - Waves -> Unit 1 - Fundamental Properties

P112 $A \rightarrow U3 - S2 + S3.$

S2 - Types of Energy

Types of Energy

Kinetic (motion)

$$E_K = \frac{1}{2}mv^2$$

$v_i \rightarrow v_f$ (Speed)

$W = \Delta E_k$

$Fd = \Delta E_K$

$Fd = E_{Kf} - E_{Ki}$

$Fd = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2$

Potential

Gravitational (position)

Vertical $\rightarrow$ ref. level

$$E_g = mgh$$

$h_i \rightarrow h_f$

$W = \Delta E_g$

$Fd = \Delta E_g$

$Fd = E_{gf} - E_{gi}$

$Fd = mgh_f - mgh_i$

Elastic (condition)

$K \rightarrow$ spring or force constant

$$F = kx$$

F (graph: $m = k$, x axis)

$$E_e = \frac{1}{2}kx^2$$

S3 - Power

$$P = \frac{W}{t}$$

$$P = \frac{Fd}{t} = Fv$$

$$P = \frac{mgd}{t} \quad (lifting)$$

$$P = \frac{\Delta E}{t}$$

$$P = \frac{\Delta E_g}{t} \quad or \quad P = \frac{\Delta E_K}{t}$$

Watt $= W = \frac{J}{s}$

$1 hp = 746 W$

S3 - Efficiency

$$Eff = \frac{E_o}{E_i} \times 100\%$$

$\nwarrow$ is l Sound

$\swarrow$ is l electrical

$$E_i > E_o$$

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Physics 112 - Topics - Final Exam

Unit 1 - Kinematics
-> SI base/derived units and prefixes
-> significant digits
-> rearranging equations
-> uniform/uniformly accelerated motion
-> types of quantities (scalar and vector)
-> resultant
     - minimum/maximum values
     - tip to tail/parallelogram methods
     - graphical/analytical methods
-> velocity-time graphs
     - time or velocity from the graph
     - maximum velocity/speed
     - acceleration/average acceleration
     - displacement/distance
     - time stopped/reversed direction
-> comparison of velocity and acceleration directions to
   determine if an object speeds up or slows down
-> kinematic equations
-> freely falling body problems

Unit 2 - Dynamics
-> force
-> contact/non-contact forces
-> five forces
-> FBDs
-> Newton's Three Laws of Motion
     - Law of Inertia
     - Law of Force, Mass and Acceleration
     - Law of Action and Reaction
-> First Law Problem (rest/constant velocity)
-> Second Law Problem (acceleration)
-> momentum
-> impulse
-> impulse-momentum theorem
-> Atwood's machine/Fletcher's trolley

Unit 3 - Work and Energy
-> work (done, not done, positive/negative)
-> types of energy (kinetic, potential: gravitational, elastic)
-> reference line/zero line
-> Hooke's Law
-> force vs extension graph (m = spring constant)
-> work-energy theorems
-> power
-> efficiency
-> energy conservation problems

Unit 4 - Waves
-> pulse/wave
-> types of waves (mechanical, electromagnetic)
-> parts/regions of a wave (crest, trough/compression, rarefaction)
-> measures of a wave (amplitude, period, frequency, wavelength, wave speed)
-> wave problems
-> wave behaviors
        - boundary behaviors
        - reflection
        - diffraction
        - refraction
              - index of refraction
              - speed of light in a medium
              - Snell's law
              - critical angle
              - total internal reflection

Format: multiple choice = 35
problems = 10

1. $\vec{R}$ -> analytical method

2. freely falling body problem

3. First Law problem

4. Second Law problem

5. Second Law problem

6. impulse-momentum problem

7. work-energy theorem problem

8. energy conservation problem

9. wave problem

10. refraction problem

Science 122
Monday, May 30/16

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

1. Test - Nuclear Physics

Science 122- Topics - Final Exam Topics

<u>Magnetism</u>
- magnetic domains
- magnetic field lines (N -> S)
- RHR/LHR's #1, 2 and 3 + Modified Versions
- symbols: in and out of page
- parallel wires
- electric motor: decide direction of armature or I
- force acting on a straight wire
- force acting on a single charged particle
- radius of a single particle in a uniform magnetic field
- velocity selector (perpendicular B and E fields, v)
- mass spectrometer (q to m ratio)
- electromagnetic inductance
- Lenz's Law
- EMF
- Ohm's Law
- self-inductance and mutual inductance
- transformers (primary and secondary coils, turns ratio, power)

<u>Optics</u>
- Plane Mirror: ray diagram and POST
- Spherical Mirrors:
        - concave (converging) and convex (diverging)
        - labelled ray diagrams and POST
        - mirror and magnification equations (sign conventions)
- Lenses:
        - focal length - shape and index of refraction
        - convex (converging) and concave (diverging)
        - labelled ray diagrams and POST
        - lens and magnification equations (sign conventions)
        - double lens problems

Fluid Mechanics
- hydrostatics
    - mass density
    - specific gravity
    - pressure
    - hydrostatic pressure equation
    - gauge pressure
    - pressure gauges (ie/ open-tube manometer)
    - Pascal's Principle
    - Archimedes's Principle
        - buoyant force
        - apparent weight
- hydrodynamics
    - steady (streamline)/unsteady flow
    - compressible/incompressible flow
    - viscous/non-viscous flow
    - mass flow rate
    - continuity equation
    - volume flow rate
    - Bernoulli's Equation

Nuclear Physics
- atom, nucleons (protons and neutrons) and electrons
- isotopes, nuclides, notation (mass number/atomic number)
- radioactive decay (alpha, beta (2), gamma)
- half-life, activity, decay constant
- electron-volt
- Planck: quantization of energy
- Einstein: photons and photoelectric effect (work function, cut-off
  frequency)
- wave-particle duality, deBroglie wavelength
- Bohr: atomic structure, energy level diagrams

Electrochemistry
- electrochemistry
- oxidation and reduction
- oxidizing agents and reducing agents
- half-reactions
- balanced net ionic equations
- Table of Redox Half Reactions
- determining the spontaneity of redox reactions
- oxidation numbers
- balancing redox reactions using oxidation numbers
- redox titrations

Science 10
Monday, May 30/16

1. Article - 5 Days Late

2. Assignment - Oh What a Tangled Web We Weave
                    - 4 Days Late

3. Topics - Final Exam

4. Roller Coasters - Final Touches

5. Biodiversity

6. Change and Stability in Ecosystems

7. DDT And Cats in Borneo

8. Bioaccumulation and Biomagnification

9. Sustainability

10. Types of Substances

11. Cycling of Organic Matter

12. Biogeochemical Cycles

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IS - Potential Grad Meeting

1. Quiz - Electrostatics -> Thursday, June 2/16

2. Topics - Final Exam

3. Series Circuits - Continue

4. Worksheet - Textbook: Page 719, PP #27-31 - HW

5. Parallel Circuits

6. Textbook: Page 724, C15 - PP#32-35

7. Complex Circuits

8. Textbook: Page 728, PP #36-37
   Textbook: Page 749, PFU #33-34

Physics 122/121 - Topics - Final Exam

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

Unit 2
-> projectiles
  - horizontal
  - fired at an angle
-> circular motion
  - horizontal circular motion
  - banked and unbanked curves
-> Kepler's Laws
-> Law of Universal Gravitation
-> g, v and T of satellites, moons, planets, etc.
-> SHM
  - pendulum
  - mass on a spring

Unit 3
-> electrostatics
- electrical charges
- transfer of charge between identical objects
- charging objects
- by electrification by friction
- by conduction
- by induction
- electric force - Coulomb's Law
- 2 charges
- 3 charges
- in a line
- at angles
- electric fields
- 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
- power
- circuits
- VIR chart
- series
- parallel
- complex

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Format - multiple choice = 30
problems = 9

1. push/pull OR inclined plane problem

2. static torque problem

3. 2D collision/explosion

4. projectile fired at an angle

5. Law of Universal Gravitation and
g, v and T of satellite or planet, etc.

6. SHM - mass on a spring

7. Coulomb's Law - 3 charges

8. electric field - diagram, magnitude and direction

9. complex circuit - complete VIR chart