Physics 112
Wednesday, May 22/19

1. SA - U3 S1&2 -> Today, May 22/18
   -> Work, Types of Energy and W-E Theorems

2. Final Exam Topics and Format

3. Concept Sheet: U3-S3 -> Systems and Conservation of Energy

4. Systems

5. Reminder: Mechanical Energy

6. Law of Conservation of Energy

7. Worksheet - C7 - Cons. of Energy> Page 287: PP# 1-4, 6-7
   Worksheet - C7 - Page 329, PFU #21-23, 25
                    Page 332, PFU #38, 39
                    Page 333, PFU #54
   Worksheet - C7 - Extra Practice - Conservation of Energy

Physics 112 - Topics - Final Exam (June 2019)

<u>Unit 1 - Kinematics</u>
-> 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
     - analytical method (rubric - 10 pts)
-> 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

<u>Unit 2 - Dynamics</u>
-> force
-> contact/non-contact forces
-> five forces
-> FBDs
-> Newton's Three Laws of Motion
     - 1st Law (Law of Inertia)
     - 2nd Law (Law of Force, Mass and Acceleration)
          - Type I
          - Type II
          - Type III
     - 3rd Law (Law of Action and Reaction)
-> momentum
-> impulse
-> impulse-momentum theory

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

☆

Format: multiple choice = ~~35~~→ 30
                   problems = 10

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

2. freely falling body problem

3. First Law problem

4. Second Law problem - Type II

5. Second Law problem - Type III

6. impulse-momentum problem

7. work-kinetic energy theorem problem

8. work-gravitational potential energy theorem problem

9. energy conservation problem

10. power problem

Physics 122
Wednesday, May 22/19

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

Progress Reports (Rylan)

---

1. Return/Submit: FAs - SHM (2)

2. Topics and Format - Final Exam

3. U2-S4: Projectile Motion

4. Terms to Know

5. Projectile Fired Horizontally

6. Formulas: Horizontal Projectiles

7. Examples - Horizontal Projectile Motion - To Be Continued

---

8. Worksheet - Text: Page 536, PP #1-8

9. Experiment 7.2 - Range of a Projectile (Page 45)

Physics 122 - Topics: Final Exam - June 2019

Unit 1
-> force problems
  - push/pull
  - suspended objects
  - incline plane
-> static torque
  - vertical forces
  - forces at angles
-> relative velocity (boat, plane and intersection problems)
-> collisions
  - 1 D
    - simple
    - elastic/inelastic
  - 2D
    - collision/explosion

Unit 2
-> circular motion
  - horizontal circular motion
  - banked and unbanked curves
-> Kepler's Laws (3)
-> Law of Universal Gravitation
-> g, v and T of satellites, moons, planets, etc.
-> SHM
  - pendulum
  - mass on a spring
-> projectiles
  - horizontal
  - fired at an angle   ] Remaining

Unit 3
-> electrostatics
  - types of electrical charges (2)
  - transfer of charge between identical objects/conservation of
    charge
  - charging objects
    - by electrification by friction
    - ~~by conduction~~
    - ~~by induction~~
  - electric force - Coulomb's Law
                      - 2 charges
                      - 3 charges
  - 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 (6-8 Resistors)

─────────────────────────────────

June 2019

Format - multiple choice = 20
problems = 10

1. push/pull <u>OR</u> inclined plane problem

2. circular motion <u>OR</u> relative velocity

3. static torque problem

4. 2D collision/explosion

5. projectile fired at an angle

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

7. SHM - mass on a spring

8. Coulomb's Law - 3 charges (in a line)

9. electric field - diagram, magnitude and direction

10. circuit - complete VIR chart

Science 122
Wednesday, May 22/19

1. Final Exam - Topics and Format

2. Questions?
   Worksheet - The Force On A Wire Due To A Magnetic Field

3. Force on a Single Charged Particle

4. Modified Hand Rule #3

5. Worksheet - Magnetic Force on a Single Charged Particle

6. Trajectory of A Single Charged Particle in a Uniform Magnetic Field

7. Worksheet - Magnetic Fields and Circular Paths

8. Reminder - Strength of Electric Field

Science 122- Topics - Final Exam Topics

Magnetism
- 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)

Optics
- 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

<u>Fluid Mechanics</u>
- 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
                - net force problem
- hydrodynamics
        - steady (streamline)/unsteady flow
        - compressible/incompressible flow
        - viscous/non-viscous flow
        - mass flow rate
        - continuity equation
        - volume flow rate
        - Bernoulli's Equation

<u>Nuclear Physics</u>
- 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

June 2019

MC - 20
Problems - Ray Diagrams　→ *Curved M. | Lens.*
　　　　　　Double Lens Problem
　　　　　　Hydrostatic Fluid　　⎤
　　　　　　Hydrodynamic Fluid ⎦ *OR.*
　　or ⎡ Apparent Weight　　$w_{app} = W - F_B$.
　　　⎣ "Hanging" Object in Fluid　$F_B = W_b + W_c.$
　　　　　　Nuclear Activity/Decay Constant, Etc
　　or ⎡ Photoelectric Effect
　　　⎣ Energy Levels (Quantum Jump)
　　　　　　Most Likely Redox Reaction/Spontaneity
　　　　　　Balancing Redox Reaction Using Oxid. #'s
　　　　　　Velocity Selector
　　　　　　Induced EMF

Science 10
Wednesday, May 22/19

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

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

1. Return: FA - Graphing Basics

2. Check
   Worksheets - Distance vs Time Graphs

3. Various Distance vs Time Graphs

4. Matching a Graph to a Story

5. Worksheet - Match a Graph to a Story

6. Roller Coasters

7. Average Speed

8. Problem Solving Strategy

9. Problem Solving Template

10. Average Speed - Sample Problems