


## Physics 112

Thursday, May 23/19

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

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1. SA - U3 S1&2 -> 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. [Handout - Mechanical Energy \(Skateboarder\) - Complete](#)
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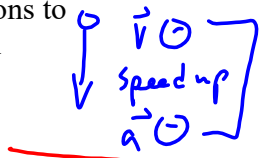
6. Law of Conservation of Energy
7. Worksheet - C7 - Cons. of Energy > Page 287: PP# 1-4, 6-7  
Worksheet - C7 - Page 329, PFU #21-23, 25  
Page 332, PFU #38, 39  
Page 333, PFU #54  
Worksheet - C7 - Extra Practice - Conservation of Energy

**Physics 112 - Topics - Final Exam (June 2019)**

Unit 1 - Kinematics

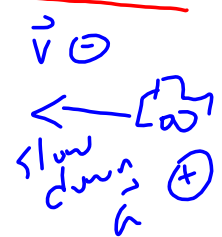
$c, m, k, n$

- > 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 - slope
  - displacement/distance - area
  - 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  $\vec{a} = -9.8 \text{ m/s}^2$

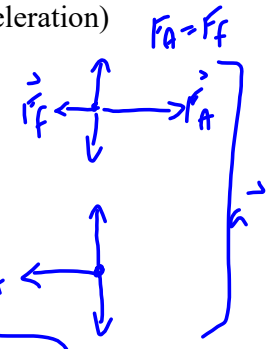


Unit 2 - Dynamics

- > force
- > contact/non-contact forces
- > five forces  $\vec{N}, \vec{F}_A, \vec{F}_f, \vec{T}, \vec{N}$
- > 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)

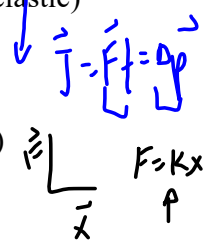


- > momentum  $\vec{p} = m\vec{v}$
- > impulse  $\vec{J} = \vec{F}t$
- > impulse-momentum theory  $\vec{J} = \Delta\vec{p}$



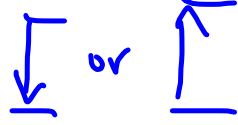
Unit 3 - Work and Energy

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



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

1.  $\vec{R}$  → analytical method (10/10)
2. freely falling body problem  $\vec{a} = -9.8 \text{ m/s}^2$  Sketch: 
3. First Law problem **FBD**
4. Second Law problem - Type II  $F_{\text{net}} = m\vec{a}$  + K. eq.
5. Second Law problem - Type III **FBD**  $F_{\text{net}} = m\vec{a}$  + individual forces.
6. impulse-momentum problem \* impulse,  $\vec{p}_i, \vec{p}_f$
7. work-kinetic energy theorem problem  $W = \int \vec{F} \cdot d\vec{r} = \Delta E_K$
8. work-gravitational potential energy theorem problem
9. energy conservation problem  $W = \Delta E_g = \int \vec{F} \cdot d\vec{r}$
10. power problem  $\Delta E_g = E_{gf} - E_{gi}$

## Physics 122

Thursday, May 23/19

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1. Return/Submit: FAs - SHM (2)
  2. Examples - Horizontal Projectile Motion - Continue
  3. Worksheet - Text: Page 536, PP #1-8
  4. Experiment 7.2 - Range of a Projectile (Page 45) - Optional
- 
5. Projectiles Fired at an Angle

## 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 OR inclined plane problem
2. circular motion OR 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

Thursday, May 23/19

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1. Modified Hand Rule #3
  2. [Worksheet - Magnetic Force on a Single Charged Particle](#)
  3. Trajectory of A Single Charged Particle in a Uniform Magnetic Field
  4. [Worksheet - Magnetic Fields and Circular Paths](#)
- 
5. Reminder - Strength of Electric Field
  6. Velocity Selector
  7. Mass Spectrometer
  8. Worksheet - Circular Trajectories and Applications

## Science 122- Topics - Final Exam Topics

### Magnetism

- magnetic domains
- magnetic field lines (N  $\rightarrow$  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



## 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
    - 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

## 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

## 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

Thursday, May 23/19

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1. Check  
Worksheets - Distance vs Time Graphs  
Worksheet - Match a Graph to a Story

### 2. Roller Coasters

Tomorrow: Word Problems

3. Average Speed
4. Problem Solving Strategy
5. Problem Solving Template
6. Average Speed - Sample Problems