

Physics 112

Friday, May 24/19

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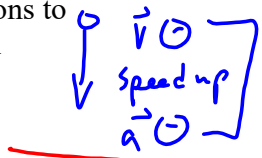
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1. Marks Available -> SA - U3 S1&2
 2. Check
Handout - Mechanical Energy (Skateboarder)
 3. FA - Mechanical Energy
 4. Law of Conservation of Energy
 5. [Worksheet - C7 - Cons. of Energy > Page 287: PP# 1-4, 6-7](#)
[Worksheet - C7 - Page 329, PFU #21-23, 25](#)
[Page 332, PFU #38, 39](#)
[Page 333, PFU #54](#)
Worksheet - C7 - Extra Practice - Conservation of Energy
 6. Power
 7. [Worksheet - C6 - Power Page 266: PP #41-43](#)
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Physics 112 - Topics - Final Exam (June 2019)

Unit 1 - Kinematics

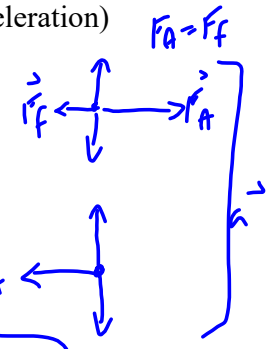
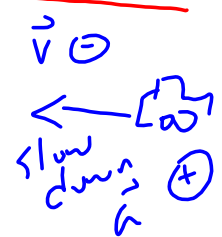
c, m, k, n

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



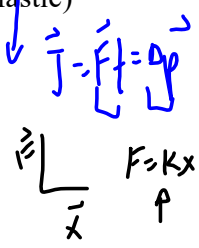
Unit 2 - Dynamics

- > force
- > contact/non-contact forces
- > five forces $\vec{w}, \vec{F}_A, \vec{F}_f, \vec{T}, \vec{N}$
- > 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 $\vec{J} = \Delta\vec{p}$



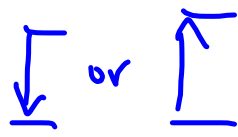
Unit 3 - Work and Energy

- > 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 $\vec{F}_{\text{net}} = m\vec{a}$ + K. eq.
5. Second Law problem - Type III **FBD** $\vec{F}_{\text{net}} = m\vec{a}$ + individual forces.
6. impulse-momentum problem * impulse, \vec{p}_i, \vec{p}_f
7. work-kinetic energy theorem problem $W = \int \vec{F} \cdot d\vec{s} = \Delta E_K$
8. work-gravitational potential energy theorem problem
9. energy conservation problem $W = \Delta E_g = \int \vec{F} \cdot d\vec{s}$
10. power problem $\Delta E_g = E_{gf} - E_{gi}$

Physics 122

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1. Questions?
Worksheet - Text: Page 536, PP #1-8
 2. FA - Horizontal Projectile
 3. Experiment 7.2 - Range of a Projectile (Page 45) - Optional
 4. Projectile Fired at an Angle - Actual vs Theoretical Trajectory
 5. Basic Trajectory - Projectile Fired at an Angle
 6. Formulas: Projectile Launched At an Angle
 7. Examples - Projectiles Fired at an Angle
 8. [Worksheet - Projectiles Fired at an Angle: C11, Text 543, PP #9-12](#)
[Worksheet - C11, Text 549, PP #13, PP #14 \(Level 1\)](#)
[C11, Text 570, PFU #17, 19, 20 \(omit graph\)](#)
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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

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1. Check
Worksheet - Magnetic Force on a Single Charged Particle
Worksheet - Magnetic Fields and Circular Paths
 2. Reminder - Strength of Electric Field
 3. Velocity Selector
 4. Mass Spectrometer
 5. Cyclotron
 6. [Worksheet - Circular Trajectories and Applications](#)
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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

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1. Check
Worksheets - Distance vs Time Graphs
Worksheet - Match a Graph to a Story
2. Average Speed
3. Problem Solving Strategy
4. Problem Solving Template
5. Average Speed - Sample Problems
6. [Practice Sheets - Average Speed Problems](#)
7. Roller Coasters