



PHYSICS 11

Comprehensive Topics List



Below is a detailed list of the topics we should cover this term. We might not get to them all, but the items below will give you a pretty good idea of where we are headed.

KINEMATICS

1. What is kinematics?
2. Frequency, Period, Cycle – definitions/units
3. Frequency, Period, Cycle – calculations (redo problems given out in class)
4. Calculate average speed
5. Average speed lab – look at **graph** and questions
6. What is acceleration – look at lab measuring acceleration graph and questions
7. Calculate average acceleration.
8. Displacement vs. time **graph** (how to calculate average velocity from a Displacement vs. time graph).
9. Velocity vs. time **graph** (how to measure average acceleration, velocity, and displacement from a **velocity vs. time graph**)
10. Try redoing questions on the graphing problem set.
11. **Constant acceleration equations.** Redo problem sets or examples
12. Understand the difference between **displacement** and **distance**.

VECTORS

1. What is the difference between a scalar and a vector?
2. Give examples of vector and scalar quantities?
3. What is a vector component?
4. What is a resultant?
5. **Know the steps to adding vectors**
6. Know how to find **components** of a vector
7. Do all problems set question relating to vectors

PROJECTILE MOTION

1. Go through projectile motion notes.
2. Understand the characteristics of both **horizontal** and **vertical** motion of projectile motion near the earth's surface.
3. Solve projectile motion problems involving range, maximum height, time, and vertical and horizontal components of velocity.
4. **Solve problems that involve projectiles that initially move Upwards off a cliff, Downward off a cliff, and Horizontal projectiles.**
5. *Definitely projectile problems on the exam!*

Dynamics - NEWTON'S LAWS

1. Review the notes we took in class. Think of physical examples that explain each of **Newton's three laws**.
2. What is the difference between mass and weight?
3. How do you find the force of gravity on an object?
4. What is a Normal force? How does it increase or decrease?
5. Know how to calculate the normal force on object (for all the situations we learned in class).
6. What is a **Friction force** (definition)? What factors affect friction?
7. What is coefficient of Friction?
8. Redo the problem sets on **Newton's three Law's of motion** and **Friction Problem Set**
9. **Incline plane problems.** (one of these is on the exam)!
10. **What is gravity?** What does it depend on?

Energy and work

1. What is **work**?
2. What is *energy*?
3. define *gravitational potential energy*
4. define *kinetic energy*
5. what are the **units** for energy?
6. solve problems involving: mgh and $\frac{1}{2}mv^2$

Energy (*Law of Conservation of Energy*)

- state the law of conservation of energy.
- solve problems **using the law of conservation of energy** including changes in gravitational potential energy, kinetic energy, energy losses, and work done.

total energy before = total energy after

$$W + \frac{1}{2} mv_1^2 + mgh_1 = \frac{1}{2} mv_2^2 + mgh_2 + H$$

Momentum in One Dimension

1. What is Momentum?
2. Calculate momentum.
3. State the **law of conservation of momentum**
4. use the law of conservation of momentum to calculate momentum, mass, or velocity during a **collision, explosion, or impact where two object stick together**
5. What is impulse? What are it's units? Is it a vector quantity?
6. Understand what impulse in terms of Momentum.
7. Understand what impulse in terms of Force and time.
8. Calculate impulse on objects when they interact with other objects.

Energy (*Power and Efficiency*)

- define *power*, What are the units for power?
- define *efficiency*. Solve problems involving the efficiency of motors, power plants, turbines and other common devices.
- Compare the efficiencies of common devices.
- Wind power.
- Use wind power formula.
- Understand and use Betz law
- Define: Current, Voltage, Resistance
- Ohm's law, use Ohm's law to calculate Voltage, Current, and Resistance.
- Calculated electric Power from Current and Voltage.
- *Understand how electric current is created* with a generator (how do conductors and magnets have to interact to create a current?)

Thermal Energy and Heat

1. What is thermal energy, heat, temperature?
2. Types of heat transfer: conduction, convection, radiation
3. Specific heat capacity *problems*
4. *Know how an internal combustion engine works*

Waves

1. Understand what an **electromagnetic wave** is. What caused them? What do they do?
2. Understand that heat radiation is an electromagnetic wave.
3. Understand that electromagnetic waves can travel through empty space.