

# Announcements

Exam 1 on Monday.

Exams will be graded & returned within a week.

HW#4 due today. Solutions will be posted tomorrow evening, which mean HW's turned in after 5 pm will not be accepted.

There will be class on Friday. We will start Relativity

## Exam 1

Things you should know:

1. You can bring your calculator.
2. Equations and constants will be given to you on the back sheet.
3. Prefices will also be given to you.
4. A picture of the EM spectrum will also be provided.
5. You will be allowed to XXX out either 1 or 2 problems which won't count toward your score. Make sure you do it, otherwise we'll just XXX out the first two problems, whether they're right or wrong.
6. Seats will be assigned, make sure to check on the posted bulletin where your seat is.
7. Questions will be a mix of multiple choice, short answer and some computations, similar to those in lecture/HW.
8. This is a closed book exam.

## Topics For Test - 1

- Powers of 10 – know how to use them
- Proportionality: directly proportional, inverse proportionality, inverse squared proportionality, etc, as done in examples & HW
- Basic Algebra: I won't have a problem just intended to do algebra. Any algebra will be integrated into a physics problem.
- Be proficient in dealing with the prefixes. For example, if you see 10 [MHz], you immediately know this means  $10 \times 10^6$  [Hz].
- Order of Magnitude Estimates... see examples

## Topics For Test - 2

### Physical Variables:

distance, time

velocity (vector):  $\mathbf{v} = \Delta \mathbf{d} / \Delta t$

acceleration (vector):  $\mathbf{a} = \Delta \mathbf{v} / \Delta t$

Force (vector):  $\mathbf{F}_{\text{tot}} = m\mathbf{a}$

**Newton's 1<sup>st</sup> and 2<sup>nd</sup> Law .. Understand what they mean**

**When are objects accelerating and when are they not accelerating?**

**Graphs of distance vs time, velocity vs time**

**Scalars vs Vectors..**

# Gravitational Force

Gravitational Force:  $F_G = Gm_1 m_2/d^2$

Gravity:  $g=9.8 \text{ m/s}^2$       $g = Gm_{\text{earth}}/R_{\text{earth}}^2$

Weight:                       $w = mg$

How does gravity compare between here and some other place? How does gravity weaken with distance from the earth's surface or center?

See examples in class, HW's..

Motion of satellites, moon around earth, earth around sun, etc.

# Work/Energy

Work-Energy Theorem: If you do work on an object, it's total energy changes.

$$\text{Work} = F_{\text{tot}} * \text{distance} \quad [\text{J}]$$

Gravitational Potential Energy:      $\text{GPE} = mgh$

Kinetic Energy:                       $\text{KE} = \frac{1}{2} mv^2$

Total Energy = GPE + KE (you should know this w/o equation)

**Conservation of total energy, understand this!** Applications to rollercoaster, pendulum...

→ Find velocity of the object at some point along the path, see examples in notes..

Forms of energy: conversion from one form to another

## Energy/ Power

Calories as a unit of energy, How much work can you do with some number of calories?

Power = Work done / time to do it     $[J/s] == [Watt] = [W]$

Usage of [kWh] as a unit of energy.

Find cost of operating some device for a specified period of time.

## EM Waves

How are EM Waves produced? What do we mean by a transverse wave?

What constitutes an EM Wave?

What are the differences between electric & magnetic fields?  
(How are they produced? Electric field of an isolated charge?  
Magnetic field of a moving charge? Be able to use the right hand rule..

Know the various types of EM Waves, which are least energetic and which are more energetic. Given frequency, find wavelength, and visa versa. Given a type of EM wave, find frequency or wavelength.

How is light produced in atoms?

## EM Waves cont

Interference, how do interfering waves behave?

Speed of light.. Be able to determine distances based on some given time that light travels..

Wavelength, frequency, Amplitude what are they?

## Demos

You should understand all the demos which we did in class

If you were there and paying attention, you should be able to handle these questions

If you were not in class, you may have no idea, oh well..

# Final Comments

Good luck...

If you:

have high attendance rate (> 90%)

have been (awake & alert) in class

putting in the time outside of class (HW, studying notes)

not falling behind

You're gonna do fine...