PHYSICS 1112 **Name: ______________________________**

Chapter 18 – Warm-Up due Friday August 16th

Reading Objectives:

Read sections 18.1 and 18.2. You should get familiar with the following terms

- Charging by friction/rubbing. Why do you put drying sheets with your laundry in the drying machine?
- Electric charge – connect charging by friction to the atomic level.
- Conductors and dielectrics/insulators
- Electric dipole. In Chemistry you learn that water is a polar molecule…

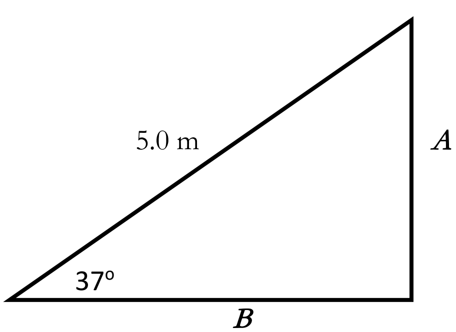
In section 18.3, you will read about the forces between charges and charged materials

- Coulomb's Law is a main take-away from the reading. Why are absolute values in equation 18.3?
- How much charge is on a proton? What about an electron? What are the units of charge?

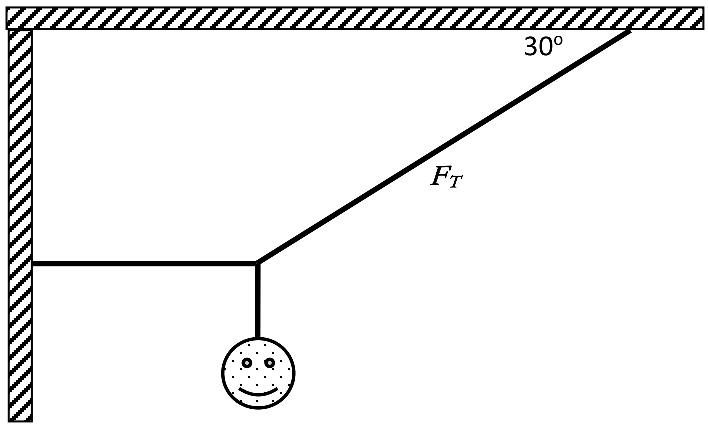
Warm-up

1. Use Coulomb's Law to determine the magnitude of the electric force acting on a 3.0 C charge located 2m away from a -5.0 C charge. Are the charges attracted to one another or repelled? Make sure you include units on your answer.

2. Determine the length of sides ***A*** and ***B*** in the right triangle shown below.



3. A heavy smiley face is suspended by two massless strings as shown in the figure. The smiley face weighs 1000.0 N. What is the tension F_T in the angled string[1]?



[1] This problem will require you to sketch a free body force diagram (there are three forces acting here: two tensions and weight. You should also resolve the forces into their *x* and *y* components. Since the suspended object is motionless, these components should sum to zero.

PHYSICS 1112 **Name: ______________________________**

Chapter 18 – Warm-Up due Monday August 19th

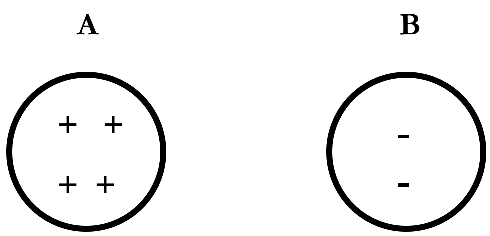
Reading Objectives:

Monday, we will keep talking about electric forces (section 18.3). We'll do some examples that involve more than two charges.

- Coulomb's Law is a main take-away from the reading. Why are absolute values in equation 18.3?
- How much charge is on a proton? What about an electron? What are the units of charge?
- Principle of superposition

Cool-down

1. In the figure below there are two metallic spheres labelled A and B. Sphere A has 4 positive charges and B two negative ones. The two spheres are brought into contact. After that, they were separated again. What is the charge on each sphere? Briefly explain



PHYSICS 1112 **Name: ______________________________**

Chapter 18 – Warm-Up due August 21st

Reading Objectives:

- Electric field is described in section 18.4
- Equations 18.11 and 18.12 are essential take-aways. Make sure you know if the *Q* in that equation is a charge creating the field (i.e. the source of the field) or just experiencing the field (often referred to as "test" charge). Try to relate this to $F_{weight} = m\ g$
- Electric field lines (section 18.5) are a tool to visualize the electric field. Everything is easier if we can see it, right? Check figures 18.22 and 18.23

Warm-up

1. What is the electric force (magnitude and direction) acting on a -3 C test charge located in a region of space having an electric field of 20 N/C pointing down (↓)? Example 18.2 will be helpful here.

2. What is the electric field at a point that is 10cm apart from a +1nC charge? Draw an arrow to indicate the direction of the field. Figures 18.22 and 18.23 would be helpful to figure out the direction of the field.

PHYSICS 1112 **Name:** ______________________________

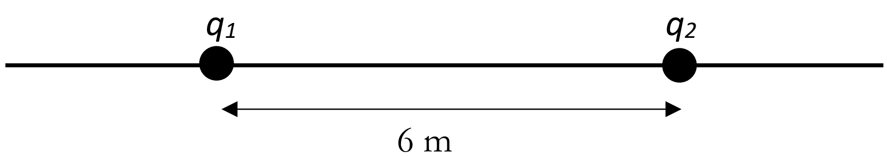
Chapter 18 – Warm-Up due August 23st

Reading Objectives:

- Catch-up with your reading

Cool-down

Two charges (q_1 = 5 C, q_2 = 20 C) are at the fixed positions shown in the figure below. At what distance from q_1 would you put a third charge q (q is also positive)[1], such it suffers a net force equals to zero?



[1] I didn't forget the value of *q*. You don't need it to solve the problem.

PHYSICS 1112 **Name:** ______________________________

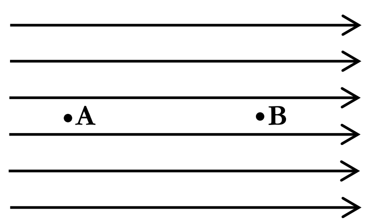
Chapter 18 – Warm-Up due August 26th

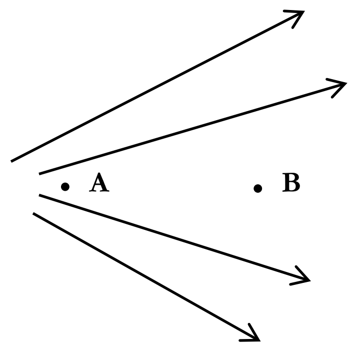
Reading Objectives:

- Keep learning about electric field lines. They are a pretty useful tool to visualize the electric field.
- Remember, equations 18.11 and 18.12 are essential take-aways for the electric field. Make sure you know if the *Q* in that equation is a charge creating the field (i.e. the source of the field) or just experiencing the field (often referred to as "test" charges). Example 18.4 is pretty similar to what we do in class.

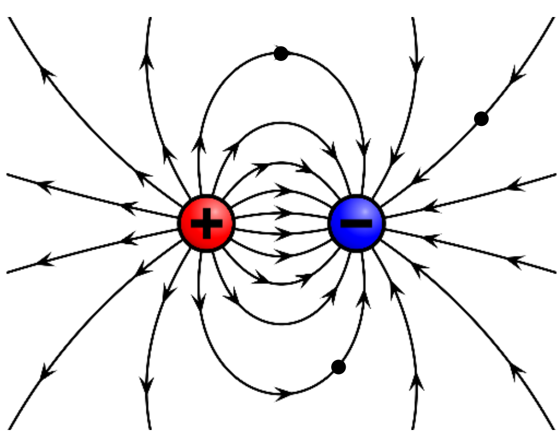
Warm-up

1. Two sets of electric field lines are directed as below. For each figure, rank in order, the strengths of the electric field





2. Below you have the electric field lines created by a dipole. Draw an arrow in the black dots indicating the direction of the electric field. Figure 18.25 should be pretty helpful here.



PHYSICS 1112 **Name: _______________________________**

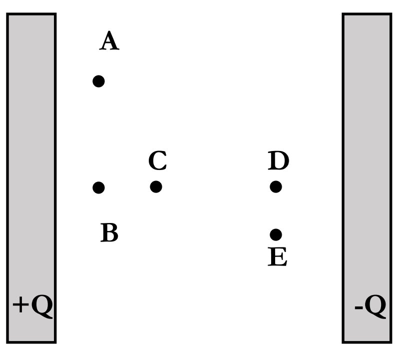
Chapter 18 – Warm-Up due August 28th

Reading Objectives:

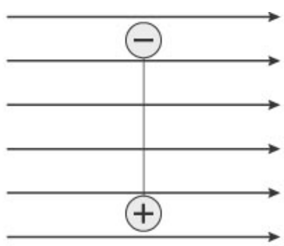
- There are configurations that create uniform electric fields, for example, capacitors. Capacitors are found in all your electronic devices. Read about them in section 18.7
- Conductors in electrostatic equilibrium (also in section 18.7). Here you will learn how a lightning rod works among other things.
- Pay attention to the electric field lines created by conductors in equilibrium.
- Section 18.6 talks about biology and electric fields, ie, DNA and water molecules. We will related this to the concepts of torque and electric field.
- Example 18.5 is pretty interesting. Be sure you work it out.

Warm-up

1. Rank in order, from largest to smallest, the forces F_A to F_E a proton would experiment if placed at points A to E in this parallel plate capacitor.



2. What is going to happen to the dipole inside the electric field?



PHYSICS 1112 **Name: ______________________________**

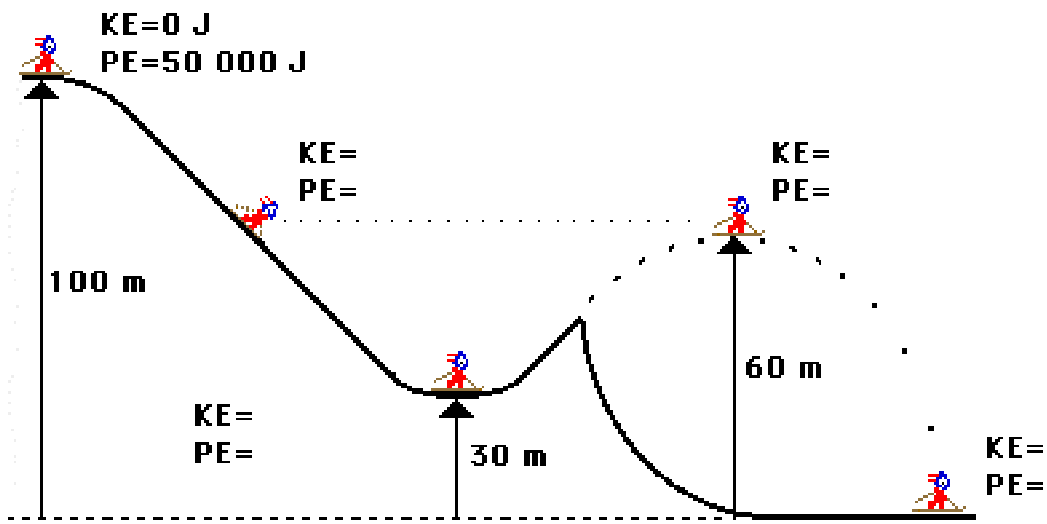
Chapter 19 – Warm-Up due August 30th

Reading Objectives:

- In PHYS1111 you learned about potential energy (PE = m g h). In section 19.1 you will learn about **electric** potential energy. Can you find any similitudes?
- Another important concept you will learn in section 19.1 is electric potential.
- Wow, these two terms sound pretty similar, but they are not. What are the units of the potential energy and electric potential? Equations 19.2 and 19.7 relate these two concepts.
- What is an electron-volt?
- Conservation of energy. Be sure to work out example 19.3

Warm-up

1. Calculate the gravitational potential energy and kinetic energy for each position marked in the figure below. You should have done this in your PHYS1111 class.



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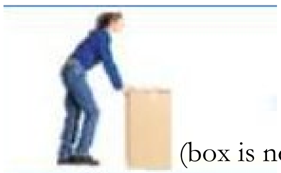
Continue on the back

2. Are you doing work in these situations? Also a question from your PHYS1111 class.


(box is not moving)


(walking to the right)


(lifting grocery bag)


(walking to the right)

PHYSICS 1112 **Name:** ______________________________

Chapter 19 – Warm-Up due September 4th

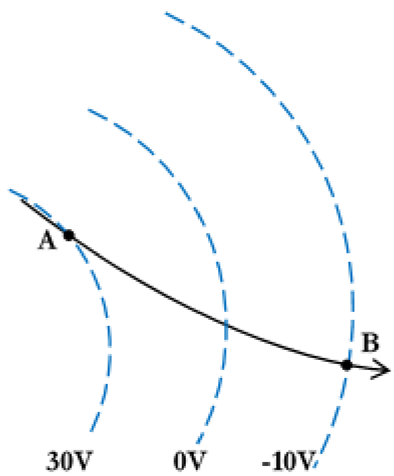
Reading Objectives:

- In section 19.2 you will see how the electric field and the electric potential are related when the electric field is uniform, like inside capacitors. Equation 19.36 is a main take away.
- In section 19.3 you will learn about electric potential created by point charges. Equation 19.37 is a main take away.
- Equipotential lines (not the same than electric field lines, but they are related, of course!)

Warm-up

1. How far from a 1nC charge will you measure a 10V potential?

2. The kinetic energy of a proton is 50 eV at point A. Is the kinetic energy of the proton at point B larger or smaller than in point A? If we had an electron instead of a proton, would your answer change? Explain briefly.



PHYSICS 1112 **Name: ______________________________**

Chapter 19 – Warm-Up due September 9th

Reading Objectives:

- We talked a bit about capacitor in chapter 18. Here we are getting into more detail. Capacitance and equations 19.50 and 19.53 are a main take away.
- What are the units of capacitance? Example 19.8 would help you to solve this warm-up.
- At the end of section 19.5 you will read about dielectrics filling the gap between the plates of a capacitor. You might want to review the concept of polarization that we studied in chapter 18.
- Energy stored in a capacitor

Warm-up

1. 6.0C of charge are stored in a capacitor connected to a 1.5V battery. What is the capacitance? Include units on your answer.

2. What is the capacitance of a parallel plate capacitor having plate area of $10cm^2$ and separated by a single sheet of paper of thickness 0.5 mm. Don't forget about the dielectric constant of the paper, κ!! (You'll need information from Table 19.1 for this.) And watch those units.

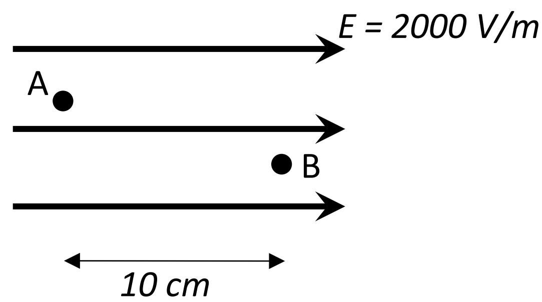
Continue on the back

Cool-down

The electric potential at point A is - 300V.

(a) How is the potential at point B compared to point A, larger or smaller?

(b) Calculate the potential at point B



PHYSICS 1112 **Name:** ______________________________

Chapter 19 – Cool-down due September 11th

An air-filled capacitor is connected to a battery and charged up as usual. While the battery connection is maintained, the distance between the plates is increased. What happens next?

Capacitance

```
Increases          Decreases          Stays the same
```

Voltage

```
Increases          Decreases          Stays the same
```

Stored charge

```
Increases          Decreases          Stays the same
```

Electric field

```
Increases          Decreases          Stays the same
```

2. Imagine having a 4.0F air-filled capacitor with plates separated by 1.0mm. The capacitor is connected to a 5.0V battery.

a. How much charge is stored by the air-filled capacitor? What is the electric field strength between the charged capacitor plates? Include units on your answers.

Now, with the 5.0V battery connected as before, the space between the capacitor plates is filled with a material having a dielectric constant $\kappa = 5.0$.

b. How much charge is stored now? What is the ***net*** (or "resultant") electric field between the plates? What is the strength of the electric field produced by the charges on the plates? What is the electric field due to the polarized dielectric material? Include units on your answers.

PHYSICS 1112 **Name: ______________________________**

Chapter 20 – Warm-Up due September 16th

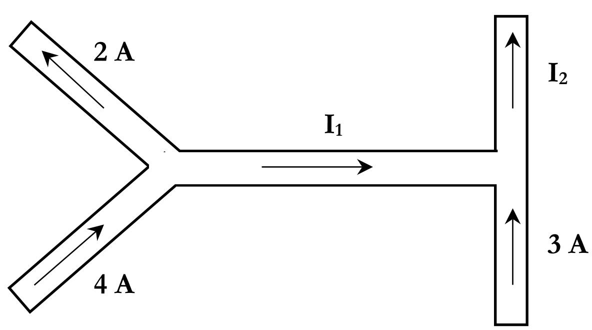
Reading Objectives:

- Go to section 20.1 and read the definition of current. Pay attention to the units. Equation 20.1 is a main take away. You may want to work examples 20.1 and 20.2.
- Current is "conserved" meaning that at any junction of wires, the amount of "flow" going in must be the same as the amount of "flow" going out. Later on, we will call this Kirchhoff junction law
- In section 20.2 you will find the definition of resistance and its units. Also Ohm's law.
- Ohm's law is one of the main principles in electronics. You will use equation 20.14 many times in the following weeks.

Warm-up

1. An electric eel flexes its muscles to create a voltage that stuns its prey. During the discharge, the eel can transfer a charge of 2.0 mC in a time of 2.0 ms. What current, in A, does this correspond to?

2. The wires below carry currents as noted. What are I_1 and I_2?



PHYSICS 1112 **Name: ______________________________**

Chapter 20 – Warm-Up due September 18th

Reading Objectives:

- Section 20.3 describes the concepts of resistance and resistivity. These two words sound similar, but they have different meanings and units. What are the units of resistivity? Pay attention to equation 20.18 and figure 20.11.
- Power and energy. Equations 20.28, 20.29 and 20.30 are the same, and you can go from one to another just using Ohm's law.

Warm-up

1. A 15cm-long copper wire is connected between the terminals of a 1.5 V battery. If the current in the wire is 2.0 A, what is the wire's diameter? Table 20.1 will be helpful to solve this question.

2. What power is supplied to the starter motor of a large truck that draws 250 A of current from a 24 V – battery?

PHYSICS 1112 **Name: ______________________________**

Chapter 21 – Warm-Up due

- Go to section 21.1 and read about combinations of resistors in series and parallel. Pay attention to figure 21.2, look how resistors are connected; are any junctions in between them?
- Equations 21.5 and 21.20 are main take aways.

Warm-Up

1. A 6.0Ω and a 12.0Ω resistor are connected in *series*. Make a sketch below. What is the overall equivalent resistance of this combination?

2. A 6.0Ω and a 12.0Ω resistor are now connected in *parallel*. Make a sketch below. What is the overall equivalent resistance of this combination?

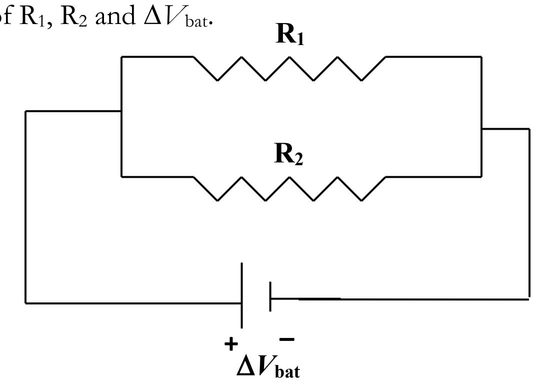
PHYSICS 1112 **Name: ______________________________**

Chapter 21 – Warm-Up due September 23th

- Start at section 21.3, Kirchhoff's rules. These rules are conservation of charge and energy laws.
- Figure 21.24 is an important sign criteria you must remember.

Warm-up

1. In this circuit, $R_1 = R_2$. I_1 is the current flowing through R_1, and I_2 is the current flowing through R_2.
   a. Find algebraic expressions for I_1, I_2 and I_{total}, in terms of R_1, R_2 and ΔV_{bat}.



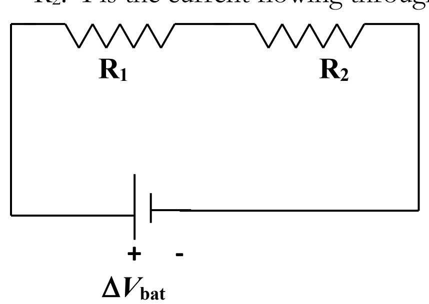
   b. Suppose we add another resistor in parallel (so we have three resistors in parallel, instead of two); we keep the same battery. Will I_{tot}, the total current flowing through the battery,

      increase, decrease, or remain the same?

   c. Suppose we keep adding resistors in parallel. Will the total current

      increase, decrease, or remain the same?

2. In this circuit, $R_1 = R_2$. I is the current flowing through R_1 and R_2.



a. Find algebraic expressions for I, in terms of R_1, R_2 and ΔV_{bat}.

b. Suppose we add another resistor in series (so we have three resistors in series, instead of two); we keep the same battery. Will I_{tot}, the total current flowing through the battery,

increase, decrease, or remain the same?

c. Suppose we keep adding resistors in series. Will the total current

increase, decrease, or remain the same?

PHYSICS 1112 **Name:** ______________________________

Chapter 21 – Warm-up due September 30th

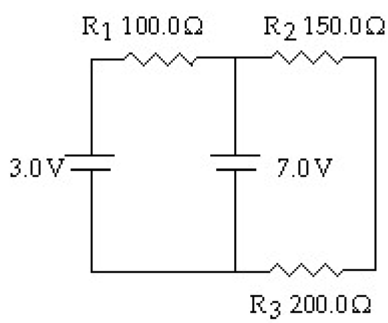
- Read section 21.6 about circuits with resistors and capacitors.
- You'll learn that charging and discharging a capacitor takes time, so time will be now a new variable you have to think about when you solve an RC circuit.
- Equations 21.77 and 21. 79 are main take-aways
- What is e^{-1}? And $(1-e^{-1})$? Use your calculator!
- Example 21.7 shows one of the multiple applications of RC circuits, the defibrillator. Work it out

Warm-up

A 500 Ω resistor, a 1.5 μF capacitor and a 6V battery are connected in series. What is the time constant of the circuit? Don't forget the units.

Cool-down

For each resistor, calculate the voltage drop and current.



PHYSICS 1112 **Name:** ______________________________

Chapter 21 – Cool-down due October 2nd

Provide the answer to problem 21.68

PHYSICS 1112 **Name: ______________________________**

Chapter 22 – Warm-Up due October 14th

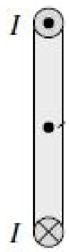
- Read sections 22.1 and 22.2. They are a nice introduction to magnetism and its applications. Notice that magnets seem to always come as a pair (N and S poles). How is this different than electric charge?
- Also, magnets interact via the "Law of Poles" which is summarized in Figure 22.5. How is this similar to Coulomb's Law? How is it different?
- In section 22.3 magnetic fields, lines and forces are described.
- Figure 22.16 shows how magnetic field direction is determined. How is this similar to the use of "test charges" to determine the strength and direction of an electric field? How is this similar to Coulomb's Law? How is it different? How are the lines similar/different to the electric field lines?
- The direction of the magnetic field is given by the right-hand rule (Fig. 22.16 (c)). We'll use this a lot, so this is a main take away.
- Section 22.9 will be key. The long straight wire, the loop of current, and the solenoid are going to be our focus points. Equations 22.24, 22.26 and 22.27 should be on your "need-to-know-for-sure" list.

Warm-up

1. A long straight wire carries a 200A current. What is the magnitude of the magnetic field at a position 1.0cm away from this wire? Include units on your answer.

2. A 50.0cm long solenoid with 500 turns carries a 20.0A current. What is the strength of the magnetic field inside the solenoid? Include units on your answer.

3. The diagram below shows a current loop perpendicular to the page; the view is a “slice” through the loop. The direction of the current in the wire at the top and the bottom is shown. Indicate with an arrow the direction of the magnetic field at a point in the center of the loop?



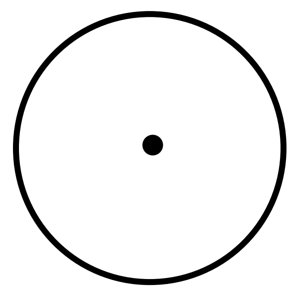
PHYSICS 1112 **Name: ______________________________**

Chapter 22 – Warm-Up due October 16th

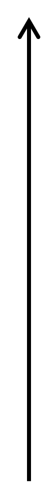
- The direction of the magnetic field is given by the right-hand rule (Fig. 22.16 (c)). We'll use this a lot, so this is a main take away.
- Section 22.9 will be key. The long straight wire, the loop of current, and the solenoid are going to be our focus points. Equations 22.24, 22.26 and 22.27 should be on your "need-to-know-for-sure" list.

Cool-down

1. A wire carrying a current is shaped in the form of a circular loop of radius 4.0 mm. If the magnetic field strength at its center is 1.1 mT with no external magnetic fields contributing to it, what is the magnitude of the current that flows through the wire? If the magnetic field is pointing out of the page like in the figure, draw an arrow to indicate the direction of the current.



2. How far from the center of a wire carrying a 2.0 A current does the magnetic field that results from the current have a magnitude of 4.0 × 10-5 T? Indicate the direction of the magnetic field at both sides of the wire



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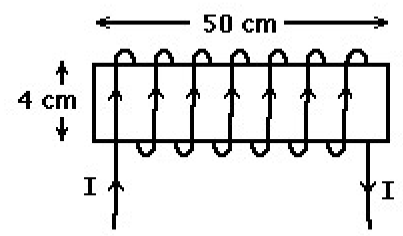
3. A solenoid is wound with 470 turns on a form 4 cm in diameter and 50 cm long. The windings carry a current in the sense that is shown. The current produces a magnetic field, of magnitude 4.1 mT, at the center of the solenoid. What is the current in the solenoid? What is the direction of the magnetic field?



PHYSICS 1112 **Name: ______________________________**

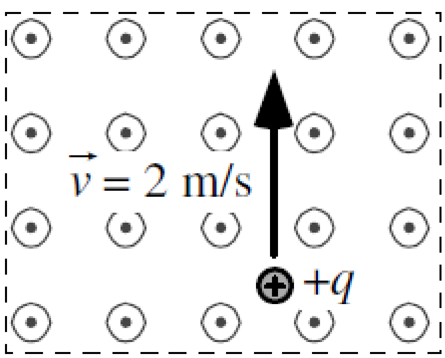
Chapter 22 – *Warm-up* due October 18th.

Reading Objectives

- We have learned how to create magnetic fields using electric current.
- In chapter 18, we learned that a static charge q inside an electric field suffers a force (F = q E). What happens if you have a charge inside a magnetic field? Read section 22.4. Equation 22.1 is a main take away. Can you spot the similarities and differences with the electric force?
- The direction of the magnetic force on a point charge is given by another right hand rule, RHR1 in your book. See figure 22.17 for details.
- Read section 22.5 for more applications. Also, you can see there that magnetic fields can cause moving charges to move in circular (or helical) paths. Pay close attention to figure 22.20 and equations 22.6 and 22.7. This should remain you to circular motion (PHYS 1111)

Warm-up

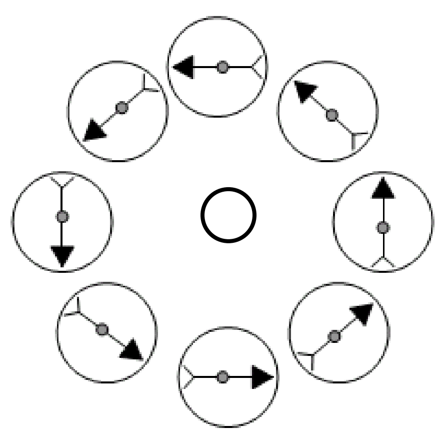
Indicate with an arrow the direction of the magnetic force acting on the charge (**B** is pointing out of the page)



Cool-down

1. A long, straight wire extends into and out of the paper . The current in the wire is?

   A. Into the paper.
   B. Out of the paper.
   C. There is no current in the wire.
   D. Not enough info to tell the direction.



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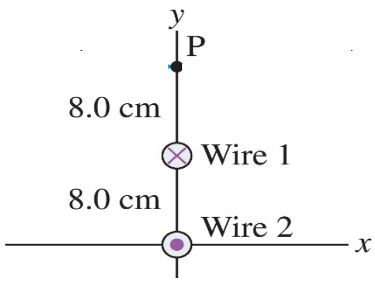
2. Two long, straight wires lie parallel to each other, as shown in the figure. They each carry a current of 5.0 A, but in opposite directions. What is the magnetic field (magnitude and direction) at point P?



PHYSICS 1112 **Name:** ______________________________

Chapter 22 – Warm-Up due October 21st

- Hall effect is described in section 22.6. This is how most of the probes to measure magnetic fields are made. You will use one of these in the lab.
- If a moving charge inside a magnetic field suffers a force, a wire carrying a current should also suffer a force when they are in a magnetic field. Read section 22.7; equation 22.16 is a main take away
- Try example 22.4

Warm-up

A 3m long wire carries a 25A current. It is in a magnetic field of 1.5T. Determine the maximum magnetic force acting on the wire.

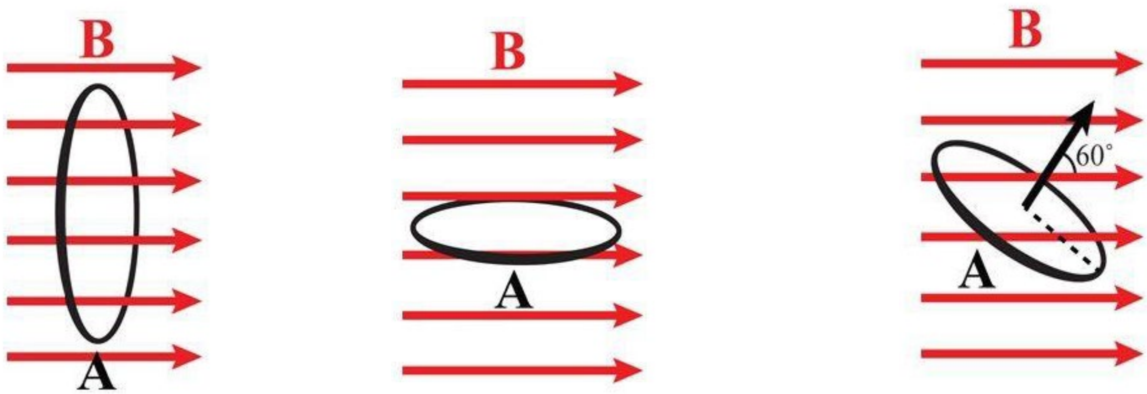
PHYSICS 1112 **Name: ______________________________**

Chapter 23 – Warm-Up due October 25th

- Symmetry in nature is amazing, an electric field (current) creates a magnetic field, so could a magnetic field create an electric field? Read section 3.1. Figure 23.4 illustrates how a "changing" magnetic field creates an electric field.
- We quantify that change of magnetic field through the variable flux. The expression from flux is equation 23.1 and we will use it extensively. Pay attention to the angle theta. From where is that angle measured?
- What are the units of flux?

Rank in order, from largest to smallest, the flux through the loop. All the loops have the same area A

(i) **(ii)** **(iii)**

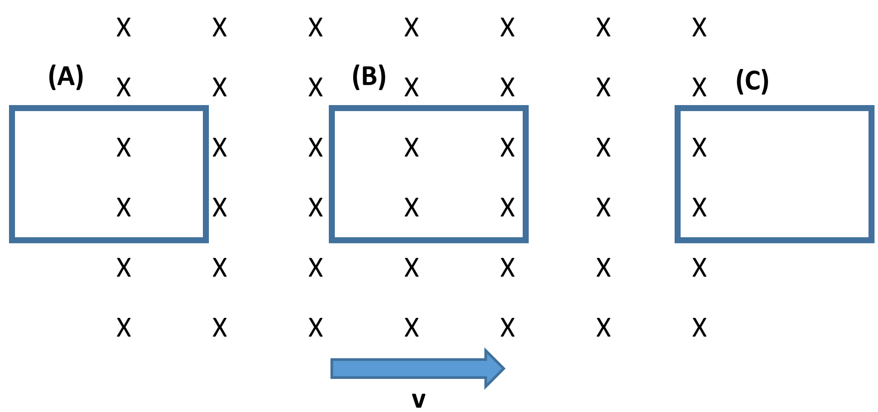


PHYSICS 1112 **Name: ______________________________**

Chapter 23 – Warm-Up due October 28th

- Faraday-Lenz's law (equation 23.2) quantify the potential difference (emf) created by the change of magnetic flux. This is the most important thing you're going to learn in this chapter. Think about, a current creates a magnetic field and a changing magnetic field creates an electric field… Magnetic and electric fields are going to appear together in the form of an electromagnetic wave. More about this in chapter 24.
- The minus sign in the equation indicates the induced current opposes the change of flux
- Try example 23.1

A loop is moving inside an area where a uniform magnetic field is pointing into of the page. What is the direction of the induced current (clockwise, counter clockwise or zero) at each position of the loop: (A) moving into the field, (B) moving inside the field and, (C) moving out of the field.



PHYSICS 1112 **Name: ______________________________**

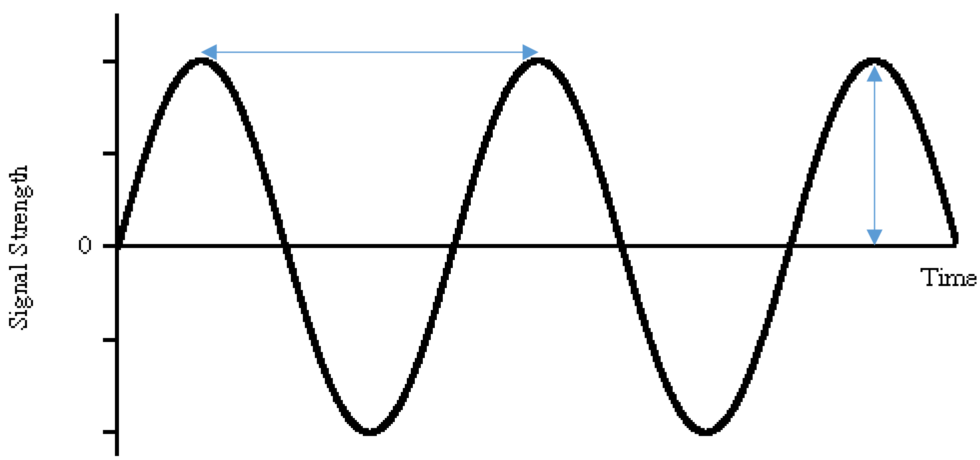
Chapter 24 – Warm-Up due November 1st

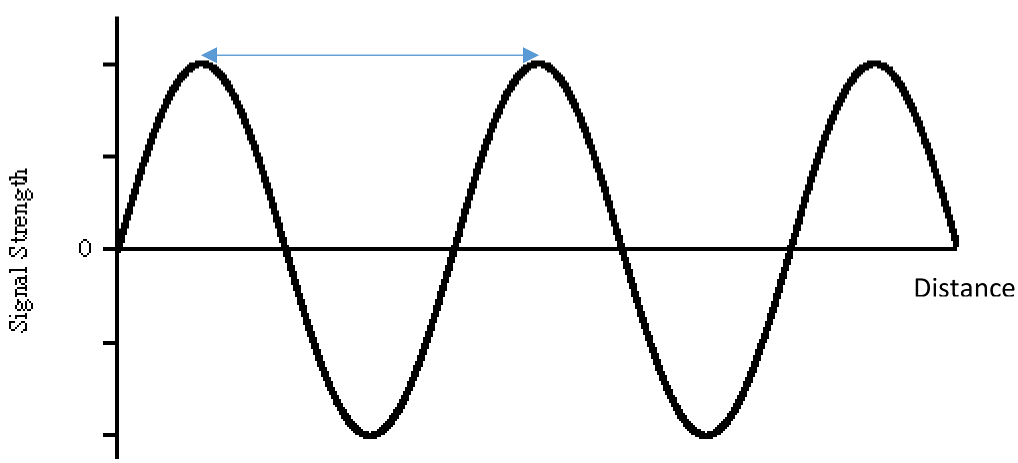
Reading Objectives:

- Maxwell unified the electric and magnetic forces in just one electromagnetic force. This is huge. This still motivate scientists to create a unified theory for all the forces. Read more about this in section 24.1
- We are going to talk about waves a bit in this chapter. It would be a good idea to review the concept of frequency, period and wavelength you studied in PHYS 1111
- Try example 24.2
- In section 24.4 we talked about energy and intensity of an electromagnetic wave. Don't confuse them. Do you know their units?
- Try example 24.4

Warm-up

Write amplitude, period and wavelength in their corresponding places





Cool – down

Provide the solution to problems 3 and 4 (page 946)

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Chapter 24 – Warm-Up due November 4th

Reading Objectives:

- In section 24.4 we talked about energy and intensity of an electromagnetic wave. Don't confuse them. Do you know their units?
- Try example 24.4

Cool - dowm

Assume the mostly infrared radiation from a heat lamp acts like a continuous wave with wavelength 1.5 um. If the lamp's 200 W output is focused on a person's shoulder, over a circular area 25cm in diameter, what is its intensity? What is the peak electric field strength? What is the peak magnetic field strength?

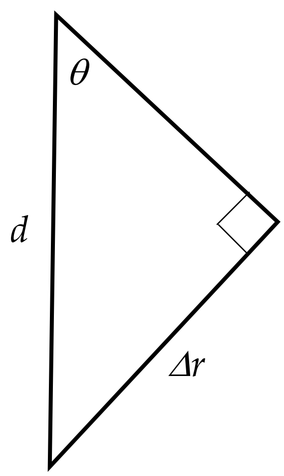
PHYSICS 1112 **Name: ______________________________**

Chapter 27 – Warm-Up due November 11th

- In Chapter 27 we will try to understand the concept of light. The colors in Fig. 27.2 and other experiments can only be understood if we treat light as a wave.
- Section 27.3 presents the most classical experiment to probe the wave character of the light: Young's double slit experiment
- Interference (constructive and destructive) are nicely explained in Fig. 27.11. This is key to understand the double slit experiment.
- Diffraction gratings are describe in section 27.4. These are everywhere, from the wings of a butterfly to monocrhomators in chemistry and biology labs.
- Work example 27.3

Warm-up

Known d and θ, what is Δr?



Continue on the back

Cool-down

What is the wavelength of light falling on double slits separated by 2 μm if the third-order-maximum is at an angle of 60°?

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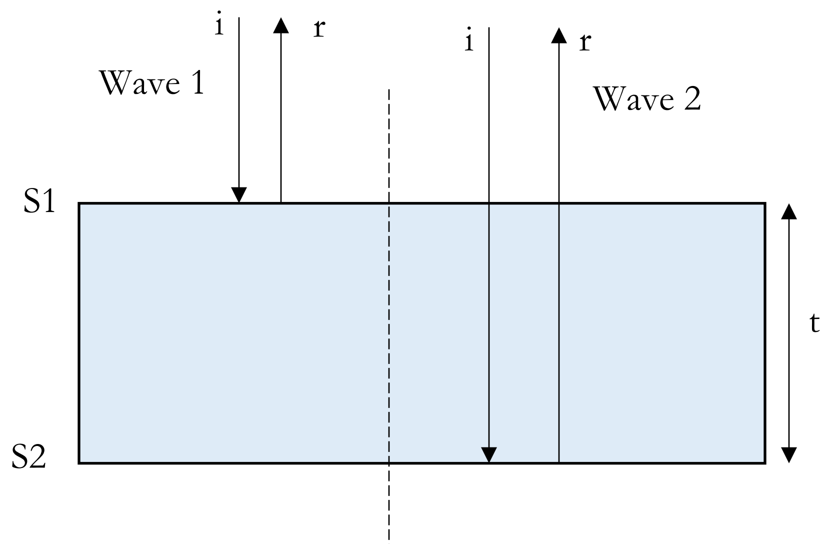
Chapter 27 – Warm-Up due November 13th

- Single slit experiments (section 27.5)
- In section 27.6 we talked about the Rayleigh criterion and what the limits of resolution are
- In section 27.7 we will talked about thin film interference and we could explain the colors in the bubbles in Fig. 27.32. Also, we learn about the antireflection coating of the eye glasses
- Work example 27.6

Warm-up

Two traveling waves with the same wavelength find a material in their path. Wave 1 is reflected at the first interface (S1) meanwhile wave 2 is reflected at S2. How much further does the second wave travel more than the first one?



Cool-down

Light from a helium-neon laser (λ = 633 nm) illuminates two slits spaced 0.4 mm apart. A viewing screen is 2m behind the slits. A bright fringe is observed at a point 9.5 mm from the center of the screen. What is the fringe number m, and how much further does the wave from one slit travel to this point than the wave from the other slit?

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Chapter 27 – Warm-Up due November 15th

Cool-down

1. When light travels from air into water,
   a. its velocity, wavelength and frequency all change.
   b. its velocity changes, but its frequency and wavelength do not change.
   c. its frequency changes, but its velocity and wavelength do not change.
   d. its velocity and wavelength change, but its frequency does not change.
   e. its wavelength changes, but its velocity and frequency do not change.

2. What principle is responsible for light spreading as it passes through a narrow slit?
   a. refraction
   b. polarization
   c. diffraction
   d. dispersion

3. Monochromatic coherent light shines through a pair of slits. If the distance between these slits is decreased, which of the following statements are true of the resulting interference pattern? (There could be more than one correct choice.)
   a. The distance between the maxima stays the same.
   b. The distance between the maxima decreases.
   c. The distance between the minima stays the same.
   d. The distance between the minima increases.
   e. The distance between the maxima increases.

4. What do we mean when we say that two light rays striking a screen are in phase with each other?
   a. When the electric field due to one is a maximum, the electric field due to the other is also a maximum, and this relation is maintained as time passes.
   b. They are traveling at the same speed.
   c. They have the same wavelength.
   d. They alternately reinforce and cancel each other.

5. Two beams of coherent light start out at the same point in phase and travel different paths to arrive at point P. If the maximum constructive interference is to occur at point P, the two beams must travel paths that differ by
   a. a whole number of wavelengths.
   b. an odd number of half-wavelengths.
   c. a whole number of half-wavelengths.

6. Two beams of coherent light start out at the same point in phase and travel different paths to arrive at point P. If the maximum destructive interference is to occur at point P, the two beams must travel paths that differ by
   a. a whole number of wavelengths.
   b. an odd number of half-wavelengths.
   c. a whole number of half-wavelengths.

7. When a beam of light that is traveling in glass strikes an air boundary at the surface of the glass, there is
    a. a 90° phase change in the reflected beam.
    b. no phase change in the reflected beam.
    c. a 180° phase change in the reflected beam.
    d. a 60° phase change in the reflected beam.
    e. a 45° phase change in the reflected beam.

8. When a beam of light that is traveling in air is reflected by a glass surface, there is
    a. a 90° phase change in the reflected beam.
    b. no phase change in the reflected beam.
    c. a 180° phase change in the reflected beam.
    d. a 60° phase change in the reflected beam.
    e. a 45° phase change in the reflected beam.

9. The colors on an oil slick are caused by reflection and
    a. diffraction.
    b. interference.
    c. refraction.
    d. polarization.
    e. ionization.

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Chapter 25 – Warm-Up due November 18th

- In Chapter 25 we will keep working on light. We will now ignore things like "light bends around corners" (aka diffraction) and consider the "ray model" of light. This model is appropriate when the light interacts with objects larger the wavelength of the light. Check the introduction and section 25.1 for details.
- In section 25.2 you can read about reflection and learn why in many terror movies the monster comes from behind a mirror.
- Index of refraction and Snell's law (equation 25.8) are the main take-aways from section 25.3. Now you know why a straw looks 'bent' inside a glass of water…
- Work examples 25.1 and 25.2
- Total internal reflection (section 25.4) has many applications, from endoscopes to telephones.

Warm-up

A beam of light is incident on the surface of a pool of water at an angle of 30^o from the normal. Use Snell's Law to determine the angle of refraction. Include a sketch of the situation and label both the incident and refracted angles on your sketch.

PHYSICS 1112 **Name: ______________________________**

Chapter 25 – Warm-Up due November 25th

- In section 25.6 we will learn about thin lenses. We are surrounded of them, from your eye glasses to the camera in your phone.
- There are two type of lenses, converging and diverging.
- Read about ray tracing and how we can find the images created by a lens graphically.
- Figure 25.34 compares our eyes with a photographic camera…
- Equations 25.26 and 25.27 are main take-aways.
- Work example 25.6

Cool-down

In the figure, the object is 50 cm in front of a converging lens (f = 30 cm). What is the position of the image? Solve this using ray tracing and the thin lens equation