PHYS 212L Charge & Field Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  
Partner(s):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Go to the following [website](http://bcs.wiley.com/he-bcs/Books?action=mininav&bcsId=5586&itemId=0470469080&assetId=211452&resourceId=20409&newwindow=true), go to Chapter 24, and select Electric Field lines and Equipotential Surfaces.   
   Listen to the audio introduction and answer the following:
2. What is an equipotential surface?
3. What is the net work done on a charged particle by an electric field when the particle moves between two points on the same equipotential surface?
4. What is the shape of equipotential surfaces produced by a point charge?
5. What is the angle between equipotential surfaces and electric field lines, when they cross each other?
6. Sketch the electric field lines and cross sections of the equipotential surfaces for the following below:
7. An isolated positive point charge b) An isolated negative point charge
8. An electric dipole (see Section 24-4, p632, HRW-9 text)  
   <http://media.pearsoncmg.com/bc/aw_young_physics_11/pt2a/Media/Electricity/1106ElecFld/Main.html>

**a. Charge Polarity Data:**

1. What polarity is the charge, on the rubber rod?\_\_\_\_\_\_\_on the glass rod?\_\_\_\_\_\_\_\_\_\_

2. What is the peak value of charge produced by the rubber rod?\_\_\_\_\_\_\_\_\_\_\_\_\_  
 by the glass rod?\_\_\_\_\_\_\_\_\_\_\_\_\_  
         (Use the smart tool to read)  
**b. Charging by Contact Data:**

a. What is the value of charge produced by the rubber rod?\_\_\_\_\_\_\_\_

    b. What is the value of charge produced by the glass rod?\_\_\_\_\_\_\_\_

**c. Charging By Induction Data:**

|  |  |  |
| --- | --- | --- |
|  | Hard-rubber rod | Glass rod |
| Peak value of charge produced while the rod is inside |  |  |
| Peak value of the induced charge |  |  |
| The polarity of the induced charge |  |  |

**d.** Draw a [series of diagrams](http://www.splung.com/content/sid/3/page/electrostatics), showing how you charged the calorimeter jacket, by induction, for any one of the rods.

Charge the hard-rubber rod with fur (diagram-1) and lower the rod inside the jacket (diagram-2) without touching the inside, and hold it there. While holding the rod inside, ground the jacket (diagram-3), then remove the ground (diagram-4), and then remove the rod (diagram-5)

PHYS 212L Lab4 Problems from Chap 21 Due on WP 2/14

P25. How many electrons would have to be removed from a coin to leave it with a charge of +2.4 x 10-6 C?

P33. Calculate the number of coulombs of positive charge in 320 cm3 of (neutral) water. (*Hint:* A hydrogen atom contains one proton; an oxygen atom contains eight protons.)

P36. Electrons and positrons are produced by the nuclear transformations of protons and neutrons known as beta decay. **(a)** If a proton transforms into a neutron, is an electron or a positron produced? **(b)** If a neutron transforms into a proton, is an electron or a positron produced?

P45. How many coulombs of positive charge are in 1.27 mol of neutral molecular-hydrogen gas (H2)?

P59. What is the total charge in coulombs of 72.7 kg of electrons?