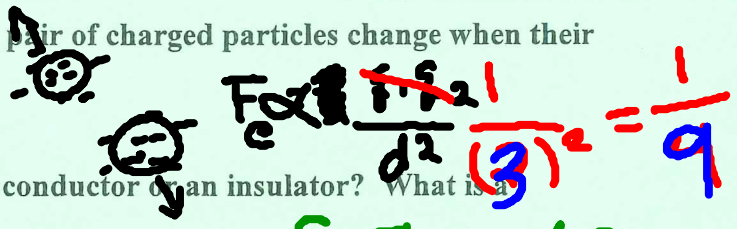
Name_____
(20 points, due _____)

ELECTROSTATICS STUDY SHEET

Each of the following questions represents a concept discussed in class. Further information can be found in Chapters 16-17 of the text.

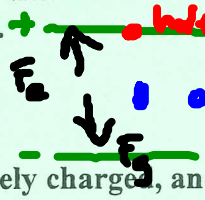
1. By how much does the electric force between a pair of charged particles change when their separation is doubled? Tripled?



2. What factors determine whether an object is a conductor or an insulator? What is a semiconductor?

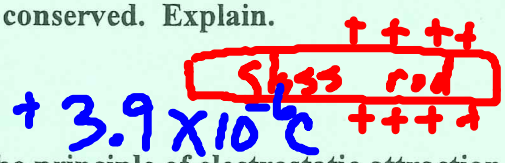
The numbers of electrons in the farthest distant cloud. If 3 or fewer conductor if 4 semiconductor and if 5 or more insulator.

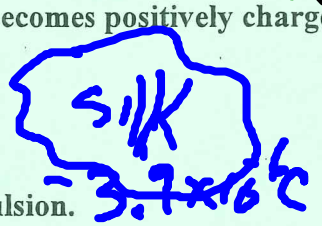
3. Who determined the value of a single charge? Describe (in terms of the 2 forces used) this person's famous experiment which won him the Nobel Prize in Physics.



Millikan Oil Drop

4. When rubbing a neutral glass rod with silk, the rod becomes positively charged, and yet total charge in conserved. Explain.



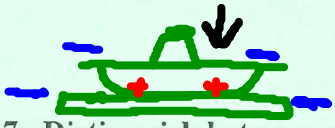


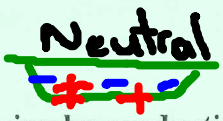
before after
neutral = gr^+ + $silk^-$

5. State the principle of electrostatic attraction and repulsion.

like repel Unlike attract

6. Define polarization. Use this to explain why neutral objects are attracted to charged.





7. Distinguish between charging by conduction and charging by induction.

Touch
leave same charge

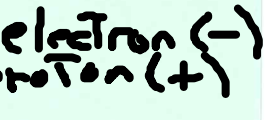
don't Touch charge with rod
leave with opposite charge

8. Put yourself inside the hollow Van de Graaff generator sphere. When turned on, would you feel a charge? Why or why not?

You would feel no charge on The inside of the Van de Graaff (Faraday Cage) Why? Charge resides on the outside.

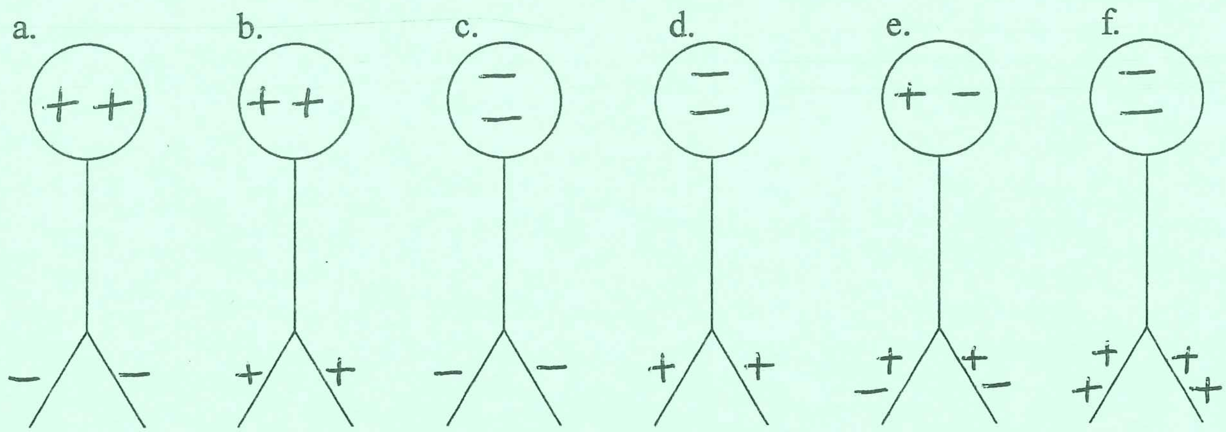
9. In what way is the charge of a proton similar and dissimilar to that of an electron?

Both hold 1.6×10^{-19} Coulombs of charge



10. List 5 practical examples of static electricity in today's world.

On the blanks below, place the letter of the diagram that best represents the charge on an electroscope during each of the procedures described:



d 1. A positively-charged rod is brought near an uncharged electroscope.

c ~~b~~ 2. A glass rod is charged positively by rubbing it with silk. The silk is then touched to a neutral electroscope.

c 3. A positively-charged rod is brought near a neutral electroscope and the electroscope is charged by induction (by grounding).

b ~~f~~ 4. A neutral electroscope is charged by conduction using a positive rod.

a ~~d~~ 5. A negatively-charged rod is brought near a neutral electroscope.

f b 6. A positively-charged rod is brought near a positively-charged electroscope.

e a 7. A metal rod is brought in contact with a positively-charged electroscope.

b c? 8. A neutral plastic rod is brought in contact with a positively-charged electroscope.