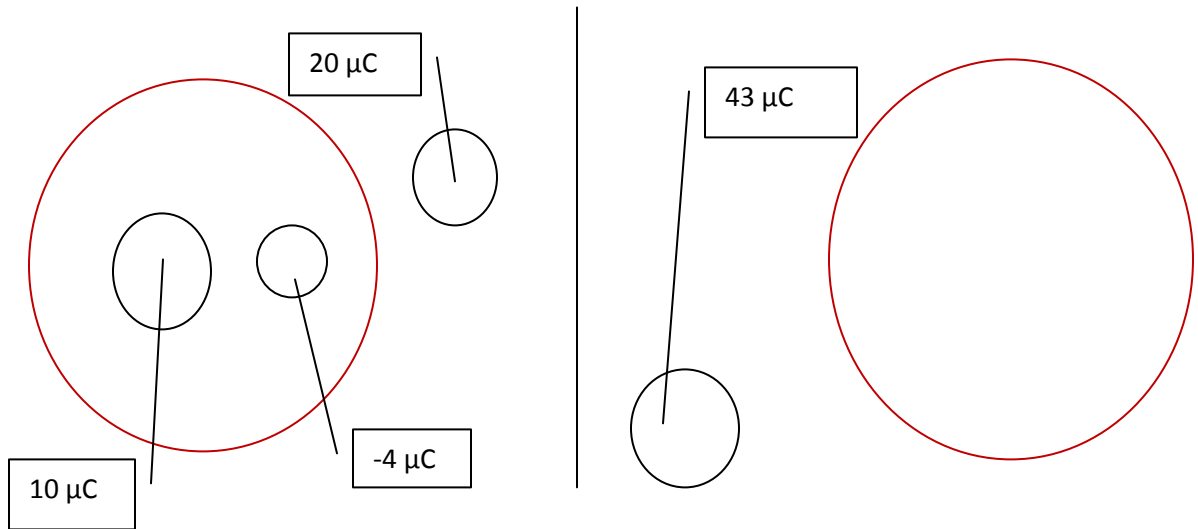


1. List three properties of charges
2. Positive charges move from _____ potential to _____ potential.
3. An object of positive charge $18 \mu\text{C}$ is at the origin. What is the magnitude and direction of the force felt on an object of charge $-40 \mu\text{C}$ placed 30 cm to the right?
4. (T/F) Electrons tend to move in the same direction as the electric field it's in.
5. Determine the flux through the following Gaussian surfaces. (surfaces are red, charges are black)



6. How are the charge distributions different when comparing a solid insulating sphere to a solid conducting one?
7. A charged object is placed in a uniform electric field of 200 V/m heading to the right. If the object feels a force of $.032 \text{ N}$ to the left, what is the charge of the object?
8. A person has a $9 \mu\text{F}$ capacitor hooked up to a circuit. She wants to add another capacitor so that the equivalent capacitance is doubled. What value should that other capacitor be if it is hooked up in parallel? Can the same effect occur if they are hooked up in series?
9. A parallel plate capacitor has an area of 4 cm^2 , a distance of 1 mm , and a capacitance of $.40 \text{ nF}$. What is the dielectric constant of the substance between the plates?
10. In a downward pointing electric field of strength 300 N/C , point A is measured to be 7.5 volts . What is the electric potential at a point 10 mm down from point A? Where will the electric potential be zero?
11. The expression for electric potential at a point is found to be $35x/y^2$. Find the x, y, and z components of the electric field.
12. A dipole consists of two opposite charges of magnitude $30 \mu\text{C}$ that are 100 nm apart. If the dipole orients itself to a 500 N/C electric field, what amount of work is needed for it to reverse directions?