Chapter 21:
F = k(q1)(q2)/r^2 : Force between two charges in (C)
Opposites Attract. Like charges repel.
Matter:
Electricity: moving (mobile) charges (usually electrons)
Conductors: Conducts electricity has many available mobile charges (usually electrons)
Non-Conductors: outer electrons tightly bound to each nucleus
Insulators: no electricity can flow (bonding in atom very tight)

Charging by rubbing: Tribio electric charging (transfer charge by rubbing) (electrons physically transfer)

Charging by conduction (Touching): Touch a charged object to a neutral one (electrons physically transfer)

Charging by Induction (No touch - gets close): Grounding a neutral object while its polarizing. Attracts/repels

Chapter 22:
Electric Field: Mediates the electric force
Scalar Field: numbers at every point in space (temperature, elevation map)
Vector Field: vector at every point in space (Fluid flow, wind, oil in pipe)
Electric fields are vector fields
E = k(q)/r^2
Protons: Sources out
Electrons: Pulls in
F = (q)E

Charges in a Line: regular way
Continuous Charge Distribution: E = Integral/ dE, break into i and j, try to cancel, use angles (cos and sin) for i and j, = k integral/ dq(z)/r^2

E(Line charge) = 2*K*Lambda/r
E(Disk) = surface area/ z (epsilon knot) * (1 - 2/(sqrt(z^2 + R^2)))
E(Ring) = KQZ/(Z^2+R^2)^(3/2)

Chapter 23:
Electric Flux: Measure of how many vector (Field Lines) penetrate a surface. “Net flow in or out of surface”
Flux = E*A = EAcos(theta) = ExAx + EyAy
Gauss’ Law: charges outside has no influence on flux.

Spherical Shell of Charge: E(Surface Area of GS) = q/(epsilon knot): E = kq/r^2

Infinite Line Charge (“very long”): E = 2*K*lambda/r

Cylindrical: Qout balances out charge on Qin. Qin = -Q

Can a non-conducting material polarize? Yes, its referred to as partial polarization, (charged separation). (Slight shift of electrons per each molecule, not object based)