General Physics II - Equation Sheet

-Electric Charge, Force, and Field -Gauss’s Law

 (Field of a Point Charge)

 (Coulomb’s Law)  for a sphere

 outside sphere:

  **,** where inside sphere:

 (Infinite Line of Charge) inside hollow sphere:

-Electric Potential -Electrostatic Energy and Capacitors

 (Potential-Energy Difference) (Capacitance)

 (Electric Potential Difference) (Energy in a Capacitor)

 (Point Charge Potential) (Parallel-Plate Cap.)

 (PPC with Dielectric)

-Electric Current -Electric Circuits (RC)

 (Steady Current) (Series)

 (Instantaneous Current) (Parallel)

 (Ohm’s Law) (Charging)

 (Discharging)

 (Electric Power)

-Magnetism: Force and Field

 (Magnetic Force) (Magnetic Dipole Moment)

 (Electromagnetic Force) (Gauss’s Law for Magnetism)

 (Magnetic Force on a Current) (Torque on a Dipole)

 (Biot-Savart Law)

 (Solenoid Field)

-Electromagnetic Induction -Alternating-Current Circuits

 (Magnetic Flux) and

 (Faraday’s Law) ;

 (Lenz’s Law) ; (Resonant Frequency)

 (Inductors in Circuits) ;

 (Impedance)

 ; ;

-Optics. Images, and Optical Instruments

 (Index of Refraction) -Interference and Diffraction

 (Snell’s Law)

 (Polarizing Angle) (Bright Fringes)

 (Critical Angle) (Dark Fringes)

 (Magnification) (where m=0,1,2,…)

 (Mirror Equation)

 (Lensmaker’s Formula)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Constant | Symbol | Value | Units | Alternative |
| Elementary Charge | e | 1.60x10-19 | C | -------------- |
| Proportionality Constant | k | 9.0x109 |  | 8.99x109 |
| Permittivity Constant |  | 8.85x10-12 |  | -------------- |
| Permeability Constant |  | (4π)x10-7 |  |  |

- Conversion Factors

**Length Time Mass Energy**

1 mi = 5280 ft 1 d = 24 hr 1 metric ton = 1000 kg 1 Cal = 1000 cal

1 ft = 12 in 1 hr = 60 min 1 lb = 0.454 kg 1 cal = 4.184 J

1 in = 2.54 cm 1 min = 60 sec 1 kg = 1000 g

**Chemistry Pressure**

1 mol = 6.02x1023 molecules 1 atm = 101.3 kPa = 101,300 Pa = 760 mmHg = 760 torr

1 g = 6.02x1023 amu