ISP 209
Equations for Exam 2

- Energy

\[ K = \frac{1}{2} m v^2 \]

\[ U = mgh \quad \text{(gravity; } g = 9.81 \text{ m/s}^2) \]

\[ U = \frac{1}{2} k x^2 \quad \text{(spring; } k = \text{Hooke’s constant)} \]

Power = Energy / Time

- Static Electricity

\[ F = \frac{K Q_1 Q_2}{r^2} \quad \text{(Coulomb’s law; } K = 8.99 \times 10^9 \text{ Nm}^2/\text{C}^2) \]

The electric field outside a charged sphere: \[ \mathbf{E} = \frac{KQ}{r^2} \hat{r} \]

\[ Q = CV \quad \text{and} \quad U = \frac{1}{2} Q V \quad \text{(capacitor; } C = \text{capacitance)} \]

- Electric Current

\[ I = \frac{\Delta Q}{\Delta t} \]

\[ V = IR \quad \text{(Ohm’s law; } R = \text{resistance)} \]

\[ P = IV = I^2 R \quad \text{(Joule’s law)} \]