Equations/rules you should know for the final exam.

$F_{spring} = -kx$

$PE_{spring} = \frac{1}{2} kx^2$

$E = kq/r^2$

$F_e = qE$

$\Delta PE = -W_{ab} = -qE\Delta x$ (constant, uniform E-field)

$\Delta V = V_b - V_a = \Delta PE/q$

$V(r) = kq/r$ (electrostatic potential for a point charge)

$PE(r) = kq_1q_2/r$

$C = Q/\Delta V$

$R = \Delta V/I = \rho L/A$

$V = IR$ (Ohm's Law)

Ceq = C1 + C2 + C3+.... parallel capacitors

1/Ceq = 1/C1 + 1/C2 + 1/C3 .... series capacitors

Req = R1 + R2 + R3+.... series resistors

1/Req = 1/R1 + 1/R2 + 1/R3 .... parallel resistors

Kirchhoff's rules: I1 = I2 + I3, Sum of delta(V) around closed = 0

F_m = qvBsin(theta) or F_m = ILBsin(theta) Magnetic force on moving charge or current

angle of incidence = angle of reflection (law of reflection)

n1sin(theta1) = n2sin(theta2) (Snell's Law)

sin(thetaC) = n2/n1 (total internal reflection)

M = hi/ho = - di/do (magnification)

1/do + 1/di = 2/R = 1/f (know the sign conventions for using these for mirrors and lenses)

$\Delta(KE) + \Delta(PE) = 0$ (conservation of energy)

$W = -\Delta PE$

$t = \gamma t_p$ (time dilation)

$L = L_p/\gamma$ (length contraction)

$p = \gamma mv$(Relativistic momentum)

$KE = \gamma mc^2 - mc^2$ (relativistic kinetic energy)

Etotal = γmc^2 = KE +Er (relativistic total energy)

Er = mc^2 (rest energy)

$m_{bound}c^2 + Eb = m_{individual}c^2$ (binding energy)

$hf = 1/2mv_{max}^2 + \phi$ (photoelectric effect)

$hf_0 = \phi$ (work function)

$f = 1/T$

$v = \lambda f = \lambda / T$

$F = kq_1q_2/r^2$ (Coulomb's Law)

$C = kC_o$ (capacitance change with dielectric)

$P = IV = I^2R = V^2/R$ (power dissipated by R)