Spring Semester Final Exam Formulas and Other Helpful Information

Power, Impulse, & Momentum

$$P = \frac{W}{t} \qquad P = \frac{Fd}{t} \qquad P = Fv \qquad P = \frac{\Delta KE}{t} \qquad P = \frac{(1/2mv_f^2 - 1/2mv_i^2)}{t}$$

$$P = \frac{mgh}{t} \qquad P = mgv \qquad P = \frac{mg\mu d}{t} \qquad P = mg\mu v \qquad P = \frac{mg\mu d\cos\theta}{t} \qquad P = mg\mu v\cos\theta$$

$$\rho = mv \qquad F = \frac{\Delta\rho}{t} \qquad \Delta\rho = J \qquad J = (mv_f - mv_i) \qquad J = m(v_f - v_i) \qquad J = Ft$$

$$m_1v_{1i} + m_2v_{2i} = m_1v_{1f} + m_2v_{2f} \qquad m_1v_{1i} + m_2v_{2i} = (m_1 + m_2)v_f \qquad (m_1 + m_2)v_i = m_1v_{1f} + m_2v_{2f}$$

Universal Law of Gravitation and Circular Motion

G = 6.67 E -11 Nm^2/kg^2

$$\boldsymbol{F_g = G\frac{M_1M_2}{R^2}} \qquad \boldsymbol{g = \frac{GM}{R^2}} \qquad \boldsymbol{F_g = mg} \qquad v_c = \frac{2\pi r}{T}$$

$$a_c = \frac{4\pi^2 r}{T^2} \qquad \boldsymbol{a_c = \frac{v^2}{r}} \qquad T = \frac{1}{RPM}x\,60$$

$$F_f = F_N\mu \qquad F_f = mg\mu \qquad \Sigma F = ma$$

Electrostatics:

Point Charge Formulas:

$F_e = (K \mid Q_1q_2 \mid)/r^2$

$F = qE$

$E = (KQ)/r^2$

$V = (KQ)/r$

$W = U_e = qV$

Other important information:

milli = m = E –3
micro = μ = E –6
nano = n = E –9
pico = p = E –12

kilo = K = E 3
mega = M = E 6

Proton:
mass = 1.67 E –27 kg
charge = 1.6 e –19 C

Electron:
mass = 9.11 E –31 kg
charge = - 1.6 E –19 C

K = 9 E 9 Nm^2/C^2

Circuits:

Loop Rule: The sum of the Voltages around a closed loop = 0; OR. . .the voltage between any two points is the same independent of path

Junction Rule: The sum of the current entering a junction = sum of the current leaving the junction

$V = IR$

$P = VI = I^2R = V^2/R = E/t$

(Series) $R_t = R_1 + R_2 + R_3 \ldots$

(Parallel) $R_t^{-1} = (R_1^{-1} + R_2^{-1} + R_3^{-1} \ldots)^{-1}$

Magnetism:

$F = qvB$ $F = BIL$ $P = VI$ $P_{IN} = P_{OUT}$ $V_{IN}I_{IN} = V_{OUT}I_{OUT}$ $V_s = \frac{N_s}{N_p} V_p$

Waves and Sound:

$v = f\lambda$

$v = \Delta x/t$

Light and Color:

$c = f\lambda$

$c = 3 \text{ E } 8 \text{ m/s}$

$E = hf$ $h = 6.63 \text{ E } -34 \text{ J·s}$

Optics: Mirrors and Lenses:

$n = c/v$ $n_{air} = 1$ $n_1 \sin\theta_i = n_2 \sin\theta_r$ $\sin\theta_c = n_2/n_1$

$1/f = 1/D_i + 1/D_o$

$m = -(D_i)/D_o = H_i/H_o$

Statics

$\tau = Fr$