General Tips

1. Start by looking at your first five exams, and seeing what you got wrong and why. Think how you could have solved the problems correctly. Were you missing a basic concept, or not understanding some definition, or lost in algebra? Did you write down the formulas being applied, **before** doing calculations and inserting numbers? Did you forget to make some important conversion of units in the middle of the calculation? Did you get an answer with the correct units? Did you round off to the correct number of significant figures?

2. You might look up some old tests online and see if you can solve them. It may even be useful to read some of the problems quickly, and just imagine how you would try to answer them, without going through all the details. If you are pretty sure you know how to do one, then go on to another one until you find the ones that give you a greater challenge.

3. Check out the list of Concepts to Review and Equation Highlights on the following page. For each concept listed, check your memory, do you have a good idea what it means? If so, then go on to another one until you find the ones that you don't know, then research those in the appropriate chapters of the textbook. Do the same for the listed equations, if you can't remember the situations in which you would apply them.

4. Check your old homework solutions, especially the ones on the Self-Study Review Assignment. Also make sure you now know how to do any other examples that gave you difficulty during the semester. Try to do the new suggested problems that are marked there in **bold**. Ask your friends or tutor for help if you still can't figure them out, but don't do this until you try to find the answers on your own. After all, you want to have the confidence that you can figure things out for yourself on the exam.

Ch.	Concepts to Review	Eqn. Highlights
1	Science: theories, SI Units, unit conversions, prefixes, uncertainty, estimations	$A = \pi r^2$ $V = \frac{4\pi}{3} r^3$
2	1D displacement, velocity, speed, acceleration, average velocity, free fall under gravity	$\Delta x = \bar{v}\ \Delta t$ $v^2 = v_0^2 + 2a\Delta x$
3	Vectors: addition, subtraction, components, magnitude & direction, relative velocity	$V_x = V\cos\theta$ $V_y = V\sin\theta$
4	Newton's Laws: inertia, forces, net force, action-reaction, free-body-diagrams, inclines ($g\sin\theta$), static friction, kinetic friction, normal force, weight, apparent weight	$\vec{F}_{\text{net}} = m\vec{a}$ $f_k = \mu_k N$
5	Uniform circular motion: centripetal force & acceleration, net force, g's, gravitation, inverse square law, $g(r)$, weight, orbits, period, free fall	$a = v^2/r$ $g(r) = GM/r^2$ $v = \frac{2\pi r}{T} = \sqrt{\frac{GM}{r}}$
6	Work: joules, work by gravity, work of friction, work-kinetic energy theorem, gravitational potential energy, elastic potential energy, conservative forces, conservation of energy, dissipation of mechanical energy by friction	$W = Fd\cos\theta$ $\Delta\text{KE} = W_{\text{net}}$ $\text{PE}_{\text{grav}} = mgy$ $\text{PE}_{\text{spring}} = \frac{1}{2}kx^2$
7	Momentum, impulse, conservation, elastic/inelastic collisions, center of mass	$\Delta\vec{p} = \vec{F}_{\text{ave}}\Delta t$ $\vec{p} = m\vec{v}$
8	Rotation: radians, revolutions, angular displacement, velocity, acceleration, frequency, rpm, rolling, torque, rotational inertia, angular momentum and conservation, KE	$v = \omega r$ $L = I\omega$ $\text{KE} = \frac{1}{2}I\omega^2$
9	Equilibrium: net force, net torque, axis, lever arm, center of gravity, stable, unstable	$\sum \vec{F} = 0$ $\sum \tau = 0$
10	Fluids: density, SG, pressure vs. depth, atm, kPa, bouyant force, Bernouli Eqn.	$\Delta P = \rho g d$ $P = F/A$
11	SHM: amplitude, frequency, period, spring constant, oscillation energy, pendulum, waves, wave speed, wavelength, frequency, wave intensity and amplitude, isotropic, standing waves (node-to-node=$\lambda/2$), resonance	$\omega = 2\pi f = \sqrt{\frac{k}{m}}$ $v = f\lambda, \lambda = vT$ $I = \frac{P}{A}, I = \frac{P}{4\pi r^2}$
12	Sound: speed, wavelength, frequency, intensity, sound level, string & pipe resonances	$\beta = (10\text{dB})\log\frac{I}{I_0}$
13	Temperature: °F, °C, Kelvin, moles, molar mass, thermal expansion, ideal gases, Avagadro's #, gas constant, kinetic theory, rms speed, ave. KE per molecule	$n = \frac{m}{M_A} = \frac{N}{N_A}$ $PV = nRT$ $\overline{\text{KE}} = \frac{3}{2}kT$
14	Heat: cal, specific & latent heats, internal energy, conduction, convection, radiation	$Q = mc\Delta T$ $P = e\sigma A T^4$
15	Thermodynamics: 1st & 2nd Laws, isothermal, isobaric, isochoric, adiabatic, work, heat engine, heat pump, refrigerator, efficiency, COP, (ideal) Carnot machines	$\Delta U = Q - W$ $e = \frac{W}{Q_H}$ $\frac{Q_L}{Q_H} = \frac{T_L}{T_H}$

Self-Study Review Assignment (not to be handed in or graded)
New questions/problems are in **bold** with answers in brackets.

Ch.	Figures or Tables	Questions	Problems
1	T1-4, F1-5	Q**5**, 7	P5, **19**[3.76 m], 20, 48, **50**[2.5×10^{-5} %]
2	F2-12, F2-22	Q11, **13**, 19	P7, 18, 27, **82**[2.25×]
3	F3-4, F3-12, F3-20	Q**4**, 16	P8, **30**[69.6 m, 7.54 s, 405 m], 31, P**41**[530 km/h, 82° South of East], 58
4	F4-12, F4-15	Q**6**, 14, 21	P8, 29, 52, 79, P**88**[75.0 kg, 75.0 kg, 75.0 kg, 98.0 kg, 52.0 kg]
5	F5-4, F5-10	Q3, **5**, 21	P5, 11, **68**[303 N], 77
6	F6-3, F6-11	Q5, 8, **19**	P8, 51, **52**[10.1 m/s], 55, **70**[1640 W]
7	F7-10, F7-21	Q1, **4**, 13	P34, 65, P**76**[1.7 $\frac{m}{s}$, -0.34 $\frac{m}{s}$ & 1.36 $\frac{m}{s}$, 0.59 cm & 9.4 cm]
8	F8-5, F8-6, F8-13	Q13, **15**	P19, 26, **47**[14.2 kJ], 62
9	F9-4, F9-7, F9-16	Q**4**, 7	P11, 21, **72**[260 N, 110 N]
10	T10-1, F10-7, F10-11	Q7, **13**, 16	P8, 15, 29, **81**[45 kPa]
11	F11-2, F11-5, F11-24	Q1, **5**, 13	P16, 45, **54**[70 Hz, 140 Hz, 210 Hz, etc.], 59
12	T12-2, F12-12	Q4, **6**	P14, 26, **68**[30 dB]
13	F13-2, F13-11	Q1, **15**, 20	P32, 49, 85, P**42**[55.51 mol, 3.343 $\times 10^{25}$ molecules], **78**[265/cm^3]
14	T14-1, T14-3, T14-4	Q2, 7, **21**	P18, 31, **28**[0.161 kg steam], 40
15	T15-1, F15-11, F15-16	Q1, **3**, 5	P6, 21, 31, **54**[$Q_L = 237$ kJ, $\Delta t =$185 s]