Chapter 10

1. Ideas on transverse/longitudinal waves
2. Definitions of relevant terms for waves: f, λ, T, v, k, ω
3. Traveling waves on a string
4. Interference of waves, superposition
5. Standing waves on a string, resonance

Chapter 11

1. Basic ideas on sound waves
2. Intensity of sound – dB scale
3. Producing sound from a vibrating string or an air column
4. Ideas on how we hear and the structure of the ear
5. Ideas on ultrasound and its applications

Study Guide for Third Exam

Chapter 7

1. Rotational kinematics
2. Understand how to calculate moment of inertia (for collection of point masses or for symmetric objects) and rotational kinetic energy
3. Know how to use conservation of energy including rotational kinetic energy
4. Know how to calculate torques and, from Newton's laws and kinematics, angular accelerations, velocities and angular displacements
5. Know how to calculate angular momentum and when and how to use its conservation law
6. Know how to analyze static equilibrium using net forces and torques both equal to zero

Chapter 8

1. Density, pressure of a fluid, Pascal's principle
2. Qualitative ideas on types of fluid flow
3. Continuity and Bernoulli's equations with special cases
4. Hydrostatics and Archimede's principle

Study Guide for Second Exam

Chapter 5

1. Vector algebra – addition, subtraction, multiplication by scalars
2. Decomposition of a vector along x-y axes
3. Specifying vector using ordered pairs, unit vectors, or magnitude/direction
4. Kinematics in 2 dimensions – free fall problems
5. Uniform circular motion
6. Dynamics problems – free-body diagrams, setting up equations of motion
7. Work in more than more than one dimension –

8. Frictional forces – kinetic and static friction; solving problems with frictional forces present
9. Circular motion dynamics – [*omit* banking of an auto(example 7.17)]
10. Qualitative ideas on centrifugation

Chapter 6

1. Momentum definition, Newton's second law written in terms of momentum
2. Conservation of momentum for a particle and basic example of its application
3. Impulse definition and connection with change in momentum
4. Conservation of momentum
5. Center of mass for point masses and symmetric solid objects

Chapter 7

1. Rotational Kinematics

First Exam

Chapter 1

1. Basic ideas on the structure of atoms
2. Mass, density, size of atoms
3. Weight mg; action at a distance, or field forces, vs contact forces

Chapter 2

1. Position, displacement, speed, velocity, acceleration – average vs instantaneous
2. Graphical interpretations of the above variables
3. Newton's three laws – basic ideas; action-reaction forces; drawing free-body diagrams
4. Basic ideas on diffusion

Chapter 3

1. Free-fall – have basic understanding of concepts of x, v, *a*; know how to use basic three equations for constant acceleration to solve quantitative problem of free-fall
2. Motion in a fluid – appreciate the differences between laminar and turbulent flow; understand the idea of a terminal velocity and how to find it
3. Springs – Hooke's law – know how to manipulate this equation and what it means
   - motion of a mass on a spring – know the basic features (concepts) of the motion, ie. understand where the v, *a* and forces are maximum, zero, or minimum
   - know definitions of T, f, ω, A
   - understand what the graphs of x, v, and *a* are telling you
4. Elasticity – know how to apply the stress-strain equation

Chapter 4

1. Work, KE and W-KE theorem in one dimension
2. Gravitational PE and the definition of PE ($\Delta PE = -W$) in general
3. Conservation of mechanical energy
4. Graphical interpretation of PE vs position graphs – slope = - force
5. Power