HONORS PHYSICS 441 FINAL EXAM STUDY GUIDE

Things to study:

• Vocabulary Make sure you know the pertinent vocabulary from each chapter along with units where applicable

Unit 4: Energy & Momentum Conservation

Chapter 8 - Momentum:
• Collision problems • Explosion problems

Unit 5: Circular Motion

Chapter 9 – Uniform Circular Motion:
• Direction of tangential velocity, centripetal acceleration, centripetal force, angular velocity • Units

Chapter 10 – Rotational Kinematics:
• Rotational inertia variables • Coin rolling on/off table • Cat in washing machine problem • Ferris Wheel problem

Chapter 11 – Rotational Dynamics:
• Torque • Finding net torque or equilibrium point • angular momentum conservation

Unit 6: Repetitive Disturbances

Chapter 15 & 16 – Oscillations and Harmonics Motion / Wave Motion:
• Parts of a wave • Types of waves • Slowest & fastest velocity waves • Energy in waves • Apply \( f = \frac{1}{T}, v = \lambda f \) • Wave interactions with mediums • Interference • Variables that determine the speed of a wave • Units • ROYGBIV • Mass vertically oscillating on spring

Chapter 17 – Sound:
• Speed of sound in different media • Speed of sound as a result of temperature change • Doppler Effect • Sound intensity • Workings of speakers and microphones • Harmonics • Standing waves

Chapter 18 – Wave Superposition and Interference:
• Superposition Principle • Data transfer and space communication • Constructive and destructive wave pulses • EM spectrum and 3D drawing • Wave interference

Chapter 35-39 – Light and Optics:
• Mirror and lens ray diagrams • Image orientation and magnification calculations • Mirror and lens types
**Unit 7: Electrostatics**

Chapter 23 – Electric Charge and Coulomb’s Law:
- Three methods of charging (Friction/Polarization/Induction)
- Coulomb’s Law
- How is lightning made?
- Fnet on charge due to other charges

Chapter 24 – Electric Fields:
- Drawing electric field lines
- Differentiating between electric potential, voltage, potential difference, and electric potential energy
- Fnet on charge due to Electric field
- Work done by particle in Electric field, displacement, etc.

**Format**

- 50 Multiple choice (no partial credit – 50% of grade)
- 10 open ended problems (partial credit – 50% of grade)

Look over the summary sections of each chapter as well as the concept check questions at the end of each chapter. Make sure you understand the example problems given in the text.