

## Spring 2016 Final Exam Review: Physics 1P, Mr. Traeger

Name: \_\_\_\_\_

Period: \_\_\_\_\_

Date: \_\_\_\_\_

Section	Major Questions to be asked and/or tasked to be measured	Where do I find the information and/or where did we learn this and/or where do I find practice problems and Review Guides?
<b>Circular Motion and Rotational Mechanics</b>	<p><b><u>Circular Motion</u></b></p> <ul style="list-style-type: none"> <li>▪ How can <math>v = r\omega</math> be used to calculate tangential velocity and rotational velocity?</li> <li>▪ What is the difference between tangential velocity and angular velocity?</li> <li>▪ What is angular acceleration and tangential acceleration in circular motion?</li> <li>▪ How can you calculate centripetal acceleration using <math>a = v^2/r</math>? How about centripetal force using <math>F = mv^2/r</math>?</li> <li>▪ Why is centrifugal NOT a force?</li> </ul> <p><b><u>Rotational Mechanics</u></b></p> <ul style="list-style-type: none"> <li>▪ What is center of gravity and how does it affect an object's stability?</li> <li>▪ How are center of mass and center of gravity related?</li> <li>▪ How do you calculate the mass or distance of an object from a fulcrum using <math>m_1d_1 = m_2d_2</math>? (Balanced torques)</li> <li>▪ What is torque? How does it affect something as simple as opening a door?</li> <li>▪ Explain rotational inertia (moment of inertia) for different objects and how that affects the objects angular acceleration? <math>\tau = I\alpha</math></li> <li>▪ Explain angular momentum (L) as a function of <math>I\omega</math> and <math>mvr</math> and when you would use each formula.</li> <li>▪ Explain conservation of angular momentum in terms of the ice skater effect and Mr. Traeger's penny vortex example.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hewitt Chapters 9-11</li> <li>▪ <a href="#">Physics Classroom Circular Motion</a></li> <li>▪ <a href="#">PowerPoint for Circular Motion</a></li> <li>▪ <a href="#">Dr. E's PowerPoint</a> for Rotational Mechanics</li> <li>▪ <a href="#">Review PowerPoint</a></li> <li>▪ <a href="#">Circular Motion Problem Set.</a></li> <li>▪ Dr. E's <a href="#">Circular Motion Unit Resources</a></li> </ul>
<b>Universal Gravitation and Satellite Motion</b>	<ul style="list-style-type: none"> <li>• How are the falling apple and the falling Moon alike?</li> <li>• What IS an orbit? What is a planet or a moon essentially doing?</li> <li>• How can you use <math>F = Gm_1m_2/r^2</math> to calculate the force of gravity?</li> <li>• Describe the inverse square law and calculate the gravitation force on an object as the distance from the center of mass 1 increases or decreases.</li> <li>• How can you calculate the gravity field (g) of a massive object given <math>F = mg = Gm_1m_2/r^2</math></li> <li>• How does a massive object like a black hole warp the fabric of space and time?</li> <li>• What are Kepler's three laws?</li> <li>• How can Kepler's third law, the law of harmonies, be used to calculate the period or average distance of an orbiting object?</li> <li>• What are tides and why do they occur?</li> <li>• Why is there a differential pull of the Moon on the Earth's oceans facing the moon, center of Earth, and Earth's oceans facing away from the Moon?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hewitt Chapters 12-14</li> <li>▪ <a href="#">Physics Classroom Gravitation</a></li> <li>▪ <a href="#">PowerPoint for Gravitation and Satellite Motion</a></li> <li>▪ Dr. E's <a href="#">Gravity Unit Resources</a></li> <li>▪ <a href="#">Satellites and Gravitation problem set.</a></li> </ul>

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	<ul style="list-style-type: none"> <li>• Explain the conservation of energy with respect to gravitational potential and gravitational kinetic energy.</li> <li>• How would one calculate the speed required for a satellite to orbit given <math>F = mv^2/r = Gm_1m_2/r^2</math>?</li> <li>• What is escape speed and how is it calculated by equating <math>Gmm/r</math> and <math>\frac{1}{2} m^*v^2</math>.</li> </ul>	
<b>Electrostatics, Electric Fields, and Potential</b>	<ul style="list-style-type: none"> <li>• How do like charges behave near each other? How do opposite charges behave near each other?</li> <li>• What is the basic structure of the atom that makes electric charge? Do protons move, or do electrons move?</li> <li>• Why didn't the Van de Graaff generator hurt us? How does it work?</li> <li>• Why did we need to be grounded to feel the shock from the Van de Graaff generator? What does it mean to be grounded? Why don't birds get shocked just sitting on an electrical wire?</li> <li>• What does it mean to conserve charge?</li> <li>• What is Coulomb's Law <math>F = kq_1q_2/d^2</math> and how can you use it to calculate the electrostatic force?</li> <li>• What is the difference between a conductor and an insulator?</li> <li>• What is charging by friction?</li> <li>• What is charging by induction?</li> <li>• What is charging by conduction?</li> <li>• How does charge polarization occur?</li> <li>• What is an electric field? What does it look like around positive and negative charges?</li> <li>• What direction do electric field lines always point in?</li> <li>• What is lightning and how is it produced?</li> <li>• What is electric shielding and why does charge build up on the outside of objects, but not in them?</li> <li>• How does a positive test charge behave when forced toward the positive side of the electric field? What does this do to the electrical potential energy of the test charge?</li> <li>• Why can fruit be used as a battery?</li> <li>• What is electric energy and potential?</li> <li>• How do you calculate the magnitude of an electric field given <math>F = kq_1q_2/d^2 = q^*E</math>?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hewitt Chapters 32-33</li> <li>▪ Physics Classroom <a href="#">Electrostatics</a></li> <li>▪ <a href="#">PowerPoint for Electrostatics</a></li> <li>▪ <a href="#">PowerPoint for Electric Fields and Potential</a></li> <li>▪ <a href="#">Dr. E's Resources on Electrostatics</a></li> <li>▪ <a href="#">Electrostatics problem set</a></li> <li>▪ <a href="#">Electric Fields problem set</a></li> </ul>
<b>Electric Current and Electric Circuits</b>	<ul style="list-style-type: none"> <li>• What is required to get current (charge) to flow?</li> <li>• What is the direction of the flow of current and how is this different from the flow of electrons?</li> <li>• Is your power company really selling you power?</li> <li>• Is your power company really selling you electrons?</li> <li>• What is resistance? How is it affected by resistivity, wire length, and wire cross sectional area? Think about <math>R =</math></li> </ul>	<ul style="list-style-type: none"> <li>▪ Hewitt Chapters 34-35</li> <li>▪ <a href="#">Physics Classroom Electric Current and Circuits</a></li> <li>▪ <a href="#">Notes on Electric Current and Circuits</a> used in class</li> <li>▪ <a href="#">Problem Set for Electric Current and Circuits</a></li> <li>▪ <a href="#">Dr. E's Resources for Electric Circuits</a></li> </ul>

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	<p>*L/A</p> <ul style="list-style-type: none"> <li>• What factors affect resistivity of a wire?</li> <li>• What does Ohm's Law say will happen to current when resistance increases? Decreases? If voltage is held constant?</li> <li>• Why is it easier to get shocked when your body is wet as opposed to being dry?</li> <li>• What is the difference between direct current (DC) and alternating current (AC)?</li> <li>• Why is AC preferred over DC for transmitting electrical energy?</li> <li>• How does the speed of electrons in a circuit compare to the speed of current in a circuit? Directions?</li> <li>• What is the source for electrons in a circuit?</li> <li>• What is power and how can the formula <math>P = IV</math> be used to calculate it?</li> <li>• What is required to make an electric circuit?</li> <li>• Explain the concept of a short circuit.</li> <li>• What are the basic properties of a series circuit?</li> <li>• How do you calculate voltage, current, and equivalent resistance in a series circuit using Ohm's Law?</li> <li>• What are the basic properties of a parallel circuit?</li> <li>• How do you calculate voltage, current, and equivalent resistance in a parallel circuit?</li> </ul>	
Magnetism and Electromagnetic Induction	<ul style="list-style-type: none"> <li>• What are the two magnetic poles?</li> <li>• Like magnetic poles _____ and opposite magnetic poles _____.</li> <li>• What is the shape of magnetic field lines around a permanent bar magnet?</li> <li>• What is the atomic nature of a magnetic field?</li> <li>• What are magnetic domains and how does this make something magnetic?</li> <li>• Review all of the questions from the <i>Magnetic Storm</i> video. You'll be glad you did.</li> <li>• What is the right hand rule and how can you use it to determine the direction of a magnetic field around a current carrying wire?</li> <li>• How can you use the right hand rule to determine the direction of force of a moving charge and <math>F = q*v*B</math> to calculate the magnitude of the force?</li> <li>• How can you use the right hand rule to determine the direction of force on a current carrying wire and <math>F = I*L*B</math> to calculate the magnitude of the force?</li> <li>• How can a current carrying wire induce a magnetic field?</li> <li>• How can a changing magnetic field induce electric current?</li> <li>• How does this feedback loop build the magnetic dynamo in Earth's outer core?</li> <li>• What does Faraday's Law say?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hewitt Chapters 36-37</li> <li>▪ <a href="#">Magnetism</a> and <a href="#">Electromagnetic Induction</a> Class Notes</li> <li>▪ <a href="#">Magnetism</a> and <a href="#">Electromagnetic Induction</a> Chapter Problems.</li> <li>▪ <a href="#">Dr. E's Magnetism Resources</a></li> </ul>

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	<ul style="list-style-type: none"> <li>• What does Lenz's Law say?</li> <li>• What is the basic principle behind how electric motors and generators work?</li> <li>• What is a transformer and how does it either step up or step down voltage? Hint: Primary voltage/number of primary turns = Secondary voltage/number of secondary turns</li> <li>• What happens to current if voltage is stepped up? What happens to current if voltage is stepped down? Hint: <math>(\text{voltage} \times \text{current})_{\text{primary}} = (\text{voltage} \times \text{current})_{\text{secondary}}</math></li> <li>• Why is high voltage used to transfer electrical energy over large distances? What happens to the voltage as it enters a city and then enters your house?</li> <li>• How do electric fields and magnetic fields combine to make light (electromagnetic radiation)?</li> </ul>	
SHM and Waves	<ul style="list-style-type: none"> <li>• How does the length of a pendulum affect its period?</li> <li>• How does changing the gravitational acceleration (g) affect the period of a pendulum?</li> <li>• What is simple harmonic motion? How is it expressed in a sine curve?</li> <li>• What are the parts of a wave such as crests, troughs, amplitude, wavelength, and frequency?</li> <li>• How are period and frequency related?</li> <li>• If the wave speed stays the same, then what relationship does wavelength have to frequency?</li> <li>• What is Hooke's Law for a spring?</li> <li>• How does mass affect period?</li> <li>• How does the spring constant affect period?</li> <li>• What are the differences among the types of waves? (ie: longitudinal vs. transverse vs. surface waves)</li> <li>• How do you calculate the speed of a wave given the wavelength and frequency of the wave?</li> <li>• What is a standing wave and how does it behave?</li> <li>• What is constructive interference?</li> <li>• What is destructive interference?</li> <li>• What is the Doppler Effect and how does it affect the frequency of waves of moving objects either towards or away from a receiver?</li> <li>• How does sound behave and what type of wave is it?</li> <li>• How does air temperature or density of a material affect the speed of sound?</li> <li>• What is the decibel and how is loudness perceived?</li> <li>• What is the natural frequency of an object?</li> <li>• What is resonance?</li> <li>• How can interference be related to sound interference and beats?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hewitt Chapters 25 &amp; 26</li> <li>▪ <a href="#">Physics Classroom Vibrations and Waves</a></li> <li>▪ <a href="#">Physics Classroom Sound Waves and Music</a></li> <li>▪ <a href="#">SHM Notes</a> and <a href="#">Waves Notes</a> and <a href="#">Sound Notes</a> and Mr. Fulmer's notes on <a href="#">Waves &amp; SHM</a> and <a href="#">Sound</a></li> </ul>

### Physics Final Exam Schedule for Spring Semester 2016

Date	Period	Who Takes It?	Subject	Time
Tuesday, 5/24/16	6	EVERYONE	Physics 1P	12:32-2:37

### Frequently Asked Questions about Traeger's Final Exam

- What should I bring to the final? Bring your brain, a #2 pencil, a calculator, and any work that is due on the final day.
- What items are NOT allowed to be in use during the test? cell phones, iPhones, Blackberries, iPods, your moving mouth, and wandering eyes are not allowed on the final.
- How much of my semester grade is the final worth? The final exam will be about 12-15% of your overall semester grade. The final exam will be included in the test category.
- What if I need extra time? There will be plenty of time to take the test.
- What is the format of the test? The test will be all multiple choice/true false/matching. I do not have time to grade a written portion on the Spring Final Exam.
- What is the best way to study for this test? Use this review sheet and work problems.
- Am I allowed a note card on the final? Yes. One 3+x 5+note card with formulae and notes front and back will be allowed.
- How do I get help studying for the final? Email Mr. Traeger at [ttraeger@lcusd.net](mailto:ttraeger@lcusd.net) or come by at lunch or after school!