

## Final Review Sheet for Phys. 115

- 1) What acceleration acts on a freely falling body? What is its direction during ascent? During descent?
- 2) What is the velocity at the top of the trajectory in projectile motion?
- 3) What is the acceleration in the x direction in projectile motion?
- 4) What is the acceleration in the y direction in projectile motion?
- 5) What is the acceleration at the top of the trajectory in projectile motion?
- 6) What are Newton's three laws? In what situations do we apply each?
- 7) Is force a scalar or vector quantity? How do we break it apart into components? Does a horizontal force have a vertical component or vice versa?
- 8) What types of forces have we encountered throughout the semester? In what situations do we encounter them? How do we deal with the centripetal force?
- 9) What is the universal law of gravitation?
- 10) What conditions do objects in equilibrium have to obey?
- 11) What is the work done by a constant force? Is work a scalar or vector quantity?
- 12) What is the angle  $\theta$  in the work equation?
- 13) When does an object have kinetic energy?
- 14) When does an object have potential energy?
- 15) Is energy a scalar or a vector?
- 16) What non-conservative forces do you know?
- 17) What is the work done by non-conservative forces equal to?
- 18) What is conservation of energy? What is the key word that tells us that energy is not conserved in problems? How do we deal with the problems in that case?
- 18) What is momentum? What is impulse? How are they related?
- 19) What is conservation of momentum? When do we apply it?
- 20) What is conserved in elastic collisions? Inelastic collisions?
- 21) How do we apply the rotational variables in kinematics problems?
- 22) What is torque? What does it correspond to in linear variables?
- 23) How do the force and torque arm have to be oriented with respect to each other in order to maximize torque?
- 24) What are the conditions of equilibrium for a rigid body?

- 25) What is Newton's second law for rotation? When do we apply it?
- 26) What are the rotational work and kinetic energy equations?
- 27) What is angular momentum? Is it conserved? How do we apply that?
- 28) What is the elastic force?
- 29) What is the work done by the elastic force?
- 30) What is the potential energy stored in a spring?
- 31) What are period, frequency, angular frequency?
- 32) What is pressure?
- 33) What is mass density?
- 34) How does pressure change with depth? How/when do we apply it? What is gauge pressure?
- 35) What is Pascal's principle?
- 36) What is Archimedes' principle? How do we apply it?
- 37) What is buoyant force?
- 38) What is the equation of continuity?
- 39) What is the conservation of energy of a fluid in motion?
- 40) What is Bernoulli's equation? How/when do we apply it?
- 41) What is the equation for heat gained by a substance?
- 42) What are phase changes? What is the equation for heat during a phase change?
- 43) What is the ideal gas law? What units do we use for all the variables in the equation?
- 44) What is the first law of thermodynamics?
- 45) What is an isothermal process? How is it represented on a pV diagram? What are W, Q and  $\Delta U$  for an isothermal process?
- 46) What is an isobaric process? How is it represented on a pV diagram? What are W, Q and  $\Delta U$  for an isobaric process?
- 47) What is an isochoric process? How is it represented on a pV diagram? What are W, Q and  $\Delta U$  for an isochoric process?
- 48) What is an adiabatic process? How is it represented on a pV diagram? What are W, Q and  $\Delta U$  for an adiabatic process? How does it differ from the other 3 processes?
- 49) What are  $C_v$ ,  $C_p$ , and  $\gamma$ ? How are they related?
- 50) What is  $\Delta U$  for a (reversible) cycle?
- 51) What is entropy?

- 52) What is the second law of thermodynamics?
- 53) What is an engine? What is a Carnot engine? What is the efficiency of an engine? Of a Carnot engine?
- 54) What is wavelength? What is period? What is the relationship between them? How do we represent them on a sinusoidal wave?
- 55) What are decibels?
- 56) What is the Doppler effect?
- 57) What is the interference of waves?
- 58) What is diffraction?
- 59) What are beats?
- 60) What are standing waves?