

Fall 2013

AP Physics Final Exam Review

1. Definition of a particle
2. Definition of a reference frame
3. Definition of displacement
4. Definition of velocity
5. Definition of average velocity
6. Definition of average acceleration
7. Definition of acceleration
8. What is the physical interpretation of the slope of the tangent line on a position-time graph?
9. What is the physical interpretation of the slope of chord on a position-time graph?
10. What is the physical interpretation of the slope of chord on a velocity-time graph?
11. What is the physical interpretation of the slope of the tangent line on a velocity-time graph?
12. What is the physical interpretation of the area under a velocity-time graph?
13. What is the physical interpretation of the area under an acceleration-time graph?
14. What is the physical interpretation of the area under a force-time graph?
15. What is the physical interpretation of the area under a force-position graph?
16. What is the condition for the kinematic equations to be valid?
17. When does an object have tangential acceleration?
18. When does an object have centripetal acceleration?
19. The equation for finding the magnitude of the centripetal acceleration
20. What does it mean when an object is undergoing uniform circular motion?
21. Be able to solve one and multidimensional problems using both graphs and analytical methods including projectile motion, free fall, uniform circular motion, etc.

22. What is a transformation equation?
23. Be able to solve problems involving relative motion as seen by observers in different reference frames.
24. Write Newton's First law for a particle in words.
25. Write Newton's 2nd Law for a particle.
26. Write Newton's 3rd Law in words.
27. Be able to draw a proper free body diagram.
28. Equation for finding the friction force for a sliding object.
29. Equation for finding the weight of an object on Earth
30. Hooke's Law
31. Be able to apply Newton's Laws to solve dynamics problems including problems involving inclined planes, friction, pulleys, and circular motion.
32. Equation that defines work
33. Definition of a conservative force
34. Definition of a nonconservative force
35. Be able to calculate the work done by a force upon an object undergoing a displacement.
36. Definition of mechanical energy
37. Definition of kinetic energy
38. Definition of potential energy
39. Formula for finding the gravitational potential on an object on Earth.
40. Formula for finding the potential energy of a Hooke spring.
41. Formula for finding the kinetic energy of an object moving at speeds much less than the speed of light.
42. Write the Work Energy Theorem.
43. What is the condition for the mechanical energy of a system to be conserved?
44. Be able to apply energy and work concepts to solve problems.

45. Definition of linear momentum
46. What causes a change in the linear momentum of a system?
47. What is the difference between an elastic and an inelastic collision
48. When is linear momentum conserved?
49. Be able to apply linear momentum concepts to solve problems including collisions.
50. Definition of torque
51. Definition of moment of inertia
52. Moment of Inertia for a particle
53. Moment of Inertia for the following uniform, objects (bar, cylinder, sphere, and hoop) for an axis through their center of mass.
54. Know the parallel axis theorem and be able to apply it.
55. Definition of angular displacement
56. Definition of angular velocity
57. Definition of average angular velocity
58. Definition of average angular acceleration
- 59.. Definition of angular acceleration
60. What is the physical interpretation of the slope of the tangent line on an angular position-time graph?
61. What is the physical interpretation of the slope of chord on an angular position-time graph?
62. What is the physical interpretation of the slope of chord on an angular velocity-time graph?
63. What is the physical interpretation of the slope of the tangent line on an angular velocity-time graph?
64. What is the physical interpretation of the area under an angular velocity-time graph?
65. What is the physical interpretation of the area under an angular acceleration-time graph?
66. What is the condition for the angular kinematic equations to be valid?

67. Be able to solve problems involving rotation including those with constant angular acceleration.
68. Write Newton's 2nd Law for Rotation
69. Be able to apply Newton's Laws to solve rotational dynamics problems.
70. Define angular momentum.
71. What is the physical interpretation of the area under a torque-time graph?
72. What is the physical interpretation of the area under a torque-position graph?
73. When is angular momentum conserved?
74. Be able to solve conservation of angular momentum problems.
75. Definition of the Center of Mass
76. Equation for finding the kinetic energy of a system under pure rotation.
77. Be able to state Chassel's Theorem
78. Know what is meant by rolling without slipping.
79. Be able to apply energy concepts to solve problems involving rotation including rolling without slipping.
80. What two conditions must be met for a rigid body to be in equilibrium?
81. State the definition of pressure (words & equation)
82. State the definition of density (words & equation)
83. State the definition of specific density (words & equation)
84. State Pascal's Principle in words
85. State Archimedes' Principle in words
86. State Pascal's Law (words & equation)
87. Be able to determine if an object floats or sinks & the percent volume submerged
88. Be able to determine the buoyant force upon an object
89. Be able to determine the pressure for a given depth in a fluid
90. Be able to apply Pascal's Principle to solve a problem involving a hydraulic jack.

91. What are the properties of an ideal fluid?
 92. Definition of water flux.
 93. Write the Continuity Equation
 94. Write Bernoulli's Equation
 95. Be able to solve problems involving moving fluids.
 96. What is the equation that defines a simple harmonic oscillator?
 97. Know what is meant by angular frequency, period, and frequency.
 98. Write the equation that relates the period and angular frequency of a simple harmonic oscillator or wave.
 99. Be able to apply Newton's Laws to show that a spring-mass system is a simple harmonic oscillator.
 100. Be able to apply Newton's Laws to show that a pendulum is a simple harmonic oscillator for small angle disturbances.
 101. Know the equation for the angular frequency of a spring-mass oscillator.
 102. Know the equation for the angular frequency of a simple pendulum.
 103. Be able to apply Conservation of Energy and Newton's Laws to solve simple harmonic oscillator problems.
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Wave Concepts That Will Not Be Tested This Time

1. Know the definition of a wave
2. Know what is meant by amplitude, period, wavenumber, wavelength, frequency, angular frequency, phase front, and ray.
3. Know what is meant by wave reflection and when there is a phase change.
4. Know what is meant by wave diffraction.
5. Know what is meant by refraction.
6. Know the difference between a transverse and longitudinal wave
7. Be able to write and apply Snell's Law
8. Be able to write and apply the Law of Reflection
9. Write the equation that relates wavenumber and wavelength.
10. Write the equation that relates the frequency, wavelength, and speed of a wave.
11. Know what is meant by constructive and destructive interference
12. Know what is meant by intensity of a wave
13. Write the equation for determining the speed of a wave on a string under tension.
14. Know what is meant by a standing wave and how they can be created using a string.
15. Know what is meant by the terms node and antinode.
16. Be able to find the allowed wavelengths for a string with boundary conditions.
17. Know what is meant by the terms harmonic and overtone.