AP Physics 1:2nd Semester Study Guide:

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- a. Period
- b. Frequency
- c. Fastest speed obtained
- d. Maximum height
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- f. Tension in rope at 6 degrees
- 2. A spring operated dart gun fires 0.020 kg darts. Arming the gun requires 285 N of force and results in the shortening of the spring by 15 cm.
 - a. Find the spring constant.
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- 3. A 25 kg mass compress a spring vertically when it sits on it. The mass is observed to bounce up and down on the spring 35 times in 10 seconds. Find the following.
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- 5. A 3000kg cannon rests on a frozen pond. The cannon fires a 30kg cannon ball to the right. If the cannon recoils at 1.8m/s, what is the final velocity of the cannon ball?

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What is the next frequency it will resonate?

_____ hz

27 A musician is making an instrument which uses a tube open at both ends. If the speed of sound is 343m/s, how long should the musician make the tube to create a 440hz fundamental frequency?

_____ m

28. Diagram a transverse wave and label all of its physical parts

29. Diagram a longitudinal wave and label all of its physical parts

30. If a distance of 5 m separates a crest and adjacent trough and 23 crests pass by a point in 5s. what is the

______speed______frequency_____period

31. If a person on an inner-tube 40m from shore notes that it takes a wave 18s to reach the shore from their position and they go up and down 23 times in 13s, find the period and the wavelength.

_____S

_____ m

32. Draw a transverse standing wave that has 4 antinodes and 5 nodes.

33. How many wavelengths are present in the wave you drew?

_____ wavelengths

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AP Physics 1:2nd Semester Study Guide:

- 1. A 40kg mass swings at the end of a 6m long pendulum. The angle it is displaced from the vertical is 12 degrees. Please find
- a. Period
- b. Frequency
- c. Fastest speed obtained
- d. Maximum height
- e. Maximum P.E
- f. Tension in rope at 6 degrees
- 2. A spring operated dart gun fires 0.020 kg darts. Arming the gun requires 285 N of force and results in the shortening of the spring by 15 cm.
 - a. Find the spring constant.
 - b. Find the energy stored in the spring _____
 - c. Find the muzzle velocity of the dart.
 - d. If the dart is launched vertically, how high will it rise?_____
- 3. A 25 kg mass compress a spring vertically when it sits on it. The mass is observed to bounce up and down on the spring 35 times in 10 seconds. Find the following.
 - a. _____k value
 - b. _____ frequency
 - c. _____ period
 - d. _____ distance spring would compress(x)
 - e. _____elastic PE
 - f. _____ speed of mass when x=0
 - g. _____ frequency a 84kg mass would vibrate
- 4. What is the value of gravity on planet "x" if its frequency is 6hz and it is 3.8m long?
- 5. A 3000kg cannon rests on a frozen pond. The cannon fires a 30kg cannon ball to the right. If the cannon recoils at 1.8m/s, what is the final velocity of the cannon ball?

_____ m/s

6. A large 1800kg car is stopped at a light. A small 900kg car strikes it from behind. If the small car was traveling 20m/s before impact, what is the velocity of the interlocked cars after the collision?

_____ m/s

7. A 5g bullet is fired into a 1kg block of wood and imbeds in it. The force causes the block to fly 5cm straight up into the air. What is the initial velocity of the bullet?

_____ m/s

- 8. A 830n man stands 15m from the shore on a frozen pond. In order to reach the shore, the man throws his 2.3kg physics text towards the other shore at 12m/s. How long will it take the man to reach the shore?
- 9. A railroad car of mass 2 e 4kg moves at 5m/s and collides and couples with 3 identical cars moving in the same direction with a speed of 2m/s. Find the speed of the 4 cars. Find the energy lost in the collision.

_____m/s

_____j lost

j

j

10. A 2000kg car going 20m/s overtakes and collides with a 3000kg car going 10m/s in the same direction. The cars collide inelastically. What is the speed of the system? How much energy is lost in the collision?

_____m/s

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- 11. A 3kg ball is moving right at 4m/s. It collides with a stationary 4kg ball. What is the speed and direction of each ball after the collision?
- 12. A 5kg ball is moving right at 5m/s. It hits a 8kg ball. The 8kg ball moves at a 30 degree angle upwards at 1.5m/s. What is the resultant speed of the 5kg ball?

13. A 150 g pigeon is flying through the air at a speed of 50m/s. What is the pigeon's kinetic energy?

14. A boy is pulling a wagon with a force of 270N along the handle. If he pulls the wagon 60m and the handle makes a 55 degree angle to the ground, how much work did he do?

15. Suppose King Kong (900kg) climbs the BC Cobb plant which is 150m tall. How much work did he do?

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16. A motor using 1800 watts lifted a 100kg mass to a height of 78m. How much time did it take the mot to complete this task?	or
17. A hamster (50kg) rolls in its ball down a u shaped valley. If the hamster's speed was 100m/s at the bottom of the valley, how high did the hamster start from?	
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18. A 5 kg physics book is dropped off a cliff 250m high towards an unsuspecting physics teacher below. Please find	
PE top	
KE halfway	
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KE 60 m from the ground	
velocity 150m from the ground	
19. If a kid (89kg) slides down a slide 68m long and an incline of 34⁰ so that his speed at the bottom is 5r How much thermal energy was generated?	n/s

_____m/s 2nd hill

_____ m/s bottom of 1st hill

²⁰ A roller coaster has a speed of 3m/s at the top of a 40m hill. It goes down the hill and back up another hill 27m tall. What is its speed at the top of the second hill? What is its speed at the bottom of the first hill?

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