CP Physics

27 Week Practice Test

1. In Physics, work is defined as force times \_\_\_\_\_\_\_\_\_\_\_\_. (distance)
2. Bobby Boogereater pushes an object with a force for a distance. If he then pushes with four times the force for four times the distance, he does \_\_\_\_\_\_\_\_\_\_\_\_\_\_ times the work. (sixteen)
3. Potential energy is the energy an object has because of its \_\_\_\_\_\_\_\_\_\_\_\_\_. (position)
4. The amount of potential energy possessed by an elevated object is equal to \_\_\_\_\_\_\_\_\_\_\_\_\_\_. (the work done in lifting it)
5. Kinetic energy of an object is equal to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (1/2mv2)
6. A rock in a slingshot has 50 J of potential energy. Assuming no loss of energy due to heat, how much kinetic energy will it have after it has been shot? (50 J)
7. An object that has Kinetic energy must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (moving)
8. A man can lift blocks of ice a vertical distance of 2 meters or can slide them up a 10 meter long ramp to the same elevation. If he uses the ramp, the applied force required is \_\_\_\_\_\_\_\_\_\_\_\_\_\_. (one fifth as much)
9. A man can lift blocks of ice a vertical distance of 2 meters or can slide them up a 10 meter long ramp to the same elevation. If he uses the ramp, the amount of work required is \_\_\_\_\_\_\_\_\_\_\_\_\_\_. (the same)
10. A job is done slowly, and an identical job is done quickly. Both jobs require the same amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_, (work) but the job done quickly requires more \_\_\_\_\_\_\_\_\_\_\_\_\_\_. (power)
11. Which requires more work: lifting a 30 kg box vertically 4 meters or lifting a 60 kg box vertically 2 meters? (both require the same amount of work)
12. All simple machines work on the principle that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (work input equal work output)
13. When a bowling pin is slid over a frictionless bowling alley (they used a lot of wax), though it looks wobbly, its center of gravity follows a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (straight line path)
14. The center of gravity of an object can be located by drawing lines straight down from suspension points.
15. If your brother tries to touch his toes while standing flat against a wall, he will probably fall over. This is because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (his center of gravity is not located above his support area)
16. A not so massive red planet and a very massive blue planet move toward each other under the influence of mutual gravitation. Which planet exerts the greater force on the other? (both exert the same force on each other)
17. A not so massive red planet and a very massive blue planet move toward each other under the influence of mutual gravitation. As they get closer to each other, the force between them \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (increases)
18. The reason that the Earth does not fall into the Sun is that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (the Earth has a sufficiently large enough orbital, or tangential, speed)
19. How fast would a satellite have to travel in order to orbit the Earth very close to the Earth’s surface, assuming there was no atmosphere? (8000 m/s)
20. For the satellite in question #19, how far would the satellite fall vertically for every 8000 meters travelled tangentially in order to match the curvature of the Earth? (about 5 m)
21. The unit of work is called the \_\_\_\_\_\_\_\_\_. (Joule)
22. The unit of Power is called the \_\_\_\_\_\_\_\_\_\_. (Watt)

Problems: **(Use four-column format) \*Note: use g = 10 m/s2 G = 6.67 x 10-11 Nm2/kg2**

1. A 20 kg hay bale is lifted 8 meters into a barn for winter storage. How much potential energy is now stored in the hay bale? ( 1600 J )
2. A bullet has a mass of 0.006 kg and is travelling at a speed of 420 m/s. Calculate the kinetic energy of the bullet. ( 529.2 J )
3. A woman exerts a force of 375 N in pushing a cabinet across the floor for a distance of 6 meters. How much work does she do on the cabinet? ( 2250 J )
4. An electric motor does 7500 Joules worth of work over a 5 second time period. How powerful is this electric motor? ( 1500 Watts )
5. An asteroid with a mass of 2 x 108 kg passes only 3000 meters away from a second asteroid having a mass of 5 x 109 kg. What is the magnitude of the gravitational force of attraction between the two asteroids at this point? ( 7.41 Newtons )