

## Physics First I Cycle 5 Study Guide

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

- \_\_\_ 1. Energy that is stored due to the velocity of an object may be called \_\_\_ energy.
- Kinetic
  - Potential
  - Radiant
  - Nuclear
- \_\_\_ 2. A bicycle coasts up a hill. Neglecting friction and air resistance, the loss of kinetic energy is equal to the:
- gain of height.
  - gain of inertia.
  - gain in speed.
  - gain in potential energy.
- \_\_\_ 3. A man on skis travels up a mountain slope and down the other side. At what point is his potential energy the highest?
- At the peak of the mountain
  - At the beginning of the uphill slope
  - At the beginning of the downhill slope
  - At the end of the downhill slope
- \_\_\_ 4. The SI (metric!) unit of momentum and impulse is:
- Newtons.
  - Newton\*second or  $\text{kg}\cdot\text{m}/\text{sec}$ .
  - Newton\*meter or  $\text{kg}\cdot\text{m}^2/\text{sec}^2$ .
  - Newtons per second.
- \_\_\_ 5. The SI (metric!) unit of energy and work is:
- Newtons.
  - Newton\*second or  $\text{kg}\cdot\text{m}/\text{sec}$ .
  - Newton\*meter or  $\text{kg}\cdot\text{m}^2/\text{sec}^2$ .
  - Newtons per second.
- \_\_\_ 6. A cannonball is fired straight up. At what point does the kinetic energy equal the potential energy?
- At the moment of firing.
  - At the highest point of the trajectory
  - Halfway between the highest point of the trajectory and the ground
  - At the moment it hits the ground
- \_\_\_ 7. A force  $F$  is applied to an object over a distance  $D$ . The \_\_\_ done on the object is  $F\cdot D$ :
- Acceleration.
  - Impulse.
  - Work.
  - Momentum.
- \_\_\_ 8. Which of the following is true?
- Work is a change in energy.
  - Impulse is a change in momentum.
  - Both [a] and [b].
  - None of the above.

- \_\_\_\_\_ 9. Calculate the work done to lift a cat weighing 111 newtons a distance of 2 meters.
- 0.0111 joules
  - 2 joules
  - 55 joules
  - 222 joules
- \_\_\_\_\_ 10. Susie is playing on a swing in the playground. If Susie weighs 300 newtons, how much higher above the ground must Calvin push her to increase her potential energy by 625 joules?
- 2.1 meters
  - 0.48 meters
  - 20.6 meters
  - 0.213 meters
- \_\_\_\_\_ 11. The cat weighing 25 Newtons from the previous problem jumps 2 meters to the top of the refrigerator, misses his grip, and falls back down. What is his kinetic energy the instant before hitting the floor?
- 25 joules
  - 50 joules
  - 100 joules
  - 300 joules
- \_\_\_\_\_ 12. A second cat is already sitting on top of the same fridge. If his potential energy is 76 Joules, his mass must be:
- 38 kg.
  - 152 kg.
  - 372 kg.
  - 3.9 kg.
- \_\_\_\_\_ 13. The amount of mechanical kinetic energy possessed by a 0.145-kilogram baseball pitched at a speed of 35 meters per second is \_\_\_\_\_ joules.
- 89
  - 178
  - 267
  - 356
- \_\_\_\_\_ 14. Two identical cars are driving at different speeds. One car is moving at half the speed of the other and therefore has:
- Half the kinetic energy of the first car
  - Twice the kinetic energy of the first car.
  - One quarter the kinetic energy of the first car.
  - You need to know the mass of the cars to answer this question.
- \_\_\_\_\_ 15. Susie is playing on a swing in the playground. If Susie weighs 30.6 kg, how much higher above the ground must Calvin push her to increase her potential energy by 625 joules?
- 2.1 meters
  - 0.48 meters
  - 20.6 meters
  - 0.213 meters

- \_\_\_\_\_ 16. A bicyclist traveling at 10 m/sec has a mass of 50 kg including his bike. How high could he coast up a hill before he stops? Assume there is no friction or air resistance.
- 1.02 meters
  - 10.2 meters
  - 5.1 meters
  - 20.4 meters
- \_\_\_\_\_ 17. In an elastic collision, there will be:
- Sticking together of the colliding objects.
  - Permanent change in the shape of the colliding bodies..
  - Energy released in the form of sound or heat.
  - The same kinetic energy afterwards as before the collision.
- \_\_\_\_\_ 18. Which of the following situations is an example of an inelastic collision?
- Two billiard balls collide and bounce off each other.
  - Single atoms of helium bounce off of each other.
  - A bottle falls off a table and shatters.
  - A comet's orbit is perturbed by Jupiter's gravitational field and it flies off into deep space.
- \_\_\_\_\_ 19. What force is needed to accelerate a 0.5 kg model rocket to a velocity of 30 m/sec over a 5-second fuel 'burn'?
- 3 newtons
  - 7.5 newtons
  - 15 newtons
  - 74 newtons
- \_\_\_\_\_ 20. A ball with a mass of 70 kilograms runs at 3 meters per second and jumps onto a 20-kilogram stationary sled. The boy slides on the sled over a horizontal, frictionless surface at a speed of:
- 2.33 m/sec.
  - 0.429 m/sec.
  - 4.29 m/sec.
  - 42.9 m/sec.
- \_\_\_\_\_ 21. A 3-kilogram piece of clay moving at 2 m/sec strikes and sticks to a 6-kilogram piece of clay moving at 3 m/sec in the opposite direction. Calculate the speed of the combined piece of clay.
- 0.75 m/sec
  - 1.5 m/sec
  - 2.66 m/sec
  - 6 m/sec