Practice End of Semester Test

1. A car drives a 100 miles in 2 hours. What is the average speed for the trip?
2. A 1kg ball is thrown at a wall at a velocity of 30m/s and bounces back at 28m/s. What is the change in momentum (m∆v) of the ball?
3. The velocity of an object has what two components?
4. A car speeds up from 10 m/s to 20 m/s in 2 seconds. What is the car’s acceleration?
5. A car slows down from 20 m/s to 5 m/s in 3 seconds. What is the car’s acceleration?
6. A ball is dropped from a cliff. It takes the ball 5 seconds to hit the ground.
   1. What is the initial velocity of the ball?
   2. What is the final velocity of the ball?
   3. What is the average velocity of the ball?
   4. What is the ball’s total distance traveled?
7. A block is pushed with a force of 10 N to the right and 15 N to the left. What is the net force of the box (include direction)
8. A block is pushed with a force of 10 N to the right, 15 N to the right, and 5 N to the left. What is the net force of the box? (include direction)
9. A man has a mass of 50 kg. What is his weight?
10. What is the mass of a man on the Mars as compared to Earth?
11. A 2 kg block is pushed with an acceleration of 2 m/s. What is the net force on the block?
12. A 5 kg block is pushed with a force of 50 N. What is the acceleration of the block?
13. A block experiences a force of 150 and an acceleration of 10 m/s\*2. What is the mass of the block?
14. A block experiences an applied force of 10 N to the right and 2 N of friction to the left.
    1. What is the net force on the block?
    2. If the block has a mass of 4 kg, what is the acceleration of the block?
    3. If the block has an initial velocity vi = 0 m/s. what is the final velocity (vf) of the block after 3 seconds?
15. Two planets of equal mass are 1 meter apart. The planets are then separated a distance 3 meters apart. What happens to the force between the planets?
    1. Does the force get stronger or weaker?
    2. How many times stronger or weaker is the force?
16. A 10 kg ball is rolling with a velocity of 2 m/s. What is the kinetic energy of the ball?
17. A 50 kg man is riding his bike with a velocity of 10 m/s. What is the kinetic energy of the man?
18. How much energy would it take to stop the man from question #17?
19. A 1 kg ball is at rest. What is the kinetic energy of the ball?
20. A 1 kg ball is 10 meters off the ground. What is the gravitational potential energy of the ball?
21. A 10 kg block is 3 meters off the ground. What is the GPE of the block?
22. I start the rollercoaster with 20 J of KE and 15 J of PE.
    1. How much total energy do I have
    2. If my PE is 30 J. How much kinetic energy do I have left?
    3. If my kinetic energy is 35 J, how much PE do I have?
23. A 20 kg cart moves with a velocity of 2 m/s. What is the momentum of the cart?
24. A cart has a momentum of 15 kg m/s. If the cart is moving with a velocity of 3 m/s, what is the mass of the cart?
25. A 15 kg boulder has a momentum of 15 kg m/s. What is the velocity of the boulder?
26. A 5 kg cart has an initial velocity of 10 m/s. The cart starts slowing down and has a final velocity of 5 m/s. What is the cart’s change in momentum?
27. A ball is kicked with a force of 150 N for 1 second. What is the impulse applied to the ball?
28. What is the change in momentum (m∆v) for the ball in #27?
29. If the mass of the ball in #27 was 2kg, how much would the velocity change (∆v) due to the kick?
30. A girl who has a mass of 25kg sits 4 meters away from the center of a fulcrum (see-saw). Where would a 50kg man need to sit for the fulcrum to balance?
31. – 37) Solve the following conservation of momentum problem:





36) Momentum of Kitten B = \_\_\_\_\_\_\_

Kitten A

m = 10 kg

v = 3 m/s

35) Momentum of Kitten A = \_\_\_\_\_\_\_

After the kittens wake up

34) Total Momentum after they wake up = \_\_\_\_\_\_\_\_\_\_

33) Total Momentum before they wake up = \_\_\_\_\_\_\_\_\_\_

31) Momentum of Kitten A = \_\_\_\_\_\_\_

32) Momentum of Kitten B = \_\_\_\_\_\_\_

Kitten B

m = 5 kg

v = 0 m/s

Kitten A

m = 10 kg

v = 0 m/s

**B**

**A**



Before the kittens wake up

Kitten B

m = 5 kg

37) v =\_\_\_\_m/s