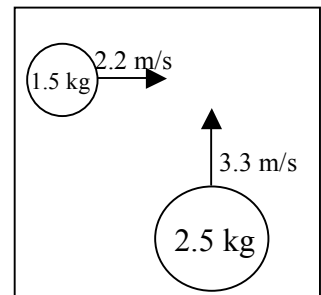


Semester 2 Phinal Review

- Find the weight of an 8.0 kg mass.
- The weight of an object is 25.5 N. What is its mass?
- A 4.0 N force pulls a 2kg object **East** while a 1.5 N force pulls it **West**.
 - What is the net force (size and direction) on the object?
 - What is the acceleration of the object?
- A 4.0 N force pulls a 2kg object **East** while a 1.5 N force pulls it **North**.
 - What is the net force (size and direction) on the object?
 - What is the acceleration of the object?
- A projectile is launched at 35 m/s at 40° above the horizontal.
 - What are the initial velocity **components** for this projectile?
 - How much time does the projectile take to reach the top of its path?
 - How fast is the projectile moving at the top of its path?
 - How much time is the projectile in the air?
 - Where does the projectile land?
- A plane flies horizontally at 250 m/s. It drops a package. What is the package's velocity after 4.0 s?
- A 55kg child rides on a carousel. The radius of the carousel is 4.0 m. If it takes 45 s to make one revolution, what is the:
 - child's centripetal acceleration?
 - net force on the child?
- What is the direction of the velocity vector for any object in uniform circular motion?
- What is the direction of the acceleration vector for any object in uniform circular motion?
- A 12 kg cart moves East at 4.0 m/s and collides with a 6.0 kg cart that was originally moving West at 3.0 m/s. They bounce and the 12 kg cart's velocity after the collision is 2.2 m/s to the East. What is the 6.0 kg cart's velocity after the collision?
- Two 5.0 kg carts move together at 4.0 m/s after a perfectly **inelastic** collision. One cart was at rest prior to the collision. What was the speed of the other cart prior to the collision?
- A 1.5 kg puck collides with a 2.5 kg puck as shown. The two pucks collide, stick together and move leave the collision together.
 - What is the total momentum before the collision? (A vector)
 - What velocity do the two pucks move after the collision? (A vector)
- A 1.25 kg puck moving at 4.0 m/s to the right and collides with a 2.25 kg puck at rest. The 2.25 kg puck leaves the collision at 2.35 m/s at an angle of 35° S of E. At what velocity does the 1.25 kg puck leave?
- For the last four problems,
 - Which are elastic and which are inelastic?
 - Chose one elastic and one inelastic collision and prove that they are truly elastic or inelastic.
- A 30 kg ball moving at 14 m/s, collides head on and elastically with a 3 kg ball initially at rest. What is the speed and direction of both balls after they collide?
- A 3.5 kg mass is hung on a spring and the spring stretches .45 m. What is the spring constant of that spring?
- The mass in problem 16 is hooked on the spring and allowed to drop. After the mass has dropped .25 m, what is the velocity of the mass? (Hint: Draw a picture and label the heights.)
- A 55 kg cart is rolling along a horizontal surface at a speed of 22 m/s. It then rolls up a hill and stops at a height of 21 m. How much energy was turned into heat as the cart rolled up the hill?
- A 4 N force acts on a 7 kg box for a distance of 3 m.
 - How much work is done on the box?



Semester 2 Phinal Review

- b. If the box was being pushed along a frictionless surface, how did the work change the box?
- c. How fast is the box moving after it has been pushed 3 m?
20. A 15 kg box sits on a merry go round. If a 8 N forces acts on the box for two full rotation (16 m), how much work is done on the box?
21. How much mass can be lifted by the lever shown?
22. Two positive charges are placed a certain distance apart. How much will the force between the two charges change if...
- one charge is given twice as much charge and the other four times less charge?
 - the two original charges are brought 4 times closer together?
 - both a. and b. are done at the same time?
23. Find the force of attraction between a group of 150 electrons and a group of 225 protons that are separated by a distance of 2 cm.
24. Explain how to charge an electrophorus (Pizza pan). Assume both pan and base begin with no charge. Be sure to describe what is happening to the charges in each step.
25. Why are you safer inside a car than inside a Port-a-John™ during a lightning storm?
26. A home circuit has a fuse labeled 20 A. Which appliances (as many as you can) can safely be plugged in without blowing the circuit? Choose from: 60 W light bulb, a 1700W hair dryer, a 200 W television, 60 W light bulb, a 2500 W microwave 2000 W dryer, and a 5 W phone charger.
27.
 - Why are fuses placed in series?
 - How are switches wired, series or parallel?
 - Why?
 - As you add light bulbs to a strand of lights wired in series, what happens to current?
 - In parallel?
28. Two bulbs with a resistance of 7Ω each are wired in parallel.
 - What is the total resistance of the circuit?
 - If plugged into a home outlet, what will the current be through each resistor?
29. Repeat #29, but for a series circuit.
30. What direction will the particles on the right be forced to move if the first has a positive charge and the second has a negative charge?
31. Page 369 in your textbook, Questions 1, 2, 3 and 4.
32. A step down transformer has 500 windings on its primary coil, and 2 windings on its secondary coil.
 - What is the voltage in the secondary coil if the transformer was plugged into a home circuit?
 - What is the current in the primary coil if the current in the secondary coil is .5 A?
33. Superman leaves Lois in Metropolis to rescue a malfunctioning space probe sent up from earth. Flying at a speed of $0.70c$, Superman reaches the probe in 20 hours according to his wristwatch.
 - How long would this trip take according to Lois's clock on earth?
 - If Superman were carrying a meter stick lengthwise with him as he flies, how long would it look to Lois?
34. Page 467 in your textbook, review 3, 5, 6, and 7.

