

PHYSICS 190: MECHANICS and HEAT; Lab 5: Uniform circular

Static force

1. set up

- a. materials needed: circular motion apparatus, level, string, slotted masses and mass hanger
- b. adjust apparatus pointer to be directly below the free hanging bob
- c. attach bob to mass hanger using a 1 to 2 ft long piece of string
- d. attach spring to bob and to central shaft of apparatus

2. measurements

- a. level rotating platform
- b. add mass to mass hanger until bob is again directly above the pointer
- c. record amount of mass needed in part "b"
- d. calculate the tension in the string (this is the static force needed to stretch the spring)

Dynamic force

1. set up

- a. materials needed: circular motion apparatus, timer and mass balance
- b. adjust apparatus pointer to be directly below the free hanging bob
- c. attach spring to bob and to central shaft of apparatus

2. measurements

- a. determine the mass of the bob
- b. spin central shaft until bob passes directly over the pointer
- c. measure the time it takes for the bob to make 50 revolutions
- d. measure the distance from the center of the central shaft to the pointer (the bob moves in a circle of this radius)
- e. calculate:
 1. the speed of the bob
 2. the radial acceleration
 3. the radial force (this is the dynamic force needed to stretch the spring)

4. Questions

- a. Should the dynamic force needed to stretch the spring be equal to the static force needed to stretch the spring?
- b. Compare the two forces using a percent difference calculation.
- c. Should the static force needed to stretch the spring change if you increase the mass of the bob? Why?
- d. Should the dynamic force needed to stretch the spring change if you increase the mass of the bob? Why?
- e. You just said the force doesn't change but according to $F = ma$ if the mass changes something else has to also change. What gives?
- f. If the bob's mass decreases what happens to the time for one revolution?