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Physics 201

Weekly Quiz 8 | Corvallis

11/18/2020

Collaboration is not allowed. You will have 30 minutes to download, solve, take pictures, AND upload this exam to Gradescope.

1. After a 2 week trip home in their newly purchased VW van, the owners drafted up plans for a device that can spin a 70.0-kg box around a 3.00 meter radius circular path at a constant speed of 7.67 m/s. The box is attached to a vertical rod via two separate pieces of rope as shown in the figure below. Both ropes make the same angle with respect to the horizontal at all times during the circular motion.

   (a) A useful unit of acceleration is the "g". For example, if a car has an acceleration of 2.00 m/s^2, the cars acceleration in units of "g" is: (2.00/9.8)g, which is approximately 0.22 g. What is the approximate acceleration of the box in units of g?

   (b) How does the tension in rope 1 compare to the tension in rope 2: greater than, less than, or equal to? Briefly explain your reasoning in words, phrases, diagrams, etc...

   (c) Find the magnitude of tension in each rope.