Name_____
Physics 110 Quiz #5, May 5, 2023

Please show all work, thoughts and/or reasoning to receive partial credit. The quiz is worth 10 points total.

I affirm that I have carried out my academic endeavors with full academic honesty.

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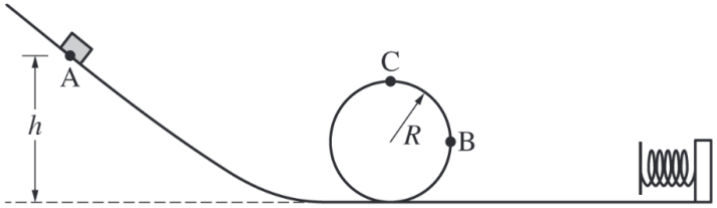
A block of mass m is released from rest at point A and travels without friction down the hill and around the loop onto a horizontal surface where it contacts a spring with stiffness $k = \frac{mg}{2R}$. Point C is the highest point on the loop and point B is the rightmost point on the loop as shown below.

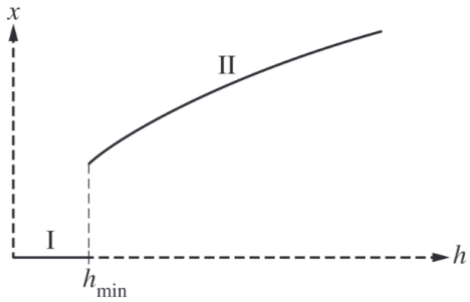


a. Using energy ideas, what is the speed of the block at point B?

b. What is the magnitude of the net force on the mass at point B?

c. Releasing the mass from rest at point A, what is the maximum compression of the spring? Assume that the spring is at a height $y = 0$ above the ground.

A graph of the compression of the spring x as a function of the starting height h of the mass is shown below, where h_{min} is the minimum height needed for the block to be released at point A such that it makes it around the loop at point C.



d. Explain why section I of the plot is horizontal.

e. Explain the mathematical shape of section II.