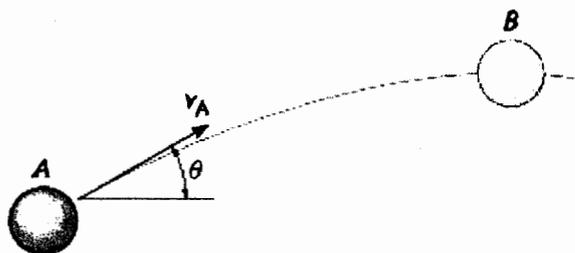
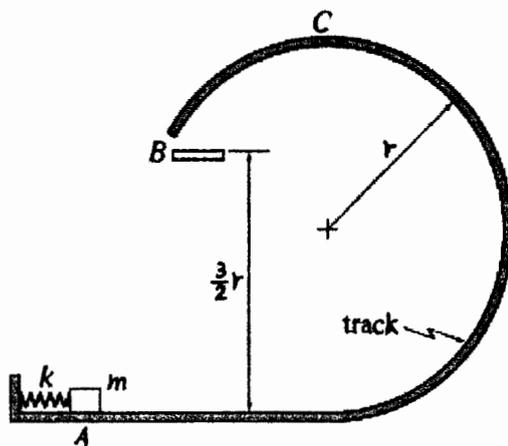


※ 考生請注意：本試題不可使用計算機

1. (25%) A ball of weight W is thrown in the direction shown with an initial speed v_A .
 - (a) Determine the time needed for it to reach its highest point B and the speed at which it is traveling at B . Use the principle of impulse and momentum for the solution.
 - (b) Find the vertical distance and the horizontal distance, respectively, between A and B .



2. (25%) The package handling system shown is designed to launch the small package of mass m along the frictionless track from A to B by using a compressed linear spring of constant k . Determine the minimum initial compression of the spring so that the package gets to B without separating from the track at C .



(背面仍有題目,請繼續作答)

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3. A CD player uses a beam of laser light to read the disc, focusing that light to a spot less than 10^{-6} m in diameter. Why can't the player use a cheap incandescent light bulb or an light-emitting diode (LED) for this task rather than a more expensive diode laser? (15%)
4. An airplane with 250 passengers cruises at altitude of 11 Km, (a) why it must compress the outside air before delivering it into the cabin? (b) Why must this air be air conditioned after the compression before delivering it into the cabin? (Note: At 11. Km, Temperature = -56.5°C , Pressure = 22632 Pa) (15%)
5. A skier leaves a ski jump with a horizontal velocity of 29.4 m/s. The instant before she lands three seconds later, calculate (a) the magnitudes of the horizontal components of her velocity and (b) the magnitudes of the vertical components of her velocity. (Note: Make any necessary assumptions to solve your problem) (20%)