Part A: Obligatory Problems

MECHANICS

1. A bead is constrained to move along a massless hoop of radius R. The hoop is arranged vertically and is rotated at a constant angular frequency ω about its diameter.

   (a) Write down the Lagrangian for this system.

   (b) Solve for the equilibrium position of the bead.

   (c) What is the frequency of small oscillations about this position?

   (d) For what angular frequency range is there no stable equilibrium?

No solution available for this problem