

Discussion 6: Week 7

Exercise 1 A 3.00 kg fish is attached to the lower end of a vertical spring that has negligible mass and force constant 900 N/m. The spring initially is neither stretched nor compressed. The fish is released from rest. (a) What is its speed after it has descended 0.0500 m from its initial position? (b) What is the maximum speed of the fish as it descends?

Exercise 2 A wooden block with mass 1.50 kg is placed against a compressed spring at the bottom of an incline of slope 30.0° (point *A*). When the spring is released, it projects the block up the incline. At point *B*, a distance of 6.00 m up the incline from *A*, the block is moving up the incline at 7.00 m/s and is no longer in contact with the spring. The coefficient of kinetic friction between the block and the incline is $\mu_k = 0.50$. The mass of the spring is negligible. Calculate the amount of potential energy that was initially stored in the spring.

Exercise 3 A ring of mass $M = 0.1$ kg hangs from a thread, and two beads of mass $m = 0.2$ kg slide on it without friction. The beads are released simultaneously from rest at the top of the ring and slide down opposite sides. The ring is initially motionless, but when the beads pass a critical angle θ_c the ring is observed to start moving upwards. Find the value of θ_c .

