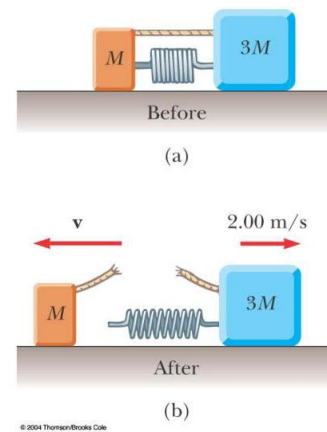


## Selected Problems on Chapter 9

Q1: Two blocks of masses  $M$  and  $3M$  are placed on a horizontal, frictionless surface. A light spring is attached to one of them, and the blocks are pushed together with the spring between them (as shown in the Figure). A cord initially holding the blocks together is burned; after this, the block of mass  $3M$  moves to the right with a speed of  $2.00\text{ m/s}$ . (a) What is the speed of the block of mass  $M$ ? (b) Find the original elastic potential energy in the spring if  $M = 0.350\text{ kg}$ .



Q2: High-speed stroboscopic photographs show that the head of a golf club of mass  $200\text{ g}$  is traveling at  $55.0\text{ m/s}$  just before it strikes a  $46.0\text{-g}$  golf ball at rest on a tee. After the collision, the club head travels (in the same direction) at  $40.0\text{ m/s}$ . Find the speed of the golf ball just after impact.

Q3: A  $10.0\text{-g}$  bullet is fired into a stationary block of wood ( $m = 5.00\text{ kg}$ ). The relative motion of the bullet stops inside the block. The speed of the bullet-plus-wood combination immediately after the collision is  $0.600\text{ m/s}$ . What was the original speed of the bullet?

Q4: Two blocks are free to slide along the frictionless wooden track  $ABC$  shown in Figure. A block of mass  $m_1 = 5.00\text{ kg}$  is released from  $A$ . Protruding from its front end is the north pole of a strong magnet, repelling the north pole of an identical magnet embedded in the back end of the block of mass  $m_2 = 10.0\text{ kg}$ , initially at rest. The two blocks never touch. Calculate the maximum height to which  $m_1$  rises after the elastic collision.

