Quiz: HW6: Ch8

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Flag question: Question 1

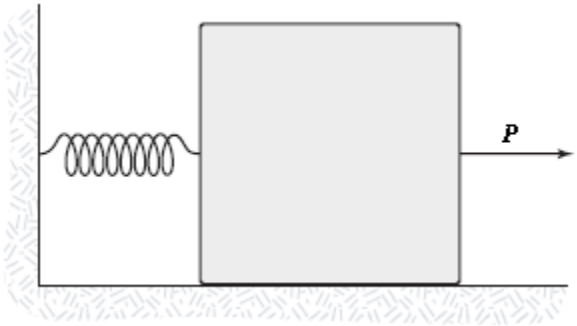
A single conservative force $F_X = (6.0x - 12)$ N (x is in m) acts on a particle moving along the x axis. The potential energy associated with this force is assigned a value of +20 J at $x = 0$. What is the potential energy at $x = 3.0$ m?

Flag question: Question 2

A 0.40-kg particle moves under the influence of a single conservative force. At point A where the particle has a speed of 10 m/s, the potential energy associated with the conservative force is +40 J. As the particle moves from A to B, the force does +25 J of work on the particle. What is the value of the potential energy at point B?

Flag question: Question 3

A 12-kg block on a horizontal frictionless surface is attached to a light spring (force constant = 0.80 kN/m). The block is initially at rest at its equilibrium position when a force (magnitude $P = 80$ N) acting parallel to the surface is applied to the block, as shown. What is the speed of the block when it is 13 cm from its equilibrium position?



Flag question: Question 4

A pendulum is made by letting a 2.0-kg object swing at the end of a string that has a length of 1.5 m. The maximum angle the string makes with the vertical as the pendulum swings is 30°. What is the speed of the object at the lowest point in its trajectory?

Flag question: Question 5

A 0.80-kg object tied to the end of a 2.0-m string swings as a pendulum. At the lowest point of its swing, the object has a kinetic energy of 10 J. Determine the speed of the object at the instant when

the string makes an angle of 50° with the vertical.

Flag question: Question 6

A 1.2-kg mass is projected from ground level with a velocity of 30 m/s at some unknown angle above the horizontal. A short time after being projected, the mass barely clears a 16-m tall fence. Disregard air resistance and assume the ground is level. What is the kinetic energy of the mass as it clears the fence?

Flag question: Question 7

A spring (k = 200 N/m) is suspended with its upper end supported from a ceiling. With the spring hanging in its equilibrium configuration, an object (mass = 2.0 kg) is attached to the lower end and released from rest. What is the speed of the object after it has fallen 4.0 cm?

Flag question: Question 8

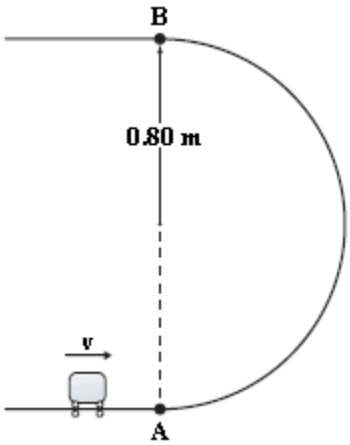
A 1.5-kg block sliding on a rough horizontal surface is attached to one end of a horizontal spring (k = 200 N/m) which has its other end fixed. If this system is displaced 20 cm horizontally from the equilibrium position and released from rest, the block first reaches the equilibrium position with a speed of 2.0 m/s. What is the coefficient of kinetic friction between the block and the horizontal surface on which it slides?

Flag question: Question 9

A particle is acted upon by only two forces, one conservative and one nonconservative and neither being a force of friction, as it moves from point A to point B. The kinetic energies of the particle at points A and B are equal if

Flag question: Question 10

A 1.2-kg mass is projected up a rough circular track (radius = 0.80 m) as shown. The speed of the mass at point A is 8.4 m/s, and at point B, it is 5.6 m/s. What is the change in mechanical energy between A and B caused by the force of friction?

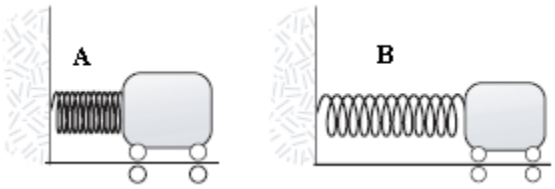


Flag question: Question 11

A 2.0-kg block is projected down a plane that makes an angle of 20° with the horizontal with an initial kinetic energy of 2.0 J. If the coefficient of kinetic friction between the block and plane is 0.40, how far will the block slide down the plane before coming to rest?

Flag question: Question 12

A large spring is used to stop the cars after they come down the last hill of a roller coaster. The cars start at rest at the top of the hill and are caught by a mechanism at the instant their velocities at the bottom are zero. Compare the compression of the spring, x_A, for a fully loaded car with that, x_B, for a lightly loaded car when $m_A = 2m_B$.



Flag question: Question 13

A spring (k = 600 N/m) is placed in a vertical position with its lower end supported by a horizontal surface. The upper end is depressed 20 cm, and a 4.0-kg block is placed on top of the depressed spring. The system is then released from rest. How far above the point of release will the block rise?

Flag question: Question 14

A small lead sphere of mass m is hung from a spring of spring constant k. The gravitational potential energy of the system equals zero at the equilibrium position of the spring before the weight is attached. The total mechanical energy of the system when the mass is hanging at rest is

Flag question: Question 15

A spring with spring constant k = 800 N/m is extended 12 cm from its equilibrium position. A spring with 6.0 cm extension from equilibrium will have the same potential energy as the first spring if its spring constant is

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