HW5 - due 6 pm Day 11 (Mon. Aug. 11) (6000385)

Question 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1. Question Details OSColPhys1 7.P.010.WA. [2611458]

A 0.48-kg object travels from point A to point B. If the speed of the object at point A is 8.0 m/s and the kinetic energy at point B is 8.0 J, determine the following.

(a) kinetic energy of the object at point A
15.4 J

(b) speed of the object at point B
5.77 m/s

Supporting Materials

Physical Constants

2. Question Details OSColPhys1 7.P.012.WA. [2611734]

If a projectile with a mass of 9.90 g is traveling at a speed of 1.21 km/s, determine the following.

(a) kinetic energy of the projectile in kilojoules
7.25 kJ

(b) kinetic energy of the projectile in kilojoules, if its speed is reduced by a factor of two
1.81 kJ

(c) kinetic energy of the projectile in kilojoules, if its original speed is increased by a factor of three
65.2 kJ

Supporting Materials

Physical Constants

3. Question Details OSColPhys1 7.P.022.WA. [2611696]

The gravitational potential energy of a cliff diver decreases by 28,000 J as she drops to the water from a height of 40.0 m. Determine her weight in newtons.
700 N

Supporting Materials

Physical Constants

4. Question Details OSColPhys1 7.P.023.WA. [2611413]

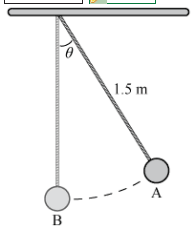
The gravitational potential energy of an 85.0-kg man increases by 1.95×10^3 J when he climbs a spiral staircase from the first to the second floor of an apartment building. If his 16.0-kg dog climbs a normal staircase from the same first floor to the second floor, by how much does the potential energy of the dog increase?
367 J

Supporting Materials

Physical Constants

5. Question Details OSColPhys1 7.P.026.WA. [2611610]

A pendulum bob with a mass of 0.49 kg is attached to a 1.5 m long string as shown. As the pendulum bob swings from point A, where the angle $\theta = 30°$, to point B at the bottom of its arc, determine the change in its gravitational potential energy.
-0.965 J



Supporting Materials

Physical Constants

6. Question Details OSColPhys1 7.P.031.WA. [2611636]

Pushing on the pump of a bottle of hand washing solution compresses a small spring which obeys Hooke's Law. If the potential energy of the spring is 0.0030 J when the spring is compressed 0.51 cm, determine the following.

(a) force constant of the spring
0.231 kN/m

(b) compression needed in order for the spring potential energy to equal 0.0081 J
0.838 cm

Supporting Materials

Physical Constants

7. Question Details OSColPhys1 7.P.003.WA. [2611417]

In a shipping yard, a crane operator attaches a cable to a 1410-kg shipping container and then uses the crane to lift the container vertically at a constant velocity for a distance of 29 m. Determine the amount of work done by each of the following.

(a) the tension in the cable
[ ] 4.01e+05 J

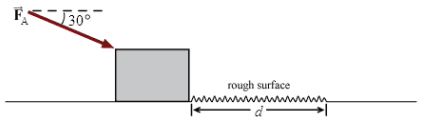
(b) the force of gravity
[ ] -4.01e+05 J

Supporting Materials

Physical Constants

8. Question Details OSColPhys1 7.P.001.Tutorial.WA. [2611961]

As shown in the figure below, a box of mass m = 63.0 kg (initially at rest) is pushed a distance d = 69.0 m across a rough warehouse floor by an applied force of F_A = 228 N directed at an angle of 30.0° below the horizontal. The coefficient of kinetic friction between the floor and the box is 0.100. Determine the following. (For parts (a) through (d), give your answer to the nearest multiple of 10.)



(a) work done by the applied force
W_A = [ ] 13620 J

(b) work done by the force of gravity
W_g = [ ] 0 J

(c) work done by the normal force
W_N = [ ] 0 J

(d) work done by the force of friction
W_f = [ ] -5050 J

(e) Calculate the net work on the box by finding the sum of all the works done by each individual force.
W_{Net} = [ ] 8580 J

(f) Now find the net work by first finding the net force on the box, then finding the work done by this net force.
W_{Net} = [ ] 8580 J

Supporting Materials

Physical Constants

9. Question Details OSColPhys1 7.P.037.WA. [2611496]

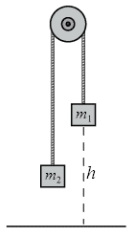
As a 1300-kg truck travels up a 16.8-m-high hill, the nonconservative forces of friction and the force generated by the engine do work on the truck. If the work done by friction is -3.21×10^5 J and the work done by the engine is $+6.33 \times 10^5$ J, determine the change in the truck's kinetic energy as it travels from the bottom of the hill to the top of the hill
[ ] 98 kJ

Supporting Materials

Physical Constants

10. Question Details OSColPhys1 7.P.014.Tutorial.WA. [2632651]

As shown in the figure below, two masses m_1 = 4.70 kg and m_2 which has a mass 75.0% that of m_1, are attached to a cord of negligible mass which passes over a frictionless pulley also of negligible mass. If m_1 and m_2 start from rest, after they have each traveled a distance h = 3.00 m, use energy content to determine the following.



(a) speed v of the masses
[ ] 2.9 m/s

(b) magnitude of the tension T in the cord
[ ] 39.5 N

Supporting Materials

Physical Constants

11. Question Details OSColPhys1 7.P.007.Tutorial.WA. [2611973]

A box of unknown mass is sliding with an initial speed v_i = 5.10 m/s across a horizontal frictionless warehouse floor when it encounters a rough section of flooring d = 4.90 m long. The coefficient of kinetic friction between the rough section of flooring and the box is 0.100. Using energy considerations, determine the final speed of the box after sliding across the rough section of flooring.
[ ] 4.05 m/s

Supporting Materials

Physical Constants

12. Question Details OSColPhys1 7.P.028.Tutorial.WA. [2611955]

As shown in the figure below, a box of mass m = 6.40 kg is sliding across a horizontal frictionless surface with an initial speed v_i = 3.80 m/s when it encounters a spring of constant k = 2900 N/m. The box comes momentarily to rest after compressing the spring some amount x_c. Determine the final compression x_c of the spring.

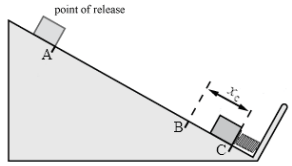
[ ] 0.179 m

Supporting Materials

Physical Constants

13. Question Details OSColPhys1 7.P.034.Tutorial.WA. [2611957]

As shown in the figure below, a box of mass m = 10.2 kg is released from rest (at position A) at the top of a 30.0° frictionless incline. The box slides a distance d = 3.50 m down the incline before it encounters (at position B) a spring and compresses it an amount x_C = 0.230 m (to point C) before coming momentarily to rest. Using energy content, determine the following.



(a) speed of the box at position B

v_B = [ ] 5.86 m/s

(b) spring constant

k = [ ] 7050 N/m

(c) the physical quantity that is constant throughout the process

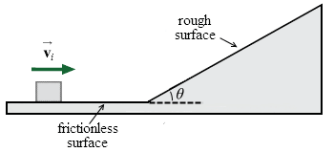
- kinetic energy
- elastic potential energy
- gravitational potential energy
- total energy

Supporting Materials

Physical Constants

14. Question Details OSColPhys1 7.P.035.Tutorial.WA. [2632675]

As shown in the figure below, a box of mass m = 26.0 kg is sliding along a horizontal frictionless surface at a speed v_i = 7.90 m/s when it encounters a ramp inclined at an angle of θ = 24.6°. The coefficient of kinetic friction between the ramp and the box is μ = 0.0704 and the box slides a distance d up the ramp before coming momentarily to rest.



(a) Determine the distance the box slides up the ramp before coming momentarily to rest.

[ ] 6.63 m

(b) Determine which of the following statements is most correct about the box traveling up the ramp and coming momentarily to rest.

- $W_{Net} = \Delta KE$
- $W_g = -\Delta PE_g$
- $W_{Net} = W_{cons} + W_{noncons}$
- $\Delta E = W_{noncons}$
- $\Delta E = \Delta KE + \Delta PE$
- all of these

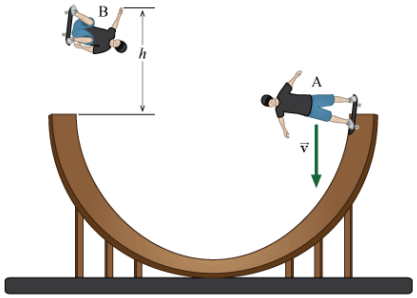
Supporting Materials

Physical Constants

15. Question Details OSColPhys1 7.P.048.WA. [2632644]

As shown in the figure below, a skateboarder starts at point A on the ramp and rises to point B, a maximum height of h = 2.43 m above the top of the ramp. If the amount of work done against friction is insignificant, determine his initial speed at point A.

[ ] 6.9 m/s



Supporting Materials

Physical Constants

16. Question Details OSColPhys1 7.P.030.WA. [2611814]

An object moving along a horizontal track collides with and compresses a light spring (which obeys Hooke's Law) located at the end of the track. The spring constant is 50.4 N/m, the mass of the object 0.250 kg and the speed of the object is 1.50 m/s immediately before the collision.

(a) Determine the spring's maximum compression if the track is frictionless.

[ ] 0.106 m

(b) If the track is *not* frictionless, will the spring's maximum compression be greater than, less than, or equal to the value obtained in part (a)?

- greater than
- less than
- equal to

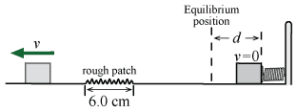
Supporting Materials

Physical Constants

17. Question Details OSColPhys1 7.P.042.WA. [2611470]

As shown in the figure, a 1.5-kg box is held at rest against a spring with a force constant k = 795 N/m that is compressed a distance d. When the box is released, it slides across a surface that is frictionless, except for a rough patch that has a coefficient of kinetic friction μ_k = 0.40 and is 6.0 cm in length. If the speed of the box is 1.7 m/s after sliding across the rough patch, determine the initial compression d of the spring.

[ ] 7.96 cm



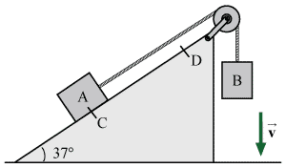
Supporting Materials

Physical Constants

18. Question Details OSColPhys1 7.P.061.WA. [2611850]

Block A (mass 40 kg) and block B (mass 80 kg) are connected by a string of negligible mass as shown in the figure. The pulley is frictionless and has a negligible mass. If the coefficient of kinetic friction between block A and the incline is μ_k = 0.29 and the blocks are released from rest, determine the change in the kinetic energy of block A as it moves from C to D, a distance of 24 m up the incline.

[ ] 3660 J



Supporting Materials

Physical Constants

Assignment Details

Name (AID): **HW5 - due 6 pm Day 11 (Mon. Aug. 11) (6000385)**
Submissions Allowed: **5**
Category: **Homework**
Code:
Locked: **No**
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