Class Problems Chapter 8

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| **••19** | |  | | --- | |  |   http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/go.gif Figure [8-34](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-fig-0034) shows an 8.00 kg stone at rest on a spring. The spring is compressed 10.0 cm by the stone. (a) What is the spring constant? (b) The stone is pushed down an additional 30.0 cm and released. What is the elastic potential energy of the compressed spring just before that release? (c) What is the change in the gravitational potential energy of the stone–Earth system when the stone moves from the release point to its maximum height? (d) What is that maximum height, measured from the release point? |

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| http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif |
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| **••26** | A conservative force http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/math/math064.gifN, where *x* is in meters, acts on a particle moving along an *x* axis. The potential energy *U* associated with this force is assigned a value of 27 J at *x* = 0. (a) Write an expression for *U* as a function of *x*, with *U* in joules and *x* in meters. (b) What is the maximum positive potential energy? At what (c) negative value and (d) positive value of *x* is the potential energy equal to zero? |

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| **••31** | |  | | --- | |  |   [http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/ilw.gif](javascript:parent.xlinkobject('c08-sec1-ilw-0002',%20'xlinks_db.xml'))  A block with mass *m* = 2.00 kg is placed against a spring on a frictionless incline with angle *θ* = 30.0° (Fig. [8-42](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-fig-0042)). (The block is not attached to the spring.) The spring, with spring constant *k* = 19.6 N/cm, is compressed 20.0 cm and then released. (a) What is the elastic potential energy of the compressed spring? (b) What is the change in the gravitational potential energy of the block–Earth system as the block moves from the release point to its highest point on the incline? (c) How far along the incline is the highest point from the release point?   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | |  | | --- | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | |  |  |  |  | | --- | --- | --- | --- | | |  | | --- | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/image_n/nt0049-y.gif | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | |  |  |  | | --- | --- | --- | | [Figure zoom](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-fig-0042) | **Figure 8-42** | Problem [31](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-prob-0040). | | | |

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| **••57** | |  | | --- | |  |   In Fig. [8-52](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-fig-0052), a block slides along a track from one level to a higher level after passing through an intermediate valley. The track is frictionless until the block reaches the higher level. There a frictional force stops the block in a distance *d*. The block's initial speed *v*0 is 6.0 m/s, the height difference *h* is 1.1 m, and μ*k* is 0.60. Find *d*.   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | |  | | --- | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | |  |  |  |  | | --- | --- | --- | --- | | |  | | --- | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/image_n/nt0059-y.gif | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | |  |  |  | | --- | --- | --- | | [Figure zoom](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-fig-0052) | **Figure 8-52** | Problem [57](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-prob-0066). | | | |

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|  | 64. In Fig. [8-55](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-fig-0055), a block is released from rest at height *d* = 40 cm and slides down a frictionless ramp and onto a first plateau, which has length *d* and where the coefficient of kinetic friction is 0.50. If the block is still moving, it then slides down a second frictionless ramp through height *d*/2 and onto a lower plateau, which has length *d*/2 and where the coefficient of kinetic friction is again 0.50. If the block is still moving, it then slides up a frictionless ramp until it (momentarily) stops. Where does the block stop? If its final stop is on a plateau, state which one and give the distance *L* from the left edge of that plateau. If the block reaches the ramp, give the height *H* above the lower plateau where it momentarily stops.  nt0062-y   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | |  | | --- | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | |  | | --- | |  | | | http://edugen.wileyplus.com/edugen/courses/crs5841/common/art/pixel.gif | | |  |  |  | | --- | --- | --- | | [Figure zoom](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-fig-0055) | Figure 8-55 | Problem [64](http://edugen.wileyplus.com/edugen/courses/crs5841/halliday9118/halliday9118c08/halliday9118/halliday9118c08/halliday9118c08xlinks.xform?id=halliday9118c08-prob-0073). | | | |