

More Energy Calculation Practice

1. Calculate the potential energy of a rock with a mass of 55 kg while sitting on a cliff that is 27 m high.

Answer - $E_p = mgh$ $E_p = (55)(9.81)(27)$ $E_p = 14567.85 J$

2. What distance is a book from the floor if the book contains 196 J of potential energy and has a mass of 5.0 kg?

Answer - $E_p = mgh$ $196 = (5.0)(9.81)(h)$ $h = 4.0 m$

3. An automobile is sitting on a hill which is 20. m higher than ground level. Find the mass of the automobile if it contains 362 600 J potential energy.

Answer - $E_p = mgh$ $362\ 600 = (m)(9.81)(20.)$ $m = 1848.11 kg$

4. Calculate the kinetic energy of the rock in problem #1 if the rock rolls down the hill with a velocity of $8.0 \frac{m}{s}$.

Answer - $E_k = \frac{1}{2}mv^2$ $E_k = (0.5)(55)(8.0)^2$ $E_k = 1760 J$

5. Calculate the kinetic energy of a truck that has a mass of 2900 kg and is moving at $55 \frac{m}{s}$.

Answer - $E_k = \frac{1}{2}mv^2$ $E_k = (0.5)(2900)(55)^2$ $E_k = 4\ 386\ 250 J$

6. Find the mass of a car that is travelling at a velocity of $60. \frac{m}{s}$. The car has 5 040 000 J of kinetic energy.

Answer - $E_k = \frac{1}{2}mv^2$ $5\ 040\ 000 = (0.5)(m)(60.)^2$ $m = 2800 kg$

7. How fast is a ball rolling if it contains 98 J of kinetic energy and has a mass of 4.0 kg?

Answer - $E_k = \frac{1}{2}mv^2$ $98 = (0.5)(4.0)(v)^2$ $v = 7.0 \frac{m}{s}$

8. A 10. kg mass is lifted to a height of 2.0 m. What is its potential energy at this position?

Answer - $E_p = mgh$ $E_p = (10.)(9.81)(2.0)$ $E_p = 196.2 J$

9. At what height is an object that has a mass of 16 kg, if its gravitational potential energy is 7500 J?

Answer - $E_p = mgh$ $7500 = (16)(9.81)(h)$ $h = 47.78 m$

10. What potential energy is acquired by a hammer with a mass of 0.75 kg when raised to 0.35 m?

Answer - $E_p = mgh$ $E_p = (0.75)(9.81)(0.35)$ $E_p = 2.58 J$

11. A book with a mass of 1.0 kg is dropped from a height of 3.0 m. What is the potential energy of the book when it reaches the floor?

$E_p = \text{zero. No height means no potential energy.}$

12. At what height is an object that has a mass of 50. kg, if its gravitational potential energy is 9800 J?

Answer - $E_p = mgh$ $9800 = (50.)(9.81)(h)$ $h = 19.98 m$

13. What is the mass of an object if its gravitational potential energy is 3822 J and it is 15 m above the ground?

Answer - $E_p = mgh$ $3822 = (m)(9.81)(15)$ $m = 25.97 kg$

14. An object with a mass of 20. kg and potential energy of 584 J is what distance above the ground?

Answer - $E_p = mgh$ $584 = (20.)(9.81)(h)$ $h = 2.98 m$