

Show all of your work when answering any problems below. Include labels and round to the hundredths.

1. Does an object have energy when it is at rest?

Explain your answer.

2. A 250 kg rock falls off a cliff and comes to rest on the ground, which is 40 m below the cliff.

a. At what point is the rock's potential energy at maximum?

b. Where is the kinetic energy at maximum?

3. A girl on a motorbike passes by at a speed of 15 m/s. Her mass is 40 kg. What is her kinetic energy?

4. What is the kinetic energy of a 24 kg mass that is moving with a velocity of 2 m/s?

5. A 10 kg mass is lifted to a height of 2 m.

a. What is its weight?

b. What is its potential energy at 2 m?

6. A roller coaster is at the top of a 72 m hill and weighs 966 N.

a. The coaster (at this moment) has what type of energy?

b. Calculate its energy at this moment.

7. There is a bell at the top of a tower that is 45 m high. The bell weighs 190 N.

a. What type of energy does the bell have?

b. Calculate its energy?

8. A cinder block is sitting on a platform 20 m high. It weighs 79 N.

a. What type of energy does the block have?

b. Calculate its energy?

9. A car is traveling with a velocity of 40 m/s and has a mass of 1120 kg.

a. What type of energy does the car have?

b. Calculate its energy?

10. A baby carriage is sitting at the top of a hill that is 21 m high. The carriage with the baby weighs 12 N.

a. What type of energy does the carriage have?

b. Calculate the energy of the carriage with the baby inside?



11. You serve a volleyball with a mass of 2.1 kg. The ball leaves your hand with a speed of 30 m/s.

a. What type of energy does the ball have?

b. Calculate its energy?

12. At what height is an object that weights 490 N if its gravitational potential energy is 4900 J?

13. A car is using 60,800 J of energy and is traveling at a rate of 10 m/s. What is its mass?

14. What is the weight of an object that has 1500 J of GPE resting on a shelf 2.5 m high?

15. A 60-kg Spiderman walks from the ground to the roof of a 74.8 m tall building. How much gravitational potential energy does he have at the top of the building?



16. A 1 kg rock is at a height of 100 meters.
a. What is the rock's gravitational potential energy at 100 meters high?

b. Calculate the rock's gravitational potential energy at 50 m, 20 m, 1 m, and 0 m high. Put the answers in the data table below.

Height (m)	Potential energy (J)
100 m	
50 m	
20 m	
1 m	
0 m	

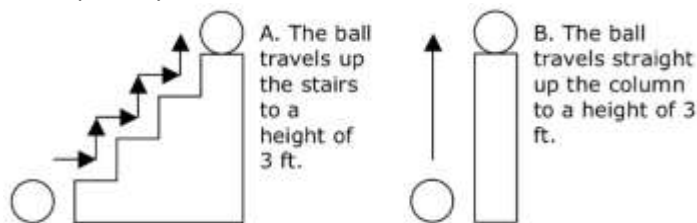
17. A 5 kg object is moving down a ramp. Calculate the object's kinetic energy when it is traveling at 0 m/s, 5 m/s, 10 m/s, 20 m/s, and 40 m/s.

Velocity (m/s)	Kinetic energy (J)
0 m/s	
5 m/s	
10 m/s	
20 m/s	
40 m/s	

18. What is the velocity of a 500 kg elevator that has 4000 J of energy?

19. What is the mass of an object traveling at 30 m/s if it has 33,750 J of energy?

20. In which scenario below does the ball have more gravitational potential energy when sitting at the top? Why?



A. The ball travels up the stairs to a height of 3 ft.

B. The ball travels straight up the column to a height of 3 ft.