

1) A 50 kg box at rest is pulled horizontally a distance of 5 m along a frictionless floor by a 300 N force, and achieves a final velocity of 7.75 m/s.

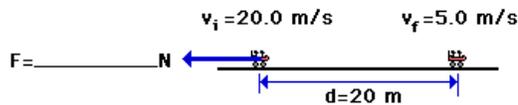
a) What is change in kinetic energy of the box?

b) How much work is performed on the box?

c) How much power was exerted during this time period?

2) A 8-kg shot-put is launched from a burley man's arm with a speed of 16 m/s. The shot-put experiences an 800 N force from the burly arm as it started from rest. How much work did the burly arm do?

3) At the end of the Shock Wave roller coaster ride, the 6000-kg train of cars (includes passengers) is slowed from a speed of 20 m/s to a speed of 5 m/s over a distance of 20 meters in a time of 1.6 seconds. How much power was exerted during this time period? Did the roller coaster give or receive energy?



5) According to the label, a 2 oz. Snickers candy bar contains 266 nutritional calories.

a) How much energy in Joules is in one Snickers bar? (1 nutritional calorie = 1 kcal = 1000 cal = 4186 J)

b) If an average person ( $m=60 \text{ kg}$ ) were eat a Snickers bar and use all of its energy for mechanical work, how high could this person climb in elevation (ignoring drag and friction)?

c) If a person eats a 2 oz. snickers bar, and then participates in an activity that requires a constant 100W power output, how long would the person be able to participate using only the energy from a snickers bar? Express your answer in minutes.

d) The average person expends approximately 1500 kcal per day just to maintain physiological function. What is the power generated by an average person, in Watts?

6) A 2005 Corvette convertible coupe automobile was tested by Road & Track magazine. The following performance data were collected:

Tested Weight (lb)	Mass (kg)	¼ mile time (s)	Final speed (mph)	Final speed (m/s)
3480	1581.8	12.8	114.5	51.2

a) What is the KE at the start of the trial,  $v = 0$  mph?

b) What is the KE at the end of the quarter mile?

c) How much net work is performed on the Corvette during this trial?

d) What is the average net power output in (W or J/s) for the Corvette during this test?

e) What is the average net power in horsepower (hp)? Note: 1 hp = 745.7 W

g) What is the average net force exerted on the Corvette during this trial?