

## WORK AND ENERGY PRACTICE PROBLEMS

Answer these questions in your notebooks. Remember to show all of your work in order to receive full credit. Textbook reference pages are 84-88.

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1. How much work (energy) is needed to lift an object that weighs 200 N to a height of 4 m?
2. How much power is needed to lift the 200 N object to a height of 4 m in 4 seconds?
3. What is the power output of an engine that does 60,000 J of work in 10 seconds?
4. A rifle can shoot a 4.20 gram bullet at a speed of 965.0 m/s.
  - a. Find the kinetic energy of the bullet.
  - b. Find the work done on the bullet if it starts from rest and travels 0.75 m in  $1.6 \times 10^{-3}$  sec.
  - c. In general, how would the kinetic energy of the bullet change if it was made from a more dense metal? Shot with a smaller velocity?
5. A comet with a mass of  $7.85 \times 10^{14}$  g strikes Earth at a speed, relative to Earth, of 25.0 km/s. Find the kinetic energy of the comet.
6. A 90.0 kg rock climber climbs 45 m upward to the top edge of a quarry, then, from the top, descends 85 m to the bottom. Find the gravitational potential energy of the climber at the top edge and also at the bottom.
7. A 50.0 kg shell is shot from a cannon at the Earth's surface to a height of  $4.00 \times 10^2$  m.
  - a. What is the gravitational potential energy with respect to the earth's surface when the shell is at this height?
  - b. What is the change in gravitational potential energy when the shell falls to a height of  $2.00 \times 10^2$  m.