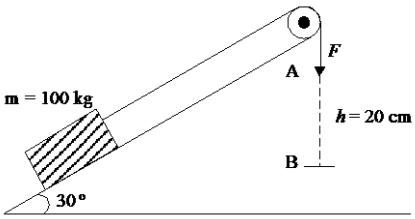
Physics 504

Practice Questions: Work and Power

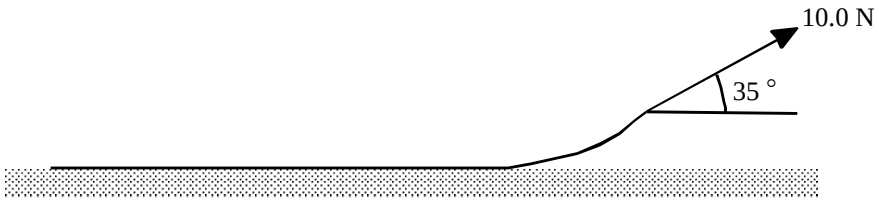
1. A 3.0 kg block is dragged over a rough horizontal surface by a constant force of 16 N acting at an angle of 37° above the horizontal. The speed of the block increases from 4.0 m/s to 6.0 m/s in a displacement of 5.0 m. What work was done by the friction force during this displacement?

2. The diagram shows an ideal mechanical system (frictionless).



From point A to point B, you pull a distance of 20 cm in 0.5 second.
What power do you develop as a result of this mechanical system?

3. A sled has a mass of 10 kg. A child pulls the sled a distance of 20 metres with a force of 10.0 N at an angle of 35° with respect to the horizontal. During this motion, a force of friction of 4.0 N acts in the opposite direction of the motion.



How much work is done on the sled by the child over the distance of 20 metres?

4. If a small motor does 520 J of work to move a toy car 260 m at a constant velocity, what force does it exert?

5. A boy on a bicycle drags a wagon full of newspapers at constant speed of 0.80 m/s for 30 min using a force of 40 N. How much work has the boy done?

6. A 50 kg bicyclist on a 10 kg bicycle speeds up from 5.0 m/s to 10 m/s in 10 s. How much work was done to increase the kinetic energy of the bicyclist?

7. A force of 5.0 N moves a 6.0 kg object along a rough floor at a constant speed of 2.5 m/s. What power is being generated if this is done in 25s?

8. A man pushes a 20 kg box up an incline of length 5.0 m and 30 ° angle in 20 s. The coefficient of friction between the coefficient of friction between the incline and the box is 0.2. The box is pushed up at a constant velocity. What is the power generated by the man?

Answers:

1. 34 J
2. 196 W
3. 163.8 J
4. 2.0 N
5. 57 600 J
6. 2250 J
7. 12.5 W
8. 33 W