HW 1.1 Power Per _____ Name _____

1. If a car generates 25 **horsepower** when traveling a steady 100 **km/hr**, watt must be the forece exerted on the car due to friction?

2. How long does it take a 15 **kW** steam engine to do 6.8 E 7 J of work?

3. Watt is the power in kilowatts of a 200 horsepower engine?

4. A 200 W winch pulls a box along a horizontal surface at a constant velocity of 3.5 m/s. What is the net force being applied to the box?

5. How much power does it take to slide a 20 kg crate of gazelle toys 5 meters along a horizontal floor in 5 seconds? ($\mu_k = 0.2$)

6. How much time will it take me (75 kg) to run up 30 steps if I generate the equivalent power of a 75 watt light bulb. Each step is 23 cm tall.

7. A motor is used to pull an 80 kg skier along a horizontal surface at a constant speed of 2 m/s to enable him to learn to keep his balance. If the coefficient of kinetic friction between the skis and the surface is 0.15, what horsepower motor is required?

8. A 50 kg student climbs a rope 5 m in length and stops at the top. (a) What must her average speed have been in order to match the power output of a 200 W light bulb? (b) How much work did she do?

9. A machine lifts a 300 kg crate at a constant speed 0.75 m/s. Calculate the power output of the machine.