

Power and Efficiency

1. A 50kg box is accelerated from rest to 3.5m/s in 5s.
 - a) How much work was done?
 - b) How much work was done per second?
The answer to b is power.

2. A lightbulb is rated at 10 W. This means that the lightbulb uses 10 J/s. How much energy is needed to have this lightbulb on for one day?

3. A crane lifts a 100 kg box 3 m in 10 s. What is the crane's power?

4. Helicopter A has a power of 50 kW and Helicopter B has a power of 75 kW. If both helicopters are 4500 kg, how long will it take each helicopter to fly up 10 m?

5. A 10kg toy car uses 30J of electrical energy to accelerate from rest to 2.5m/s.
 - a) What is the work input ?
 - b) What is the work output?
 - c) What is the efficiency?

6. A toy crane is rated at 30W. It lifted a 1.5 kg mass up 2.5m in 4s.
 - a) What is the power input?
 - b) What is the power output?
 - c) What is the efficiency?

7. A ferris wheel uses 40000J of energy to move passengers from the ground to a height of 18.2 m. If the ferris wheel is 65% efficient, what is the mass of the passengers?

8. A 1500 kg car accelerates from rest to 20m/s in 12s. If the car is 35% efficient, what is the power rating of the car's engine?