4.8.3 Efficiency

videos

Efficiency is a measure of what fraction of total input energy is transferred to useful output energy:

$$Efficiency = \frac{useful\ output\ energy}{total\ input\ energy}$$

Efficiency can be expressed as a fraction or as a percentage.

(1) A ball is dropped from a height of 1m and rebounds to 0.6m. What is the efficiency of the bounce?

(2) What has happened to the 'missing' energy?

Efficiency can also be calculated from power:

$$Efficiency = \frac{useful\ power\ output}{total\ power\ input}$$

An electric light bulb is supplied at mains voltage (230V) with a current of 2.6A.

(3) What is the electrical power supplied?

(4) The light bulb, above, produces 100W of light energy. How efficient is it?

An electric motor is used to lift a 0.2kg mass by 1.2m. It is supplied at 12V with a current of 0.08A. The motor is 80% efficient.

(5) What energy transfer is occurring in this case?

(6) What is the useful power output from the motor?

(7) What is the total energy gained by the 0.2kg mass?

(8) How quickly will it be lifted?