

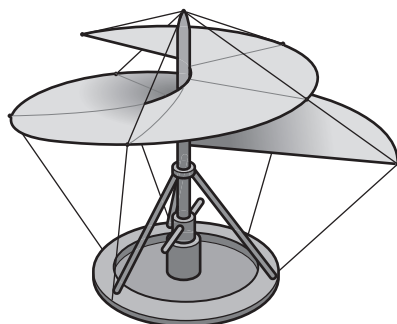
- 17 The data below are taken from a test of a petrol engine for a motor car.

power output	150 kW
fuel consumption	20 litres per hour
energy content of fuel	40 MJ per litre

What is the ratio $\frac{\text{power output}}{\text{power input}}$?

- A $\frac{150 \times 10^3}{40 \times 10^6 \times 20 \times 60 \times 60}$
- B $\frac{150 \times 10^3 \times 60 \times 60}{20 \times 40 \times 10^6}$
- C $\frac{150 \times 10^3 \times 40 \times 10^6 \times 20}{60 \times 60}$
- D $\frac{150 \times 10^3 \times 20}{40 \times 10^3 \times 60 \times 60}$

- 18 Leonardo da Vinci proposed a flying machine that would work like a screw to lift the pilot into the air. The 'screw' is rotated by the pilot.



The machine and the pilot together have a total mass of 120 kg.

Which useful output power must the pilot provide to move vertically upwards at a constant speed of 2.5 m s^{-1} ?

- A 48 W B 300 W C 470 W D 2900 W

- 19 A metal wire, fixed at one end, has length l and cross-sectional area A . The wire extends a distance e when mass m is hung from the other end of the wire.

What is an expression for the Young Modulus E of the metal?

- A $E = \frac{ml}{Ae}$ B $E = \frac{mgl}{Ae}$ C $E = \frac{me}{Al}$ D $E = \frac{mge}{Al}$