

- 14** A metal block has a mass of 750 g. 60% of the mass is magnesium and the remainder is copper.

The density of magnesium is 1.7 g cm^{-3} .

The density of copper is 9.0 g cm^{-3} .

What is the density of the block?

- A** 2.5 g cm^{-3} **B** 4.6 g cm^{-3} **C** 5.4 g cm^{-3} **D** 10.7 g cm^{-3}

- 15** A man climbs slowly at a steady speed to the top of a ladder.

What is the **main** energy transfer taking place for the man as he climbs?

- A** chemical potential to gravitational potential
B chemical potential to kinetic
C kinetic to gravitational potential
D thermal (heat) to kinetic

- 16** During an interval of time, fuel supplies energy X to a car.

Some of this energy is converted into kinetic energy as the car accelerates.

The rest of the energy Y is lost as thermal energy.

What is the efficiency of the car?

- A** $\frac{X}{X-Y}$ **B** $\frac{Y}{X-Y}$ **C** $\frac{X-Y}{X}$ **D** $\frac{X-Y}{Y}$

- 17** A railway engine accelerates a train of total mass 800 tonnes (1 tonne = 1000 kg) from rest to a speed of 50 m s^{-1} .

How much useful work must be done on the train to reach this speed?

- A** $1.0 \times 10^6 \text{ J}$ **B** $2.0 \times 10^6 \text{ J}$ **C** $1.0 \times 10^9 \text{ J}$ **D** $2.0 \times 10^9 \text{ J}$

- 18** A mass is raised vertically. In time t , the increase in its gravitational potential energy is E_p and the increase in its kinetic energy is E_k .

What is the average power input to the mass?

- A** $(E_p - E_k)t$ **B** $(E_p + E_k)t$ **C** $\frac{E_p - E_k}{t}$ **D** $\frac{E_p + E_k}{t}$