Example 7 ◄)) Self Tutor

a Density is defined as mass per unit volume. Write the SI unit for density.

b A newton is defined as the force which accelerates a mass of 1 kilogram at the rate of 1 metre per second per second. Write down the combination of SI units which defines a newton.

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a The unit for mass is kg, and the unit for volume is m^3.

∴ the unit for density is kg/m^3 or $kg\,m^{-3}$.

b 1 newton = 1 kilogram × 1 metre per second per second = $1\ kg\,m\,s^{-2}$

Example 8 ◄)) Self Tutor

Convert:

a 3540 millimetres into metres

b 7.14 kilograms into grams

c 4 hours and 12 minutes into seconds

d 15 knots into kilometres per hour

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a
$$1\ mm = 10^{-3}\ m$$
$$\therefore\ 3540\ mm = 3540 \times 10^{-3}$$
$$= 3.54\ m$$

b
$$1\ kg = 1000\ g$$
$$\therefore\ 7.14\ kg = 7.14 \times 1000$$
$$= 7140\ g$$

c
$$1\ h = 3600\ s$$
$$1\ min = 60\ s$$
$$\therefore\ 4\ h\ 12\ min = (4 \times 3600) + (12 \times 60)$$
$$= 15\,120\ s$$

d
$$1\ kn = 1.852\ km\,h^{-1}$$
$$\therefore\ 15\ kn = 15 \times 1.852$$
$$= 27.78\ km\,h^{-1}$$