SI units and prefixes

Science maths skills | AQA Combined Science 8464 and the separate sciences | 14 questions, 42 marks

GCSE science calculations

Scan for the solutions

Equations for this topic (cover this box to practise recalling them)

- energy transferred = power × time learn this one
- force = spring constant × extension learn this one
- kinetic energy = 0.5 × mass × (speed)^2 learn this one
- distance travelled = speed × time learn this one
- charge flow = current × time learn this one
- change in thermal energy = mass × specific heat capacity × temperature change on the physics equation sheet
- gravitational potential energy = mass × gravitational field strength × height learn this one

Name: _____ **Date:** _____ **Score:** _____ **/ 42**

1 Give the SI unit of each quantity.

a. power

b. resistance

(2 marks)

Answer _____

2 Convert each value to the base SI unit.

a. The power of a hairdryer is 2.4 kW. Give the power in watts.

b. The mass of a bag of sugar is 350 g. Give the mass in kilograms.

(2 marks)

Answer _____

3 Nadia records three measurements in a Year 10 lab practical.

a. A time of 3.5 minutes. Give the time in seconds.

b. A length of 45 cm. Give the length in metres.

c. A current of 80 mA. Give the current in amperes.

(3 marks)

Answer _____

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4 Tera (T) means × 10^{12}, giga (G) means × 10^{9} and nano (n) means × 10^{-9}.

a. A home wi-fi router sends radio waves with a frequency of 2.4 GHz. Give the frequency in hertz.

b. Green light has a wavelength of 550 nm. Give the wavelength in metres, in standard form.

c. A power station transfers 25 TJ of energy in one day. Give the energy in joules, in standard form.

(3 marks)

Answer _____

5 A kettle has a power of 2.5 kW. It is switched on for 2 minutes.

Calculate the energy transferred by the kettle in joules.

(3 marks)

Answer _____

6 A spring has a spring constant of 25 N/m. Ifeoma hangs a mass on the spring and it stretches by 4.0 cm.

Calculate the force stretching the spring.

(2 marks)

Answer _____

7 A football has a mass of 450 g. It is kicked and moves at a speed of 8.0 m/s.

Calculate the kinetic energy of the football.

(3 marks)

Answer _____

8 Tom rides an e-scooter 1.8 km along a cycle path. The journey takes 6 minutes.

Calculate his average speed in m/s.

(3 marks)

Answer _____

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9 A microwave oven has a power of 800 W. It transfers 96 kJ of energy to a bowl of soup.

Calculate how long the microwave is switched on for, in seconds.

(3 marks)

Answer _____

10 A small LED in a bike light has a current of 15 mA. A charge of 2.7 C flows through the LED.

Calculate the time the LED is on for, in seconds.

(3 marks)

Answer _____

11 A car of mass 1200 kg is travelling at 54 km/h.

Calculate the kinetic energy of the car. Give your answer in kilojoules (kJ).

Show your working.

(4 marks)

Answer _____

12 Aisha fills a kettle with 750 g of water at 18 °C. The kettle has a power of 2.2 kW.

The specific heat capacity of water is 4200 J/kg °C. Assume all the energy transferred by the kettle heats the water.

Calculate the time it takes to heat the water to 100 °C. Give your answer in seconds to 2 significant figures.

Show your working.

(5 marks)

Answer _____

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13 The label on a food mixer says:

- 230 V
- 600 W
- 50 Hz

Kayode uses the mixer for 3.0 minutes.

Calculate the energy transferred by the mixer. Give your answer in kilojoules (kJ). (3 marks)

Answer _____

14 A delivery drone has a mass of 1.2 kg. It carries a parcel of mass 850 g. The drone lifts the parcel straight up through a height of 30 m in 15 s.

Gravitational field strength = 9.8 N/kg.

Calculate the gravitational potential energy gained by the parcel. (3 marks)

Answer _____

End of questions | Total 42 marks

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