FULL NAME ..... DUE DATE .....

SCIENCE CLASS ..... TEACHER .....

Combined Sciences: Physics Homework/Extension Sheet T14.3

You may cut this homework page out if you are not taking your booklet home

1. Convert 45.2 kJ to J.

(1 mark)

- ☐ **A:** 452 000 J
- ☐ **B:** 45 200 J
- ☐ **C:** 0.452 J
- ☐ **D:** 0.000 452 J

2. A student is investigating the energy required to boil a kilogram of water. Another way of saying this is that they are investigating...

(1 mark)

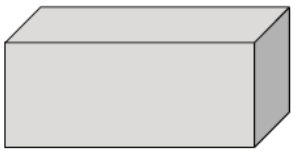
- ☐ **A:** Latent heat of fusion
- ☐ **B:** Latent heat of vaporisation
- ☐ **C:** Specific heat capacity
- ☐ **D:** Energy density

3. What is the unit for specific heat capacity?

(1 mark)

- ☐ **A:** J/kg°C
- ☐ **B:** J/kg
- ☐ **C:** kg°C /J
- ☐ **D:** °C/kg

4. A student investigates the density of a copper block and the density of a small stone. The student found the volume of the copper block by multiplying the area of its base by its height. The small stone does not have straight sides.



Describe how the student could measure the volume of the small stone. You may use a diagram if it helps your answer.

(3 marks)

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5. A steel ball has a volume of 3.6 cm^3 and a mass of 28 g.

Calculate the density of steel in kg/m^3.

(3 marks)

density = ... kg/m^3

	distance travelled = average speed × time	
	acceleration = change in velocity ÷ time taken	$a = \frac{(v-u)}{t}$
	force = mass × acceleration	$F = m \times a$
	weight = mass × gravitational field strength	$W = m \times g$
HT	**momentum = mass × velocity**	$\boldsymbol{p = m \times v}$
	change in gravitational potential energy = mass × gravitational field strength × change in vertical height	$\Delta GPE = m \times g \times \Delta h$
	kinetic energy = 1/2 × mass × (speed)^2	$KE = \frac{1}{2} \times m \times v^2$
	efficiency = $\frac{(\text{useful energy transferred by the device})}{(\text{total energy supplied to the device})}$	
	wave speed = frequency × wavelength	$v = f \times \lambda$
	wave speed = distance ÷ time	$v = \frac{x}{t}$
	work done = force × distance moved in the direction of the force	$E = F \times d$
	power = work done ÷ time taken	$P = \frac{E}{t}$
	energy transferred = charge moved × potential difference	$E = Q \times V$
	charge = current × time	$Q = I \times t$
	potential difference = current × resistance	$V = I \times R$
	power = energy transferred ÷ time taken	$P = \frac{E}{t}$
	electrical power = current × potential difference	$P = I \times V$
	electrical power = (current)^2 × resistance	$P = I^2 \times R$
	density = mass ÷ volume	$\rho = \frac{m}{V}$

	force exerted on a spring = spring constant × extension	$F = k \times x$
	(final velocity)^2 – (initial velocity)^2 = 2 × acceleration × distance	$v^2 - u^2 = 2 \times a \times x$
HT	**force = change in momentum ÷ time**	$\boldsymbol{F = \frac{(mv - mu)}{t}}$
	energy transferred = current × potential difference × time	$E = I \times V \times t$
HT	**force on a conductor at right angles to a magnetic field carrying a current = magnetic flux density × current × length**	$\boldsymbol{F = B \times I \times l}$
	For transformers with 100% efficiency, potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil	$V_P \times I_P = V_S \times I_S$
	change in thermal energy = mass × specific heat capacity × change in temperature	$\Delta Q = m \times c \times \Delta\theta$
	thermal energy for a change of state = mass × specific latent heat	$Q = m \times L$
	energy transferred in stretching = 0.5 × spring constant × (extension)^2	$E = \frac{1}{2} \times k \times x^2$

Metric prefixes

how to convert		abbreviation	prefix
x 1000 ↓		**T**	tera-
x 1000 ↓		**G**	giga-
x 1000 ↓		**M**	mega-
x 1000 ↓		**k**	kilo-
no prefix			
÷ 1000 ↑		**m**	milli-
÷ 1000 ↑		**µ**	micro-
÷ 1000 ↑		**n**	nano-
÷ 1000 ↑		**p**	pico-

Time

how to convert		abbreviation	Unit of time
x 7 ↓		**wk**	week
x 24 ↓		**d**	day
x 60 ↓		**h or hr**	hour
x 60 ↓		**min**	minute
s, seconds			
÷ 1000 ↑		**ms**	millisecond
÷ 1000 ↑		**µs**	microsecond
÷ 1000 ↑		**ns**	nanosecond
÷ 1000 ↑		**ps**	picosecond