

EDEXCEL • GCSE COMBINED SCIENCE 1SC0

Physics — Foundation Tier, Paper 2

June 2025 exam series

QUESTION PAPER

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Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Monday 16 June 2025

Morning (Time: 1 hour 10 minutes) **Paper reference** **1SC0/2PF**

Combined Science

PAPER 6

Foundation Tier

You must have:
Calculator, ruler, Equation Booklet (enclosed)

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Calculators may be used.
- Any diagrams may NOT be accurately drawn, unless otherwise indicated.
- You must show **all your working out** with **your answer clearly identified** at the end of your solution.

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- In questions marked with an **asterisk (*)**, marks will be awarded for your ability to structure your answer logically, showing how the points that you make are related or follow on from each other where appropriate.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in one of the four boxes ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

- 1 (a) Figure 1 shows two lamps in series in a circuit.

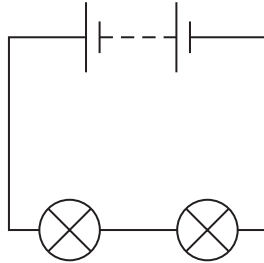


Figure 1

The resistance of each lamp is $12\ \Omega$.

- (i) Calculate the total resistance of the lamps in the circuit.

(1)

total resistance of lamps = Ω

- (ii) The current in a lamp in Figure 1 is $0.50\ \text{A}$.

The resistance of the lamp is $12\ \Omega$.

Calculate the voltage across this lamp.

Use the equation

$$V = I \times R$$

(2)

voltage = V

(iii) The voltage across a different lamp is 4.5V.

The current in this lamp is 0.40 A.

Calculate the energy transferred to the lamp in 5 minutes.

Use the equation

$$E = I \times V \times t$$

(3)

energy transferred = J

(b) Figure 2 shows a circuit with a switch, two ammeters and two resistors in series with a cell.

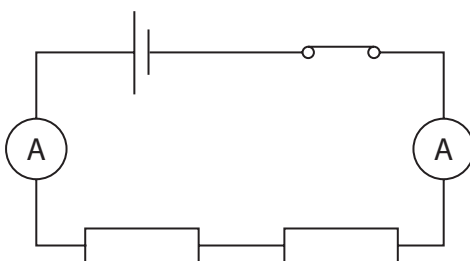


Figure 2

(i) Which of these statements is true for the circuit in Figure 2?

(1)

- ☐ **A** the switch is in the open position
- ☐ **B** the ammeters measure the current in the circuit
- ☐ **C** the resistors are variable resistors
- ☐ **D** the current supplied by the cell is alternating current (a.c.)



(ii) The resistance of the circuit is increased by adding one resistor to the circuit.

State how increasing the resistance changes the current in the circuit.

(1)

(Total for Question 1 = 8 marks)

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2 (a) Which of these describes the motion of particles in a liquid?

(1)

- ☐ **A** particles move around and are very close together
- ☐ **B** particles move very quickly and are a long way apart
- ☐ **C** particles do not move and are a long way apart
- ☐ **D** particles vibrate about fixed positions

(b) A student is asked to find the density of a metal key.

Figure 3 shows a metal key and some apparatus.

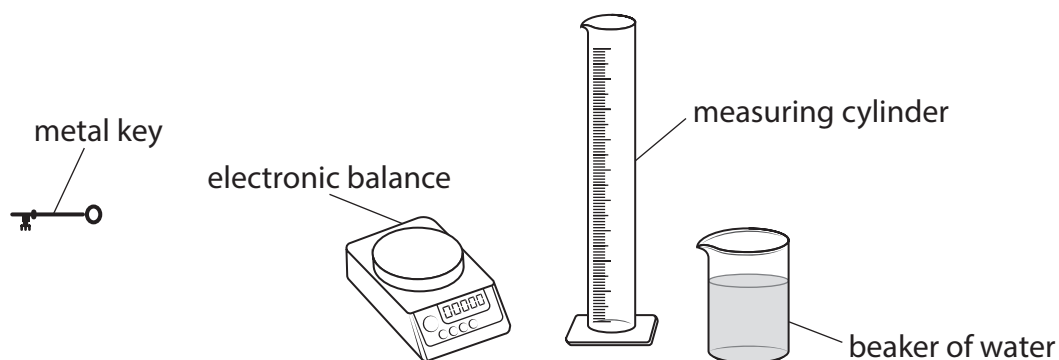


Figure 3

Using the apparatus shown in Figure 3, describe how the student can find the density of the metal key.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

(4)

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- (c) (i) A student heats an aluminium block, as shown in Figure 4.

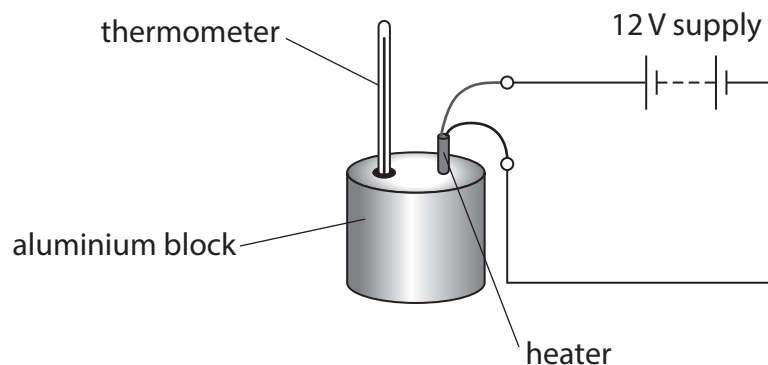


Figure 4

The aluminium block has a mass of 0.96 kg.

The specific heat capacity of aluminium is $920 \text{ J/kg}^\circ\text{C}$.

The temperature of the block increases from 18°C to 35°C .

Calculate the change in thermal energy of the aluminium block.

Use the equation

$$\text{change in thermal energy} = \text{mass} \times \text{specific heat capacity} \times \text{change in temperature}$$

(2)

change in thermal energy = J



- (ii) Suggest **one** way the student could reduce the energy loss from the aluminium block during the experiment.

(1)

- (iii) The thermometer does not show the maximum temperature reached by the aluminium block until some time after the heater is switched off.

Give **one** reason for this.

(1)

(Total for Question 2 = 9 marks)

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3 (a) Which of these is a magnetic material?

(1)

- ☐ **A** aluminium
- ☐ **B** plastic
- ☐ **C** steel
- ☐ **D** lead

(b) Figure 5 shows two magnetic poles facing each other.

There is a uniform magnetic field between the poles.

Draw field lines, on Figure 5, to show the uniform part of the magnetic field.
At least one line must have an arrow on it to indicate the direction of the magnetic field.

(2)

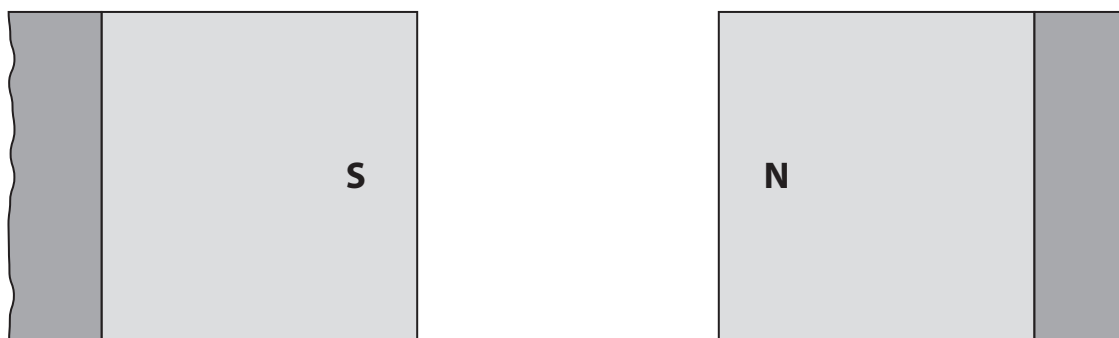


Figure 5

(c) Figure 6 shows the magnetic field around a bar magnet.

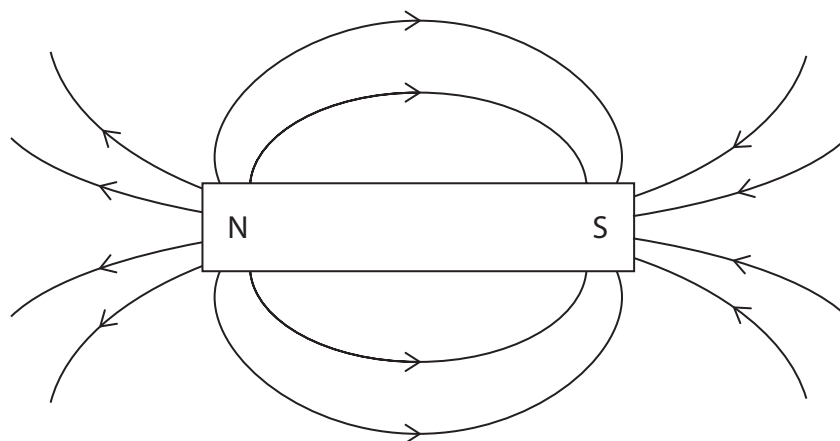


Figure 6

Iron filings are sprinkled onto the magnet.

- (i) On Figure 6, draw an X where most of the iron filings will stick.

(1)

- (ii) Explain why most of the iron filings will stick to the point you have labelled with an X.

(2)

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(d) One use of a magnet is in a plotting compass.

- (i) Explain how a plotting compass can be used to show that the Earth has a magnetic field.

(2)

- (ii) State the name of a device that uses a permanent magnet.

(1)

(Total for Question 3 = 9 marks)



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4 (a) Bending or stretching objects can cause distortions.

Which of these small distortions can be described as **inelastic**?

(1)

- ☐ A stretching a rubber band
- ☐ B squashing a piece of modelling clay
- ☐ C compressing a steel spring
- ☐ D bending a plastic ruler

(b) Figure 7 shows what happens when weights are added to the end of a wooden strip.

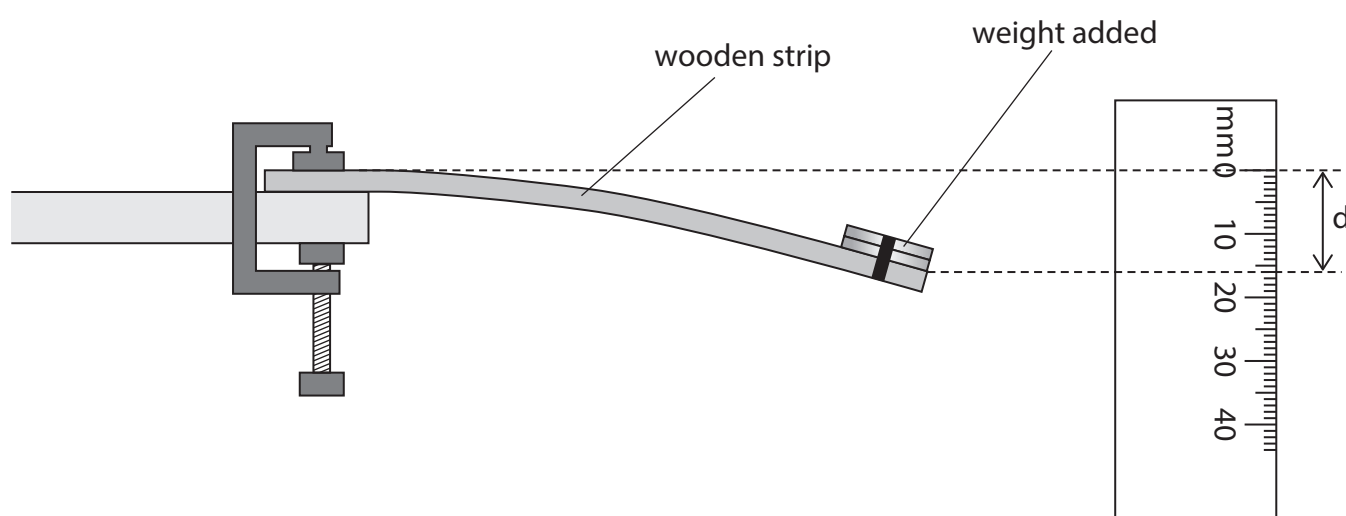


Figure 7

(Source: https://www.schoolphysics.co.uk/age16-19/Mechanics/Simple%20harmonic%20motion/text/Vibrating_cantilever/index.html)

The end of the strip of wood moves down by a distance, d , as shown in Figure 7.

- (i) Describe how a student could investigate how the distance, d , depends on the weight added to the wooden strip.

(4)

- (ii) A student conducts a second experiment with the same equipment where they decide to keep the size of the weight constant.

State another variable, other than the weights added, that would affect the distance, d .

(1)

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(c) (i) Figure 8 shows a spring stretched by some weights.

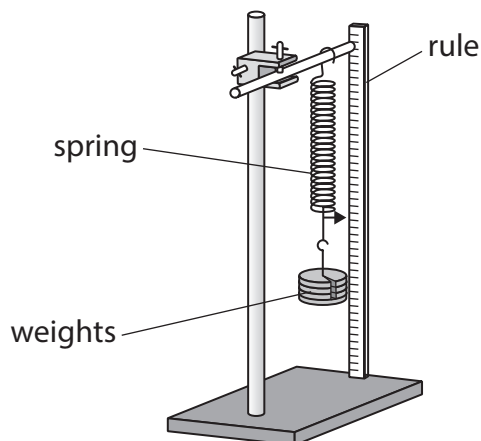


Figure 8

The extension of the spring is 6.2 cm when a weight of 2 N is added.

Calculate the spring constant, k , of the spring.

Use the equation

$$k = \frac{F}{x}$$

(2)

spring constant, $k =$ N/m

(ii) Work is done when a spring is stretched.

A different spring has a spring constant of 25 N/m.

The spring is stretched by 0.06 m.

Calculate the energy transferred by stretching the spring.

Use the equation

$$E = \frac{1}{2} \times k \times x^2$$

(2)

energy transferred = J

(Total for Question 4 = 10 marks)

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- 5 (a) A student places a trolley at the top of a runway, as shown in Figure 9.

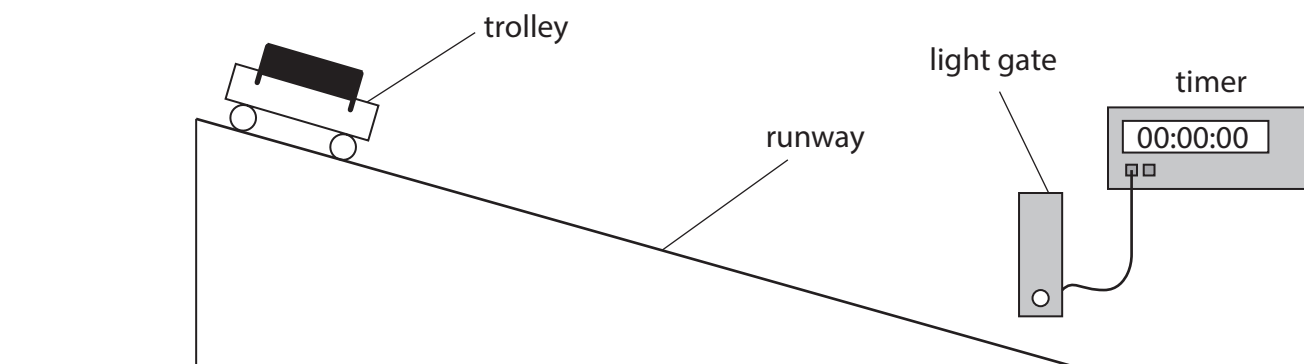


Figure 9

The student had to lift the trolley through a height of 26 cm to put it at the top of the runway.

The gravitational potential energy, ΔGPE , of the trolley increases by 4.1 J when lifted to the top of the runway.

The gravitational field strength, g , = 10 N/kg.

- (i) Show that the mass of the trolley is about 1.6 kg.

Use the equation

$$m = \frac{\Delta GPE}{g \times \Delta h}$$

(2)

- (ii) The student releases the trolley and the trolley moves down the runway.

The student assumes that all the extra gravitational potential energy, ΔGPE , stored at the top of the runway is transferred to kinetic energy at the end of the runway.

Calculate the expected value of the velocity of the trolley at the end of the runway.

Use the equation

$$v^2 = \frac{2 \times \Delta GPE}{m}$$

(3)

expected velocity = m/s

- (iii) The light gate, shown in Figure 9, is used to determine the actual velocity of the trolley at the end of the runway.

The actual velocity at the end of the runway is less than the expected velocity as calculated in part (ii).

Suggest **one** way to reduce the difference between the actual velocity and the expected velocity.

(1)

.....

.....

- (b) (i) A different student finds out how much power can be generated by running up some stairs in a measured amount of time.

The following quantities are measured:

mass of student = 48 kg

total height of stairs = 2.9 m

time to run up stairs = 3.4 s

Calculate the power the student generated.

Give the answer to 2 significant figures (2 s.f.).

Use the equation

$$\text{power} = \frac{\text{weight of student} \times \text{height of stairs}}{\text{time to run up stairs}} \quad (3)$$

power = W

- (ii) Explain how the total height of the stairs can be found using a 50 cm ruler. (2)

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(Total for Question 5 = 11 marks)



- 6 (a) State the frequency of the supply of electricity to homes in the UK (United Kingdom).

(1)

frequency = Hz

- (b) The mains supply to the television is 230V.

The current supplied to the television is 0.53 A.

Calculate the power input to the television.

Use the equation

$$P = I \times V$$

(2)

power = W

- (c) A plug connects a television to the mains supply.

- (i) The plug contains a fuse that is connected to the

(1)

- ☐ **A** live pin
- ☐ **B** negative pin
- ☐ **C** neutral pin
- ☐ **D** positive pin

(ii) A 3 A fuse is used in the plug.

Explain what happens if a fault causes the current to rise to more than 3 A.

(2)

(iii) A fuse is a safety device.

State **one** other safety device that can be used in domestic electrical wiring.

(1)

*(d) Figure 10 is a diagram showing a part of the National Grid, used to supply electrical power to homes.

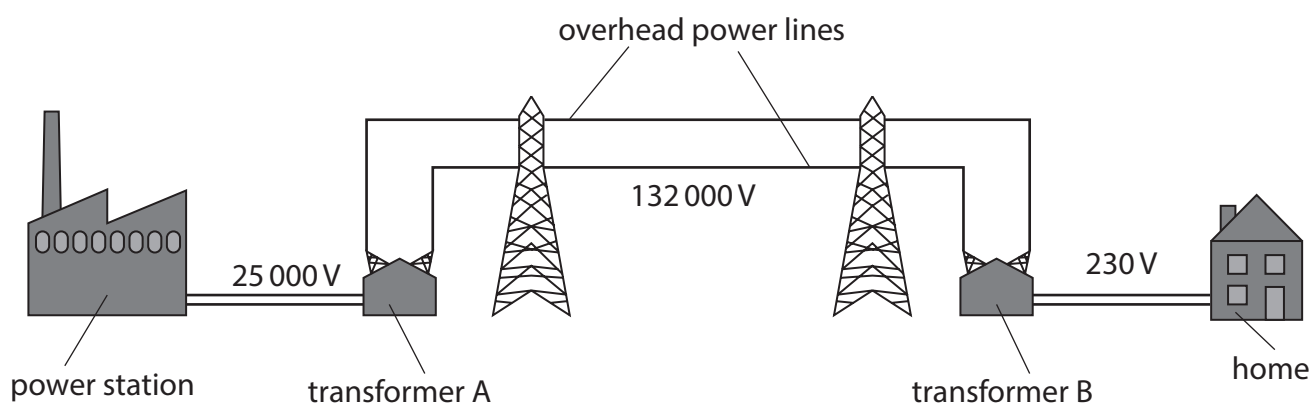


Figure 10

Using information from Figure 10, explain how electrical power is distributed from power stations to homes.

Your answer should refer to

- the role of the transformers
- the different voltages
- how energy losses are reduced

(6)

Answer lines for this question are on page 23.



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(Total for Question 6 = 13 marks)

TOTAL FOR PAPER = 60 MARKS



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Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Monday 16 June 2025

Paper
reference

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PAPER 6



Foundation Tier

Equation Booklet

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If you're taking **GCSE (9–1) Combined Science** or **GCSE (9–1) Physics**, you will need these equations:

HT = higher tier

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

	force exerted on a spring = spring constant $\times$ extension	$F = k \times x$
	(final velocity) ² – (initial velocity) ² = 2 $\times$ acceleration $\times$ distance	$v^2 - u^2 = 2 \times a \times x$
HT	force = change in momentum $\div$ time	$F = \frac{(mv - mu)}{t}$
	energy transferred = current $\times$ potential difference $\times$ 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 $\times$ current $\times$ length	$F = B \times I \times l$
	For transformers with 100% efficiency, potential difference across primary coil $\times$ current in primary coil = potential difference across secondary coil $\times$ current in secondary coil	$V_p \times I_p = V_s \times I_s$
	change in thermal energy = mass $\times$ specific heat capacity $\times$ change in temperature	$\Delta Q = m \times c \times \Delta\theta$
	thermal energy for a change of state = mass $\times$ specific latent heat	$Q = m \times L$
	energy transferred in stretching = 0.5 $\times$ spring constant $\times$ (extension) ²	$E = \frac{1}{2} \times k \times x^2$

If you're taking **GCSE (9–1) Physics**, you also need these extra equations:

	moment of a force = force $\times$ distance normal to the direction of the force	
	pressure = force normal to surface $\div$ area of surface	$P = \frac{F}{A}$
HT	$\frac{\text{potential difference across primary coil}}{\text{potential difference across secondary coil}} = \frac{\text{number of turns in primary coil}}{\text{number of turns in secondary coil}}$	$\frac{V_p}{V_s} = \frac{N_p}{N_s}$
	to calculate pressure or volume for gases of fixed mass at constant temperature	$P_1 \times V_1 = P_2 \times V_2$
HT	pressure due to a column of liquid = height of column $\times$ density of liquid $\times$ gravitational field strength	$P = h \times \rho \times g$

END OF EQUATION LIST

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