

Name \_\_\_\_\_

# Physics Summer Task

(Bridging the gap between GCSE and A Level Physics)

What do you consider to be your strengths in Physics?

What do you consider to be an area to improve in Physics?

This task will be your first assessment in Physics - so show us your potential!

**Symbols and Units** - At A level you will not be given the quantity in words on your data and formula sheet. You will need to learn the symbols and the units.

| Quantity                     | Symbol    | Unit              |
|------------------------------|-----------|-------------------|
| Current                      | I         | A                 |
| Potential difference         | V         | V                 |
| Resistance                   | R         | $\Omega$          |
| Charge                       | Q         | C                 |
| Energy                       | E         | J                 |
| Work                         | W         | J                 |
| Power                        | P         | W                 |
| Wavelength                   | $\lambda$ | m                 |
| Frequency                    | f         | Hz                |
| Distance                     | s         | m                 |
| Displacement                 | s         | m                 |
| Speed                        | v         | $\text{ms}^{-1}$  |
| Velocity                     | v         | $\text{ms}^{-1}$  |
| Time                         | t         | s                 |
| Force                        | F         | N                 |
| Mass                         | m         | kg                |
| Acceleration                 | a         | $\text{ms}^{-2}$  |
| Gravitational Field Strength | g         | $\text{Nkg}^{-1}$ |

### Prefixes

Prefixes are used in questions and on graphs and can catch you out.

| Multiple   | Prefix | Symbol |
|------------|--------|--------|
| $10^{12}$  | tera   | T      |
| $10^9$     | giga   | G      |
| $10^6$     | mega   | M      |
| $10^3$     | kilo   | k      |
| $10^{-2}$  | centi  | c      |
| $10^{-3}$  | milli  | m      |
| $10^{-6}$  | micro  | $\mu$  |
| $10^{-9}$  | nano   | n      |
| $10^{-12}$ | pico   | p      |
| $10^{-15}$ | femto  | f      |

You will notice that different 'index notation' is used at A-Level, i.e. m/s is now written as  $\text{ms}^{-1}$ ,  $\text{m/s}^2$  as  $\text{ms}^{-2}$  and N/kg as  $\text{Nkg}^{-1}$ .

When you write your answer you should write it with the correct units and to the correct number of significant figures. Put the answer to the least number of significant figures of the data in the question. If you are using a vector (a quantity which has both magnitude and direction) you will also need to add the direction in your answer.

Put some of this into practice.

1) a) Using the wave equation ( $v = f \times \lambda$ ) what is the speed of a wave with a frequency of 8.7 GHz and a wavelength of 33 mm?

b) Write your answer in standard form

c) Write your answer with a prefix

2) a. The wavelength of a microwave is  $2.8 \times 10^{-2}$  m.

i) What is this in cm?

ii) What is this in mm?

b. The wavelength of some red light is 625 nm, what is the frequency of the light?

3) Powers of Ten:  $10^n$  shows how many times the decimal place needs to move to the right

e.g.  $1 \times 10^3 = 10^3 = 1 \times 1000 = 1000$ .

$10^{-n}$  shows how many times the decimal place needs to move to the left

e.g.  $1 \times 10^{-3} = 10^{-3} = 1/1000 = 0.001$

Write out the following values in full:

a.  $3 \times 10^5$

b)  $22 \times 10^2$

c)  $0.4 \times 10^{-3}$

4) Standard form is a system where all numbers are expressed as a number between 1 and 10 multiplied by a power of ten.

Write the following numbers in standard form to 3 sf:

a. 3 155 368

b. 0.000 200 533

c. 1.033

Identifying and combining equations: At A-Level you will need to be able to select the correct equation from a number of different equations. You will also need to be able to combine equations - make sure that you brush up on your algebra.

5) Using the equation for kinetic energy and gravitational potential energy find the speed with which an object hits the floor, if the object is dropped from a height of 1.4 m above the floor.

Conditions for equations: All equations have conditions for which they can be used. You always need to bear these in mind when using them.

6) What assumptions did you make when you found the answer to question 5?

## Pythagoras and Trigonometry

Pythagoras ( $A^2 + B^2 = C^2$ ) and Trigonometry (SOHCAHTOA) are required in a number of different topics and you will be expected to use these confidently.

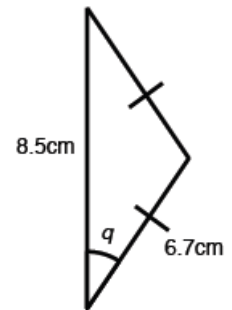
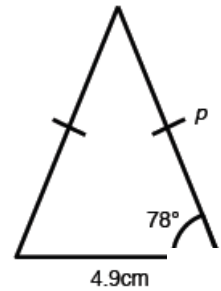
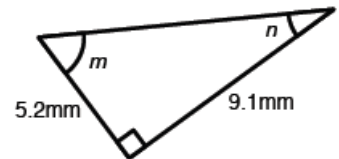
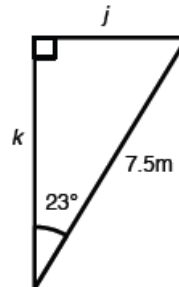
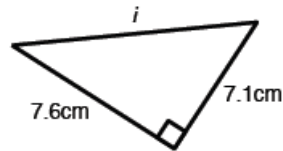
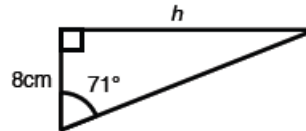
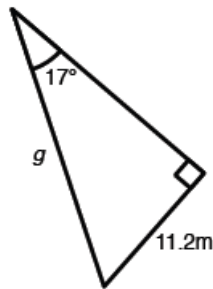
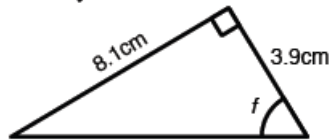
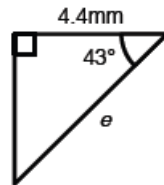
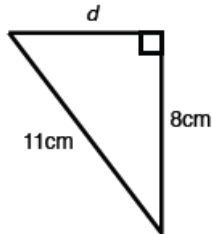
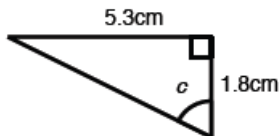
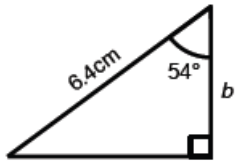
7) Ensure that you are confident using trigonometry and Pythagoras by finding and writing down the values of a-q below and **showing your calculations**:

### Working with Right-angled Triangles

For each triangle, find the side(s) and/or angle(s) marked with letters.

Give all your answers to 1 decimal place.

You may need to use Pythagoras, Trigonometry or any other appropriate method.



a

f

k

b

g

m

c

h

n

d

i

p

e

j

q

(You must show your calculations so that we can see your thought process on these questions)

Finally, if you want more practice with similar questions and concepts you may want to purchase 'Head Start to A-Level Physics' by CGP over the summer holiday.