# WJEC England Physics AS-level Section 1.1 - Basic Physics 

Flashcards

## What are SI units?

What are SI units?

## Fundamental (base) units of physical quantities.

## What is the SI unit of mass?

What is the SI unit of mass?

## Kg (kilogram)

What physical quantity is measured in mol?

What physical quantity is measured in mol?

## Amount of a substance.

## What is the SI unit of current?

What is the SI unit of current?

Amperes (A)

## Is the SI unit for temperature ${ }^{\circ} \mathrm{C}$ or K ?

## Is the SI unit for temperature ${ }^{\circ} \mathrm{C}$ or K ?

## K (kelvin) as this is the absolute scale.

## What is the SI unit of length?

## What is the SI unit of length?

## Metres (m)

What quantity is measured in seconds?

## What quantity is measured in seconds?

## Time.

(c) (i) $(5) \ominus$ $\mathrm{BY}_{\mathrm{BC}} \mathrm{ND}$

## Are Newtons ( N ) an SI unit?

## Are Newtons ( N ) an SI unit?

## No, Newtons are not fundamental. The

 SI units for force are $\mathrm{kg} \mathrm{m} \mathrm{s}^{-2}$ (Since force = mass $x$ acceleration).
## Derive the SI units of energy.

Derive the SI units of energy.

## Kinetic energy $=1 / 2 \times$ mass $\times$ velocity ${ }^{2}$ <br> $$
\begin{aligned} \text { Units }= & \mathrm{kg} \times(\mathrm{m} / \mathrm{s}) \times(\mathrm{m} / \mathrm{s}) \\ & =k g m^{2} \mathrm{~s}^{-2} \end{aligned}
$$

## Derive the SI units of force.

## Derive the SI units of force.

## Force $=$ mass $\times$ acceleration

$$
\begin{aligned}
\text { Units } & =k g \times \mathrm{m} \mathrm{~s}^{-2} \\
& =k g \mathrm{~ms}^{-2}
\end{aligned}
$$

## Express $60 \mathrm{~T} \Omega$ in standard form.

## Express 60T $\Omega$ in standard form.

## $6 \times 10^{13}$

## ( $T$ is tera and the multiplier is $10^{12}$ )

## Write 0.000003 m with a suitable prefix.

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$3 \mu \mathrm{~m}$
(c) (i) $(\underset{)}{ }=$ $\mathrm{BY}_{\mathrm{BC}} \mathrm{ND}$

## What is the actual value of $8 \mathrm{M} \Omega$ ?

## What is the actual value of $8 \mathrm{M} \Omega$ ?

## $8,000,000 \Omega$ or $8 \times 10^{6} \Omega$

## What is 6000 pF in nF ?

## What is 6000pF in nF ?

## $6 n F$, as 1 nano unit is 1000 pico units.

What multiplier is associated with the prefix kilo (k)?

What multiplier is associated with the prefix kilo(k)?

$$
\text { x } 1000\left(10^{3}\right)
$$

What multiplier is associated with the prefix femto (f)?

What multiplier is associated with the prefix femto (f)?

$$
10^{-15}
$$

## Express $7 \mathrm{G} \Omega$ in standard form.

## Express $7 \mathrm{G} \Omega$ in standard form.

$$
7 \times 10^{9} \Omega
$$

(c) (i) $(\leqslant)$ $\mathrm{BY}_{\mathrm{BC}} \mathrm{ND}$

What is 1 eV in J ?

## What is 1 eV in J ?

$$
1 \mathrm{eV}=1.6 \times 10^{-19} \mathrm{~J}
$$

## Express 6 kWh in joules.

## Express 6 kWh in joules.

## $6 \mathrm{~kW}=6000 \mathrm{~J} / \mathrm{s} \quad 1$ hour $=3600 \mathrm{~s}$ $6 \mathrm{kWh}=6000 \times 3600$ <br> $$
=21.6 \times 10^{6} \mathrm{~J}
$$ <br> $$
=21.6 \mathrm{MJ}
$$

## Convert 6.6 pJ to eV.

## Convert 6.6 pJ to eV .

## $6.6 \mathrm{pJ}=6.6 \times 10^{-12} \mathrm{~J}$ <br> Divide by $1.6 \times 10^{-19}$

$$
\begin{aligned}
6.6 \mathrm{pJ}= & 4.1 \times 10^{7} \mathrm{eV} \text { (2s.f.) } \\
= & 41 \mathrm{MeV}
\end{aligned}
$$

## What is meant by a scalar quantity?

## What is meant by a scalar quantity?

## A quantity that only has a magnitude.

## What is a vector quantity?

## What is a vector quantity?

## A quantity that has magnitude as well as direction.

## Is acceleration a vector or scalar quantity?

## Is acceleration a vector or scalar quantity?

## Vector.

Is mass a scalar or vector quantity?

## Is mass a scalar or vector quantity?

## Scalar.

Draw the vector addition of the following:


Draw the vector addition of the following:


## Draw the vector subtraction of the following:



Draw the vector subtraction of the following: a


Draw how you would resolve this vector into horizontal and vertical components:

Draw how you would resolve the vector into horizontal and vertical components


## What equation is used to calculate density?

What equation is used to calculate density?

$$
\rho=m / V
$$

## Density = Mass $/$ Volume

## Density units: $\mathrm{kg} \mathrm{m}^{-3}$

## Mass units: kg

Volume units: $\mathrm{m}^{3}$

## What is a moment?

cc) (i) $(\ominus$ $\mathrm{BY}_{\mathrm{BC}} \mathrm{ND}$

## What is a moment?

## A turning force.

## Force $\times$ perpendicular distance from the point to the line of action of the force

# If an object is in equilibrium, the sum of the anticlockwise moments would be... 

If an object is in equilibrium, the sum of the anticlockwise moments would be...

## Equal to the sum of the clockwise moments (principle of moments).

## If an object is in equilibrium it means the object is ...

If an object is in equilibrium it means the object is ...

## Not accelerating. It is either:

- Stationary.
- Moving at a constant velocity.


## How can the forces acting on a object be shown to be in equilibrium?

How can the forces acting on a object be shown to be in equilibrium?

- Adding the horizontal and vertical components of the forces acting on it and showing they equal zero.
- Or if there are 3 forces acting on the object you can draw a scale diagram - if the scale diagram forms a closed triangle, then the object is in equilibrium.


## What is meant by a couple?

## What is meant by a couple?

A pair of equal and opposite coplanar forces that have equal magnitude and opposite direction, applied to a body parallel to each other but not along the same line. For example:


What is meant by the centre of gravity?

## What is meant by the centre of gravity?

## The point through which all the weight of

 an object acts. For a uniform object, the centre of gravity is the geometric centre of the object.