

Edexcel Physics A-Level

Topic 1 - Working as a Physicist

Flashcards

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What is the difference between a base unit and a derived unit?



What is the difference between a base unit and a derived unit?

A base unit is one of seven fundamental units. A derived unit is derived by the multiplication or division of units.

A unit is a measure of quantity, such as distance, mass and time.



What is the order of the scale units?



What is the order of the scale units?

Femto [10^{-15}] → Pico [10^{-12}] → Nano
[10^{-9}] → Micro [10^{-6}] → Milli [10^{-3}] →
Centi [10^{-2}] → Deci [10^{-1}] → Kilo [10^3] →
Mega [10^6] → Giga [10^9] → Tera [10^{12}]



What is the difference between independent and dependent variables?



What is the difference between independent and dependent variables?

- Independent variables are what you change in an investigation. Dependent variables are what is observed or measured.
- Independent variables are normally the cause of the effect on the dependent variables.



What is the difference between precision and accuracy?



What is the difference between precision and accuracy?

Precision is determined by the consistency of results; a measurement is precise if the values 'cluster' closely together. It is influenced by random errors.

Accuracy is determined by how close the measurement is to the true value; a measurement is accurate if it is close to the true value. It is influenced by random and systematic errors.



What is the difference between error and uncertainty?



What is the difference between error and uncertainty?

Error is the difference between the measurement and the true value.

Uncertainty is the interval within which the true value can be considered to lie with a given level of probability. It is determined by apparatus and variables.



How do you work out percentage uncertainty?



How do you work out percentage uncertainty?

Percentage uncertainty =

(uncertainty of measurement/measurement taken)

x100



How do you work out a mean value?



How do you work out a mean value?

$$\text{Mean} = \frac{\text{Sum of results}}{\text{Number of collected results (frequency)}}$$

(anomalies shouldn't be included, to avoid inaccurate and imprecise data)



How can you tell if a value is an anomaly? How can you confirm it further?



How can you tell if a value is an anomaly? How can you confirm it further?

A value may look like an anomaly if it does not follow the pattern of results.

- **ERROR BARS** - from working out the percentage uncertainty, error bars can be drawn onto a scatter graph with the results. If the line of best fit does not go through the error bars of the result, it can be confirmed as anomalous.



What happens to the absolute
uncertainty when you
Add/Subtract/Multiply by a
Constant/Raise to a Power sets of data?



What happens to the absolute uncertainty when you Add/Subtract/Multiply by a Constant/Raise to a Power sets of data?

ADD AND SUBTRACT: you add the absolute uncertainties together

MULTIPLY: you multiply the absolute uncertainty by the constant

RAISE: you raise the absolute uncertainty to the same power



What happens to the % uncertainty when you **ADD/SUBTRACT/MULTIPLY BY A CONSTANT/RAISE TO A POWER** sets of data?



What happens to the % uncertainty when you
**ADD/SUBTRACT/MULTIPLY BY A CONSTANT/RAISE TO A
POWER** sets of data?

ADD AND SUBTRACT: add together

MULTIPLY: doesn't change

RAISE TO A POWER: multiply by the index



What is the difference between repeatable and reproducible?



What is the difference between repeatable and reproducible?

Measurements are repeatable when similar results are obtained from by students from the same group using the same method.

Measurements are reproducible when similar results are obtained by students from different groups using different methods or apparatus.



How can the validity of results be improved?



How can the validity of results be improved?

- Control more variables
- Use more precise measuring equipment
- Obtain more results to reduce uncertainty



What is the difference between random
and systematic error?



What is the difference between random and systematic error?

Random errors are caused by unpredictable changes in the investigation, often caused by the environment or irregular changes. This usually affects the precision.

Systematic errors are continuous errors throughout the investigation, and are usually caused by limitations in equipment e.g. zero error. This usually affects the accuracy.

