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Error.
The uncertainity in measurements is called error.

Accuracy.
The accuracy of a measurement is a measure of how close the measured value is to the true value of the quantity.

Precision.
Precision tells us to what resolution or limit the quantity is measured.

Systematic Error.
The errors whose causes are known are called Systematic error.

a) Instrumental error
The errors that arise from the measuring instrument, is called Instrumental error.

b) Imperfection in experimental technique or procedure.
The external or internal causes which may effect the results of measurement are ~~called known~~ categoried in this cause.

c) Personal errors.
Errors that arise due to an individual's bias, lack of proper observations or without proper precautions, are called Personal errors.

Random Errors.
The errors which occur irregularly and hence are random with respect to sign and size. In other words, errors whose causes are not known are called Random errors.

- Absolute Error, Relative error, Percentage error.
Suppose the values obtained in several measurements

are $a_1, a_2, a_3 \ldots\ldots a_n$.

$\therefore a_{mean} = (a_1 + a_2 + a_3 \ldots\ldots, a_n)/n$

$\Rightarrow a_{mean} = \sum_{i=1}^{n} a_i / n.$

i) The magnitude of difference between the individual measurement and the true value of the quantity is called the absolute error of the measurement.

i.e.,

$\Delta a_1 = a_1 - a_{mean}$

$\Delta a_2 = a_2 - a_{mean},$

... ...

....

$\Delta a_n = a_n - a_{mean}.$

ii) The relative error is the ~~absolute error~~ ratio of the mean absolute error Δa_{mean} to the mean value of a_{mean} of the quantity measured,

i.e.,

Relative error = $\Delta a_{mean} / a_{mean}$

iii) When the relative error is expressed in percentage, it is referred as the percentage error. (δa)

i.e.,

$\delta a = (\Delta a_{mean} / a_{mean}) \times 100\%.$