Precision:

- Precision is the degree to which the observed values are least scattered. It means how close the different measurement are.

- It is the measurement in which there is repetition of data.

- It depends upon least count of the measuring equipment.

Note: During Experimental work, we desire a precise set of data.

Uncertainty in measurement:

- Measuring instruments have certain limitations. Due to their limitations, physical measurement possesses some error. Measurement runs several possible counts after the decimal place. Thus, the last digit of the measurement still carries some error, which is called the uncertainty in measurement.

- It is important not to confuse the terms 'error' and 'uncertainty'.

  ✓ _Error_ is the difference between the measured value and the 'true value' of the thing being measured.

  ✓ _Uncertainty_ is a quantification of the doubt about the measurement result.

Significant Figure (Level of Accuracy):

✓ The numbers of digits in a measurement about which we are reasonably sure are called significant figures.

✓ Larger the number of significant figure obtained in a measurement, greater is the accuracy of the measurement.

✓ It helps us to know about the extent of uncertainty in the measurement.

✓ The number of significant digits depends on the least count of the instrument use. However, it does not depend on the system of units used.

Rules to determine significant figures:
1. **Non-zero digits** are always significant.
2. Leading zeros are always insignificant.
   Leading zeros: Zeros in that come before the first non zero digits.
$$0.004 \rightarrow 1\ SF.$$
$$02 \rightarrow 1\ SF.$$
3. Any zeros between two significant digits are significant.
   Trapped zeros: Zeros appearing between two non-zero digits.
$$4003 \rightarrow 4\ SF.$$
$$1.002 \rightarrow 4SF.$$
4. A final zero or trailing zeros in the decimal portion **ONLY** are significant (insignificant in whole number)