**Error Analysis**

Error – the difference in the true value and the measured value of a quantity of a quantity is called error of measurement.

**Types of error**

1. **Systematic error** – Error which tend to be in one direction, either +ve or -ve
2. Instrumental Error – Error due to imperfect design or manufacture or calibration of the instrument.

Example: Zero-error

Correction: By selecting better instruments

1. Personal or Observational Error –Error due to personal peculiarities of the experimenter

Example: Parallax error

Correction: Removing personal bias as far as possible

1. Error due to external causes – Errors caused due to external factors like tem. , pressure etc.

Example: Expansion of a scale due to increase in tem.

Correction: By applying suitable correction

1. Imperfection in experimental techniques – Error cannot be eliminated even though the nature of error is known

Example: Effect on weighing due to buoyancy, Loss of heat due to radiation in calorimetry, thermometer under armpit will always give tem. lower than actual body tem.

1. **Random Error (Chance Error)**
2. those errors which occur irregularly
3. they are random w.r.t sign and size i.e. sometimes +ve , sometimes –ve, sometimes big, sometimes small
4. They may arise due to random and unpredictable fluctuations in experimental conditions (like tem. pressure etc.)or personal error by observer taking observation

Correction: By repeating the observation a large number of times and taking the arithmetic mean of all the observations.

1. **Least count error**: It is the error associated with the resolution of the instrument

Correction: By using instruments of higher precision and by improving experimental techniques