ERRORS

Departure of measured value from its true value is termed as Errors.

Errors are of two types:

• **Determinate Error** – The source of the error is known.

The magnitude of the error can be determined or approximated and the measurement can be corrected or eliminated

 Indeterminate Errors - Also called as Accidental Errors. They do not have a definite source. These errors cannot be determined easily. They do not have a definite value.

Error arises in a measurement due to causes over which the analyst has no control.

Determinate Errors are further divided into

INSTRUMENTAL ERRORS

They are caused by the imperfections in the measuring devices (faulty instruments).

Examples:

- Faulty balance and weights
- Poorly calibrated glasswares and instruments

METHODIC ERRORS

These are errors inherent to the method selected for analysis and are most serious type since they are likely to remain undetected.

Examples:

- Solubility of precipitate in the solution in which it is precipitated and in the wash liquid.
- Decomposition or volatilization of precipitates on ignition or heating.
- Occurance of side reactions which interferes the main process.
- Failure of a reaction to proceed to quantitative completion.

OPERATIONAL ERRORS

These errors occurs largely due to improper techniques and carelessness of the analyst.

Examples:

• Errors in reading a burette.

- Mechanical loss of material in various steps of an analysis.
- Failure to wash and ignite a precipitate properly.
- Insufficient cooling of crucible before weighing.

PERSONAL ERRORS

These errors occurs largely due to physical limitations, prejudices and bias of the analyst.

Examples:

- Unable to distinguish between shades of color, resulting in over-titrating or under titrating a solution.
- Analyst has a natural tendency to estimate scale readings in a direction that improves the precision in a set of result.

Errors can be classified depending on their effect on the result of the final analysis as:

CONSTANT ERROR

The absolute error associated with the measurement always remains constant but the relative error changes and is inversely related to the sample size.

PROPORTIONATE ERROR

Errors in which absolute error increases in direct proportion to sample size, but the relative error remains constant.