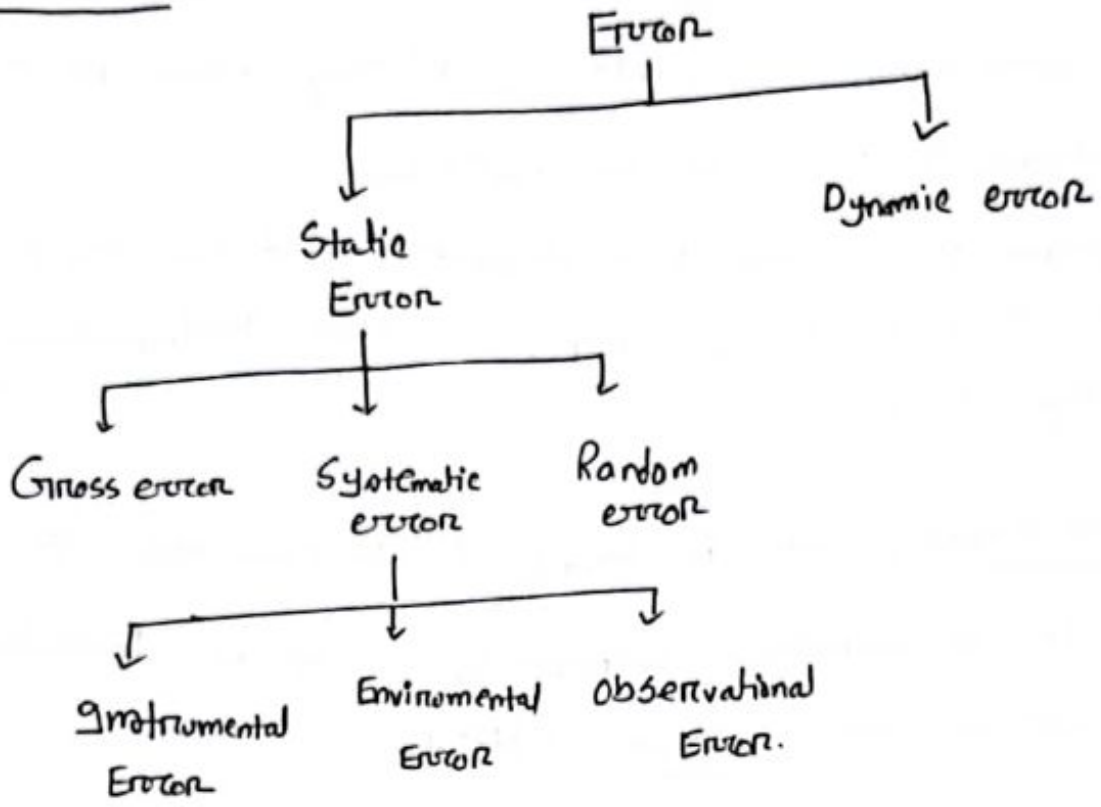
Error

Error:- It is the difference between measured value and true/ Actual value.

Types of errors:-



Static error:- Static error is the difference between measured value and its actual value/true value. Here, for a particular reading true value are not change with respect to time, means true value is fixed but measured value is changed.

$$E_s = V_m - V_t$$

$E_s \rightarrow$ Static error

$V_m \rightarrow$ measured value

$V_t \rightarrow$ true "

It can be both +ve, -ve

Dynamic errors: In Dynamic errors, true value is changed with respect to time.

It is also called measurement error.

Gross errors: It occurs due to human mistakes and errors in using measuring instruments or taking wrong readings or mistaken in recording observation.

These can not be completely eliminated. But we can try to minimise them by taking proper care while taking reading or recording observations.

Systematic errors: It is occurs due to the lack of quality in measuring instruments such as defective equipments or wear & tear effects.

Random errors: These errors occur due to unknown causes and reasons which are very difficult to determine.

Instrumental errors: Occur due to design and constructional features or the mechanical structure of the instruments

Environmental Errors: occur due to environmental effects such as temperature, pressure, humidity etc.

Observational Errors: It is occur due to errors in observation.

Difference between Accuracy & Precision:

Accuracy	Precision
1) closeness of measurement to the true value. True value = 25 mm; measured value = 25.01 mm	1) Repeatability of measurement. True value = 25 mm; measured value = 25.5 mm, 25.49 mm, 25.51 mm, 25.52 mm.
2) Accurate value have to be precise in most case.	2) Precise value may or may not be accurate.
3) It is affected with systematic errors.	3) It is affected with random errors.
4) It can be determined by single measurement.	4) To determine precision, several measurement are required.
5) Accuracy can be improved.	5) It is not improved.

Sources of Errors:

1) Lack of knowledge about measurement process.
2) Operational Errors.
3) Poor design and Construction.
4) Lack of proper maintenance.
5) Change in Process Parameters and environmental Conditions.