Accuracy and trueness.

→ Trueness

· closeness of aggreement b/w average value obtained from large series of measurement results and True value.

Bias = True value − Obtained.

↓

· Not known

· Acceptable ref. value is used ~~to~~ instead.

Qualitative concept

Quantitative measures

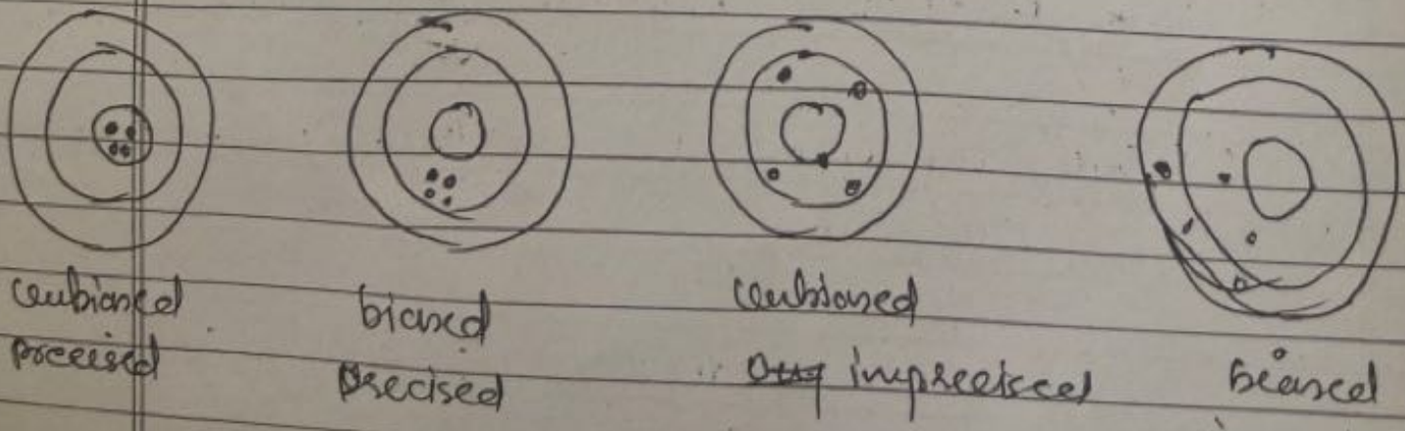
Trueness → Systemic error ← Bias

↓ ↓ ↓

Accuracy → Total error ← Uncertainity measurement

↑ ↑

precision → Random error ← SD



unbiased precised

biased precised

unbiased ~~Org~~ impreecised

biased impreecised.

→ Accuracy:

Closeness of agreement b/w single measurement and true value.

↓

- quantified by measurement uncertainty
- Influence by both bias and imprecision

↓

thus reflect total error.

⇒ **Precision:-**

closeness of ~~agreement~~ agreement b/w independent results of measurement ~~and true value~~

↓

quantified by standard dev. (SD)

↓

It Related to random error.

→ Precision can be specified as

↙ ↘

Repeatability → Reproducibility

↓ ↓

Clos. of Agr. b/w successive measurement carried out in same conditions

↓

Within run precision

under changed condition.

↙ ↘

Intermediate precision (b/w runs)

Inter-lab. prec

↓

observed

- Imprecision quantified as

SD (CV)

Total SD (CV_T) is devided in to within run and btw run components

$$CV_T^2 = \sigma^2_{\text{within run}} + \sigma^2_{\text{between run}}$$

→ To estimate total imprecision

↓

measure duplicate control samples in series of run.

ex:- wgt control

↓

measured in duplicate x 1 month

↓

Both within run and btw run precision is measured.

↓

Advantage of this approch is that within run estimate is based on several runs,

↓

so an average estimate is obtained rather than only 1 estimate for 1 particular run.

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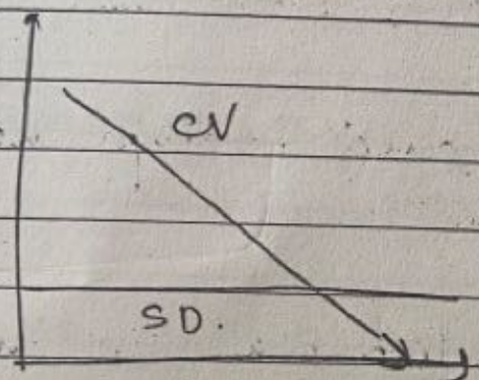
* Precision profile:-

Def: Presentation of precision as a function of analyte concentration is plotted in terms of SD and CV.

Examples:- x = Analyte concentration
y = SD or CV.

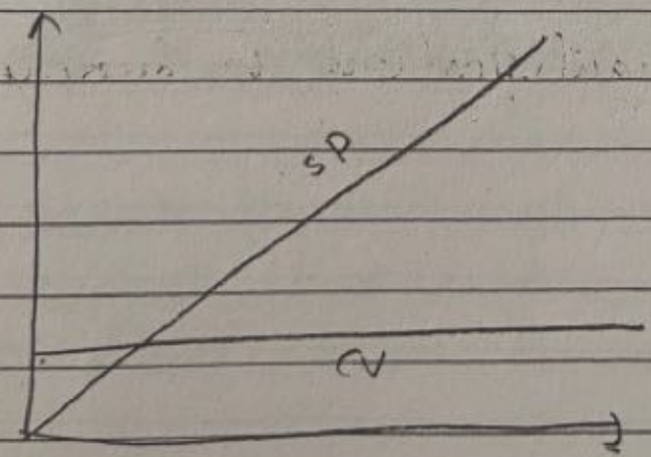
①



- SD is constant for analytical range.
- CV → inverse ē concentration

ex → Analyte ē limited range of values → S. Electrolytes

②



CV = constant
SD → ↑es ē analyte concentration

ex → Analyte ē extended range → Alt.

→ error arise bez of impreeise volume dispensing
ex →

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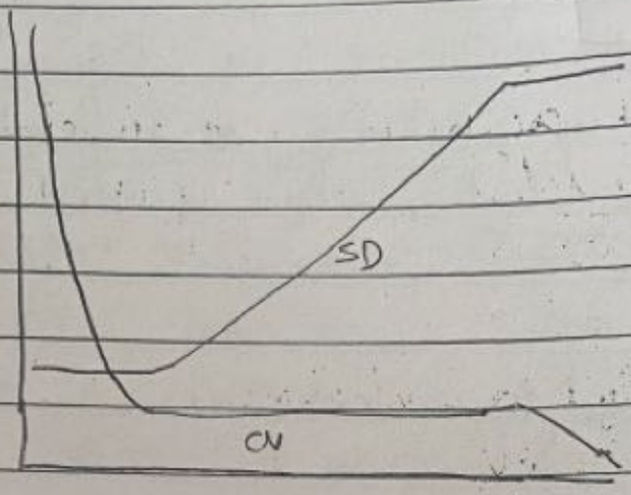
③



SD → constant in lower range
→ increase in intermediate range
↳ constant in higher range

CV → inversely proportional to concentration in lower range
→ become constant and perhaps may decline at Thg conc.

→ Precision profile (relationship b/w SD and analyte conc) is of importance

↓

① when method specification over analytical measurement range is considered.

② limit of quantification is determined.