

University of Babylon / College of Pharmacy

Department of Pharmaceutical Chemistry/Analytical Chemistry

Lecture number - 9

Wednesday – 21/12/2016

Errors and treatment of Analytical data

Errors and Sources of Errors:

2-Random Errors : -

-The nature of Random Errors

Random, or indeterminate, errors can never be totally eliminated and are often the major source of uncertainty in a determination.

Random errors are caused by the many uncontrollable variables that accompany every measurement.

Usually, most contributors to random error cannot be positively identified.

Even if we can identify random error sources, it is often impossible to measure them because most are so small that they cannot be detected individually.

The accumulated effect of the individual uncertainties, however, causes replicate results to fluctuate randomly around the mean of the set. For example, the scatter of data

Precision – Accuracy

Precision: - is the closeness of data to other data that have been obtained in exactly the same way.

Accuracy:-accuracy is the closeness of a result to its true or accepted value.

Average or Mean : - The sample mean is defined as the sum of the measurement values divided by the number of measurements.

Example : mean = $x = \frac{19.4 + 19.5 + 19.6}{3} = 19.5$

ABSOLUTE Error: The absolute error (E) in the measurement of a quantity X is given by the equation $E = X_i - X_t$

Where X_t is the true or accepted value of the quantity.

RELATIVE ERROR : (E_r) is a more useful quantity than the absolute error.

The percent relative error is given by the expression $E_r = \frac{X_i - X_t}{X_i} \times 100\%$

$$E_r = \frac{19.8 - 20.0}{20.0} \times 100 = -1\%$$

B- Mode

C- Range

D- Median

Example.....

Thank you