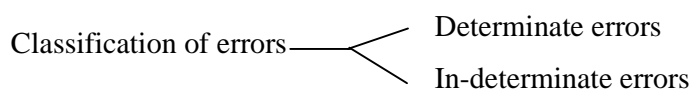


Q. 1. Write a note on errors in Analysis. Classify them.

Ans. The basis of analytical chemistry is reliability, reproducibility and accuracy. Though the measurements made are systematically and carefully but there is some degree of uncertainty or error. Error refers to Numerical difference between a measured value and true value.

True Value:- True value of any quantity is that value which we never know but uncertainty in this value is less than uncertainty in something else which is being compared.

% composition of a standard sample is certified by National Institute of Standard and Techniques (NIST earlier and Now NB National Bureau of standard). Difference between the standard value of Result by new method is error.



1. **Determinate Errors: or constant errors**

These are the errors which can be avoided or whose magnitude can be determined. These are further sub-classified into:

(a) **Operational and personal errors:** These errors are due to factors for which an individual analyst is responsible. These are not connected with method or any procedure. These are physical in nature and occur when sound analytical techniques are not followed.

Eg. Mechanical loss of materials in various steps of analysis:- under-washing/over washing of ppts.; ignition of ppts at incorrect temperatures. Allowing hygroscopic materials to absorb moisture; some persons are unable to judge the colour change sharply at end point etc.

(b) **Instrumental and Reagent error:** These arise from faulty construction of balances, use of uncalibrated or improperly calibrated weights, Graduated glassware's, other instruments; attack of reagent on glassware's/ porcelain etc. results in introduction of foreign matter.

(c) **Errors of Method:** These arise from incorrect sampling and from incompleteness of reaction. In titrimetric analysis there may be failure of reaction to proceed to completion, occurrence of side reaction, reaction of substances other than the constituent being determined.

(d) **Additive and proportional errors:**

Eg. Additive errors are loss of weight of a crucible in which ppt is ignited and errors in weighing. By taking samples of different weights error can be revealed. They may arise from an impurity in a standard substance which lead to an incorrect value for normality of standard solution.

2. **Intermediate or accidental errors:**

These errors have slight variations that occur in successive measurements. These are made by same observer due to cause over which analyst has no control Eg. If a sufficiently large no. of observations are to be taken then the errors lie on a curve of the form

small errors occur more frequently than larger ones. Large errors occur relatively infrequently. These are treated by statistics.