Pharmaceutical analysis- BP102T

UNIT: 1 **(Pharmaceutical analysis, its definition and scope, methods expressing techniques)**

CLASS:1

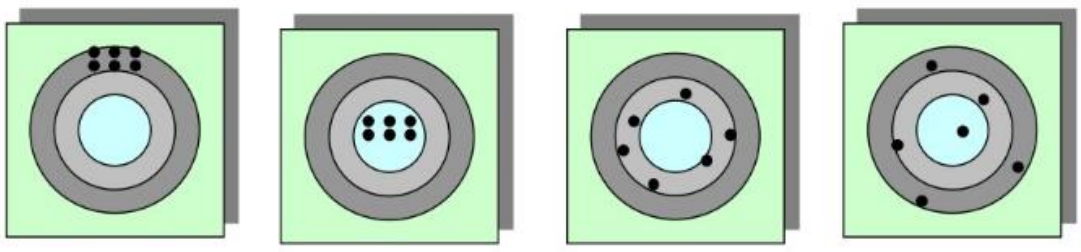
TOPIC: Accuracy, Precision, Significant Figures:

Accuracy:

closeness to the true value; closeness with which an instrument reading approaches the true or accepted value of the variable (quantity) being measured. It is considered to be an indicator of the total error in the measurement without looking into the sources of errors.

Accuracy refers to the degree of closeness or conformity to the true value at the quantity under measurement. Precision refers to the degree of agreement within a group of measurements or instruments

The target-shooting example shown in the figure illustrates the difference. The high accuracy, poor precision situation occurs when the person hits all the bullets on a target plate on the outer circle and misses the bull's eye. In the second case, all bullets hit the bull's eye and spaced closely enough leading to high accuracy and high precision. The bullet hits are placed symmetrically with respect to the bull's eye in the third case but spaced apart yielding average accuracy but poor precision. In the last example, the bullets hit in a random manner, hence poor accuracy and poor precision.



Poor accuracy
High precision

High accuracy
High precision

Average accuracy
Poor precision

Poor accuracy
Poor precision

Precision:

a measure of the reproducibility of the measurements; given a fixed value of a variable, precision is a measure of the degree to which successive measurements differ from one another i.e., a measure of reproducibility or agreement with each other for multiple trials.

Significant Figures:

numbers that describe the value without exaggerating the degree to which it is known to be accurate. Chemists report as significant all numbers known with absolute certainty, plus one more digit that is understood to contain some uncertainty. The uncertainty in the final digit is usually assumed to be ±1, unless otherwise stated.

The following rules have been developed for counting the number of significant figures in a measurement or calculation:

1. Any nonzero digit is significant.

2. Any zeros between nonzero digits are significant. The number 2005, for example, has four significant figures.

3. Any zeros used as a placeholder preceding the first nonzero digit are not significant. So 0.05 has one significant figure because the zeros are used to indicate the placement of the digit 5. In contrast, 0.050 has two significant figures because the last two digits correspond to the number 50; the last zero is not a placeholder. As an additional example, 5.0 has two significant figures because the zero is used not to place the 5 but to indicate 5.0.

4. When a number does not contain a decimal point, zeros added after a nonzero number may or may not be significant. An example is the number 100, which may be interpreted as having one, two, or three significant figures. (Note: treat all trailing zeros in exercises and problems in this text as significant unless you are specifically told otherwise.)

5. Integers obtained either by counting objects or from definitions are exact numbers, which are considered to have infinitely many significant figures. If we have counted four objects, for example,

the number 4 has an infinite number of significant figures (i.e., it represents 4.000…). Similarly, 1 foot (ft) is defined to contain 12 inches (in), so the number 12 in the following equation has infinitely many significant figures

Very Short answer questions:

1.Define Accuracy and precision.

2.What is precision and its types

Short answer questions:

1.Define Significant digits and explain its properties