1. Define scientific notation.

A number written in scientific notation written as:

$$a \times 10^n, where\ 1 \le a < 10\ and\ n \in Z$$

Here a is called the coefficient or base number.

Note:

- If the number is **greater than 1**, then **n is positive**.
- If the number is **less than 1**, then **n is negative**.

2. What is the logarithm of a real number?

The logarithm of a real number tells us how many times one number must be multiplied by itself to get another number.

The general form of a logarithm is: $\log_b x = y$. Where

- b is the base,
- x is the result or the number whose logarithm is being taken, and
- y is the exponent or the logarithm of x to the base b.

This means that $b^y = x$.

OR

The logarithm of x to the base b is y, means that when b is raised to the power y, it equals x. The relationship between logarithmic form and exponential form is given below:

$$\log_b x = y \Leftrightarrow b^y = x \qquad where\ b > 0, x > 0\ and\ b \ne 1$$

3. Define common logarithm or Brigg's logarithm.

If the base of logarithm is taken as 10 then logarithm is called common logarithm or Brigg's logarithm. It is written as $\log_{10}$ or simply as log   (when no base is mentioned, it is usually assumed to be base 10).

4. Define Natural logarithm.

Logarithm having base e is called Napier logarithm or Natural logarithm.

$$ln\ (0) = undefined$$
$$ln\ (1) = 0$$
$$ln\ (e) = 1$$

5. Differentiate between characteristic and mantissa.

The integral part of the logarithm of any number is called the **characteristic** and the decimal part of the logarithm of a number is called the **mantissa** and is always positive.

For example, if $\log 278.23 = 2.4443$ then characteristic is 2 and mantissa is 0.4443

6. Define antilog.

The number whose logarithm is given is called antilogarithm. $i.e.$ if $\log y = x$, then y is the antilogarithm of x, or $y = Anti\ \log x$

In other words, **antilog is the inverse of a logarithm**.

7. What is the difference between Common and Natural Logarithms?

Common Logarithm	Natural Logarithm
The base of a common logarithm is **10**.	The base of a natural logarithm is e.
It is written as $\log_{10}(x)$ or simply $\log(x)$ when no base is specified.	It is written as $\ln(x)$.
Common logarithms are widely used in everyday calculations, especially in scientific and engineering applications.	Natural logarithms are commonly used in higher-level mathematics, particularly calculus and applications involving growth/decay processes.