

Units, Dimensions, and Measurements Formulae for NEET & JEE

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Formula / Topic Name	Formula(e) & Expressions	Conditions & Usage Notes
1. Dimensional Analysis		
Fundamental Quantities	Mass [M], Length [L], Time [T], Current [A], Temp [K], Amount of Substance [mol], Luminous Intensity [cd]	Base dimensions from which all others are derived.
Order of Magnitude	Express number as $N = a \times 10^b$ If $a \leq \sqrt{10} (\approx 3.16)$, Order = b If $a > \sqrt{10}$, Order = $b + 1$	Used to estimate the size of a quantity. Example: $4 \times 10^5 \rightarrow$ Since $4 > 3.16$, Order is 10^6 .
2. Significant Figures		
Counting Rules	1. All non-zero digits are significant. 2. Zeros between non-zeros are significant. 3. Leading zeros are never significant. 4. Trailing zeros with a decimal point are significant.	0.007 (1 SF) 2.05 (3 SF) 2.500 (4 SF) 1200 (Ambiguous, assume 2 unless specified).
Rounding Off	- Digit > 5 : Round up - Digit < 5 : No change	Example ($= 5$): 2.45 \rightarrow 2.4 (4 is even)

- Digit = 5: Round to nearest **even** number.

2.35 → 2.4 (round up to even)

Arithmetic Operations

Add/Sub: Result has same **decimal places** as the least precise term.

Add: $12.11 + 18.0 = 30.1$ (1 dec. place)

Mul/Div: Result has same **sig figs** as the least precise term.

Mul: $2.5 \times 1.25 = 3.1$ (2 SF)

3. Vernier Caliper

Least Count (L.C.)

$$L.C. = 1MSD - 1VSD$$

Where N is total divisions on Vernier scale.

$$\text{Standard: } L.C. = \frac{1MSD}{N}$$

Common L.C. = 0.1 mm or 0.01 cm.

Reading

$$\text{Reading} = MSR + (VSR \times L.C.)$$

MSR : Main Scale Reading immediately left of zero.

VSR : Coinciding Vernier division.

Zero Error

$$\text{True Reading} = \text{Observed} - \text{Zero Error}$$

Negative Error Calculation:

Positive: Zero of VS is right of MS zero.

$$\text{Error} = -(N - \text{coinciding div}) \times L.C.$$

Negative: Zero of VS is left of MS zero.

4. Screw Gauge

Pitch

$$\text{Pitch} = \frac{\text{Distance moved on Main Scale}}{\text{Number of full rotations}}$$

Usually 1 mm or 0.5 mm. Distance screw moves in 1 rotation.

Least Count (L.C.)

$$L.C. = \frac{\text{Pitch}}{\text{Total Circular Scale Divisions (CSD)}}$$

Common L.C. = 0.01 mm or 0.001 cm.

Reading

$$\text{Reading} = MSR + (CSR \times L.C.)$$

MSR : Reading visible on linear scale.

CSR: Circular division coinciding with reference line.

Zero Error

Positive: Zero of CS is below reference line.

Always subtract the error (keeping signs in mind).

Negative: Zero of CS is above reference line.