

# 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  $N = a \times 10^b$

Used to estimate the size of a  
quantity.

If  $a \leq \sqrt{10}$  ( $\approx 3.16$ ), Order =  $b$

Example:  $4 \times 10^5 \rightarrow$  Since  
 $4 > 3.16$ , Order is  $10^6$ .

If  $a > \sqrt{10}$ , Order =  $b + 1$

### 2. Significant Figures

#### Counting Rules

1. All non-zero digits are significant.

0.007 (1 SF)

2. Zeros between non-zeros are significant.

2.05 (3 SF)

3. Leading zeros are **never** significant.

2.500 (4 SF)

4. Trailing zeros with a decimal point are  
significant.

1200 (Ambiguous, assume 2 unless  
specified).

#### Rounding Off

- Digit  $> 5$ : Round up

Example (= 5):

- Digit  $< 5$ : No change

$2.45 \rightarrow 2.4$  (4 is even)

	- Digit = 5: Round to nearest <b>even</b> number.	2.35 → 2.4 (round up to even)
<b>Arithmetic Operations</b>	<b>Add/Sub:</b> Result has same <b>decimal places</b> as the least precise term.	Add: $12.11 + 18.0 = 30.1$ (1 dec. place)
	<b>Mul/Div:</b> Result has same <b>sig figs</b> as the least precise term.	Mul: $2.5 \times 1.25 = 3.1$ (2 SF)
<b>3. Vernier Caliper</b>		
<b>Least Count (L.C.)</b>	$L.C. = 1MSD - 1VSD$	Where $N$ is total divisions on Vernier scale.
	Standard: $L.C. = \frac{1MSD}{N}$	Common L.C. = 0.1 mm or 0.01 cm.
<b>Reading</b>	$Reading = MSR + (VSR \times L.C.)$	<b>MSR:</b> Main Scale Reading immediately left of zero.
		<b>VSR:</b> Coinciding Vernier division.
<b>Zero Error</b>	True Reading = Observed – Zero Error	<b>Negative Error Calculation:</b>
	<b>Positive:</b> Zero of VS is right of MS zero.	Error $= -(N - \text{coinciding div}) \times L.C.$
	<b>Negative:</b> Zero of VS is left of MS zero.	
<b>4. Screw Gauge</b>		
<b>Pitch</b>	$Pitch = \frac{\text{Distance moved on Main Scale}}{\text{Number of full rotations}}$	Usually 1 mm or 0.5 mm. Distance screw moves in 1 rotation.
<b>Least Count (L.C.)</b>	$L.C. = \frac{\text{Pitch}}{\text{Total Circular Scale Divisions (CSD)}}$	Common L.C. = 0.01 mm or 0.001 cm.
<b>Reading</b>	$Reading = MSR + (CSR \times L.C.)$	<b>MSR:</b> 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.