

Earth sciences
petroleum department
1st Year
2nd Semester

Lab. No. 1

General physics

- Dimensional analysis
- Conversion of units

Lecturer
Sirwa Qader

Lab Objectives

Dimensional analysis

Units conversion

Dimensional analysis

- The symbols that use to specify the dimensions of length, mass, and time are L, M, and T, respectively.
- The dimension of Velocity $[v] = L/T$
- The dimensions of area, volume, velocity, and acceleration are listed in Table below, along with their units in the three common systems.

Dimensions and Some Units of Area, Volume, Velocity, and Acceleration

System	Area (L^2)	Volume (L^3)	Velocity (L/T)	Acceleration (L/T^2)
SI	m^2	m^3	m/s	m/s^2
cgs	cm^2	cm^3	cm/s	cm/s^2
U.S. customary	ft^2	ft^3	ft/s	ft/s^2

Conversion of units



Sometimes it's necessary to convert units from one system to another. Conversion factors between the SI and U.S. customary systems for units of length are as follows:

$$1 \text{ mile} = 1\,609 \text{ m} = 1.609 \text{ km}$$

$$1 \text{ m} = 39.37 \text{ in.} = 3.281 \text{ ft}$$

$$1 \text{ ft} = 0.3048 \text{ m} = 30.48 \text{ cm}$$

$$1 \text{ in.} = 0.0254 \text{ m} = 2.54 \text{ cm}$$

Exercises:



Exercise I: Show that the expression $v = v_i + at$, is dimensionally correct, where v and v_i represent velocities, a is acceleration, and t is a time interval.

Exercise II: Determine whether the equation $L = vt^2$ is dimensionally correct. If not, provide a correct expression, up to an overall constant of proportionality.

Exercise III: If a car is traveling at a speed of 28.0 m/s, is it exceeding the speed limit of 55.0 mi/h?

THANKS!

