

Al-Mustaqbal University Colleg
Medical Physics Department



Classical Mechanics/ lecture 1

First stage

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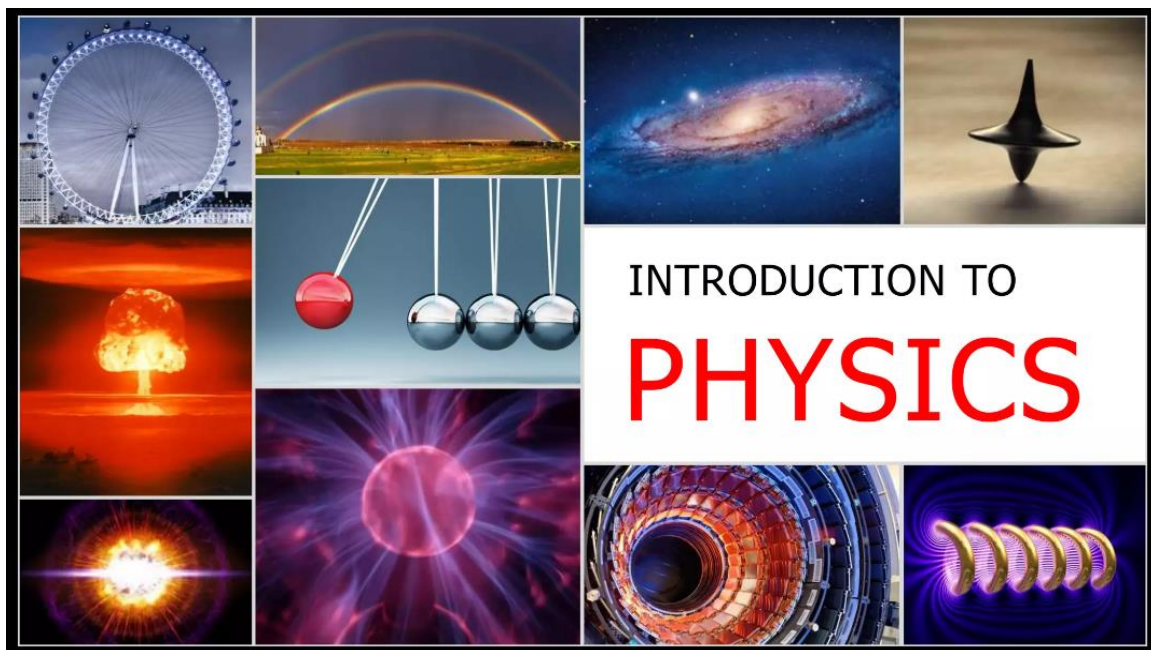
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Lecture ONE

Physics: It is the science of studying matter, and energy to identify the foundations of the structure of the universe.

The word physics is believed to come from the Greek word physis, which means nature. The study of nature later became called natural philosophy. From ancient times until the Renaissance, natural philosophy encompassed many fields, including astronomy, biology, chemistry, mathematics, and medicine.

Work of Physics: is a science that studies natural phenomena, explains them, analyzes them, and transforms them into applications that benefit humanity.



To study any natural phenomenon, we need 2 important basics

1) physical quantity (or simply quantity)

anything that can be measured

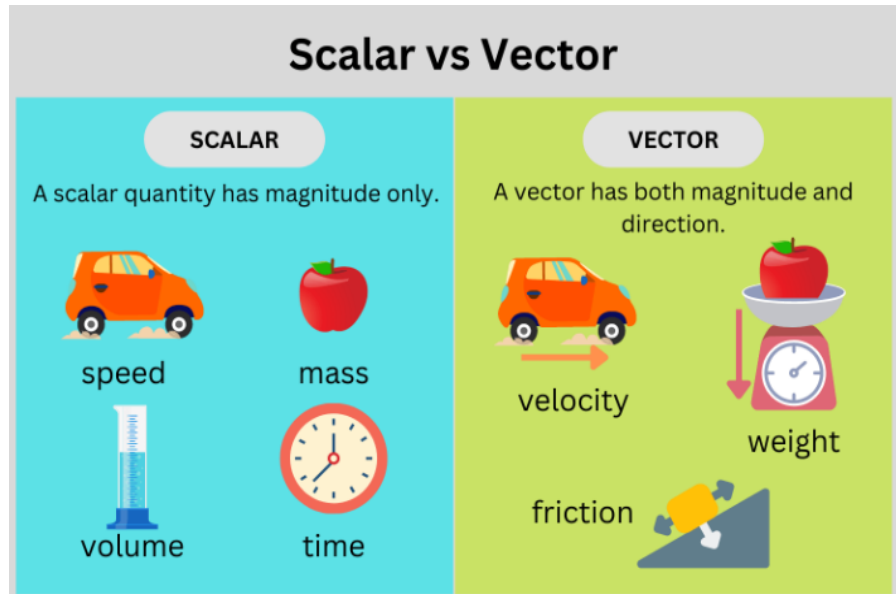
Classification of physical quantities

Scalars

They are quantities that can be defined by specifying magnitude only

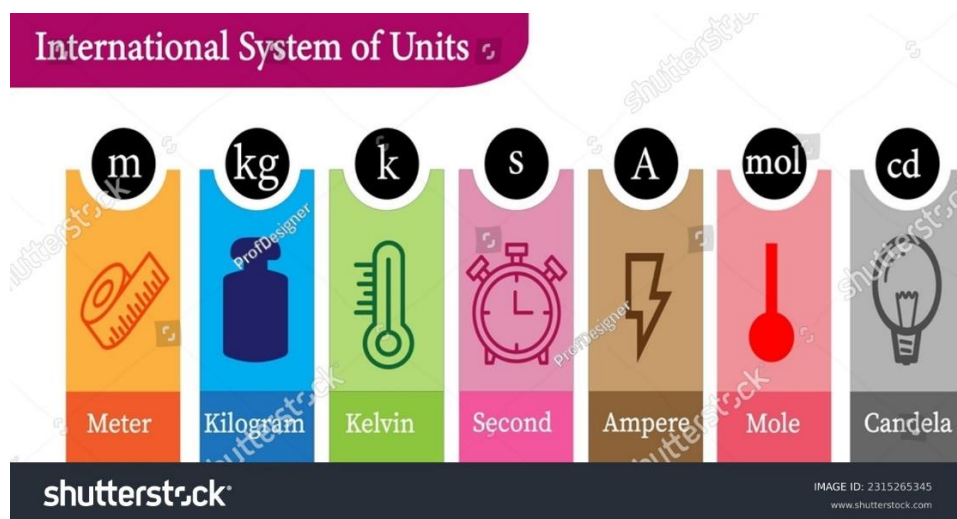
Vectors

They are quantities that can be defined by specifying their magnitude and direction



2) units of measurement

Measures used to describe physical quantities



3) prefix for an international system of units

Prefixes			
Prefixes	Symbol	Factor	Example
Tera	T	10^{12}	3 Tm = 3×10^{12} m
Giga	G	10^9	8 Gm = 8×10^9 m
Mega	M	10^6	7 Mm = 7×10^6 m
Kilo	k	10^3	5 km = 5×10^3 m
Deci	d	10^{-1}	1 dm = 1×10^{-1} m
Centi	c	10^{-2}	6 cm = 6×10^{-2} m
Milli	m	10^{-3}	9 mm = 9×10^{-3} m
Micro	μ	10^{-6}	4 μ m = 4×10^{-6} m
Nano	n	10^{-9}	2 nm = 2×10^{-9} m
Pico	p	10^{-12}	8 pm = 8×10^{-12} m

Conversion of units

4.08×10^{-6} km

= $4.08 \times 10^{-6} \times 10^3$ m

= 4.08×10^{-3} m

4.08×10^{-4} Gm

= $4.08 \times 10^{-4} \times 10^9$ m

= 4.08×10^5 m

8.28×10^{-2} μ m

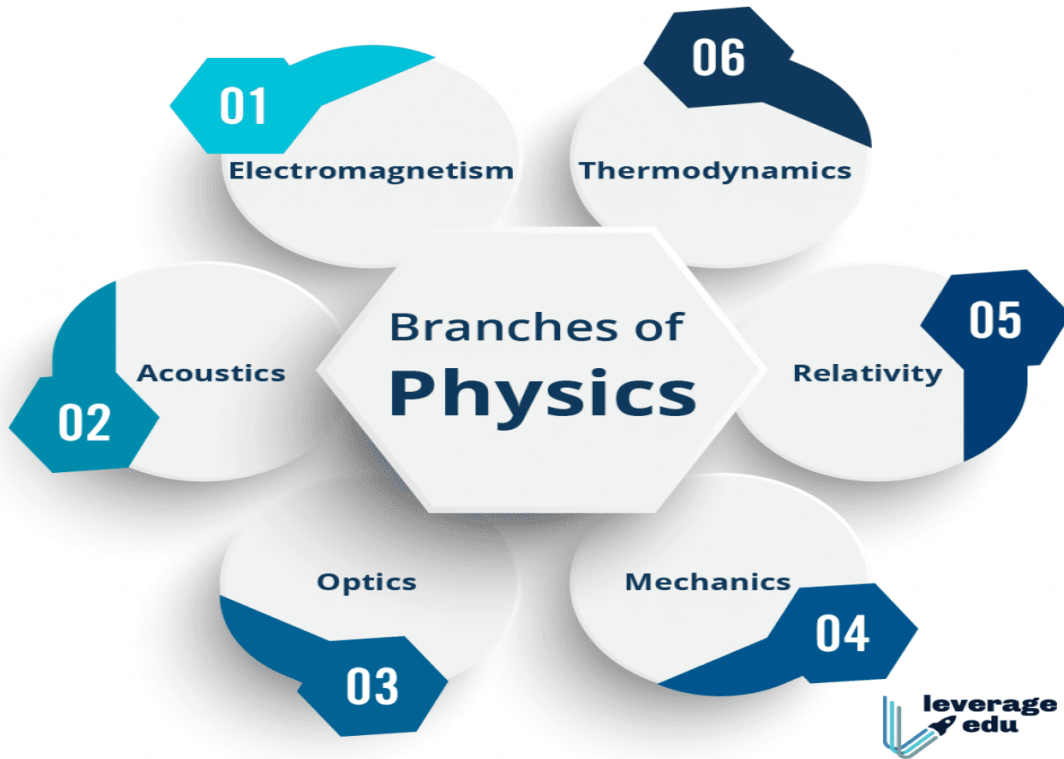
= $8.28 \times 10^{-2} \times 10^{-6}$ m

= 8.28×10^{-8} m

8.28×10^{-4} pm

= $8.28 \times 10^{-4} \times 10^{-12}$ m

= 8.28×10^{-16} m



The Mechanics. is one of the branches in physics that studies the motion, it include two main sections are:

- 1) **Kinematics:** a science that describes the objects' motion ignoring what causes the motion.
- 2) **Dynamics:** a science that cares about the causes of motion such as Force and Energy.

We will study in this course basic types of motion, where first we will get to know the concepts of location, displacement, velocity, and acceleration of objects for motion in one dimension then we talk about motion in two dimensions with some applications.

Discussion Questions

- 1) What is the definition of physics, and what are its most important applications in society?
- 2) What difference Between Scalar and Vector Quantities. ?
- 3) What are prefixes in physics, and why are they important?
- 4) Short Comparison Between Kinematics and Dynamics?
- 5) Why most students dislikes physics?