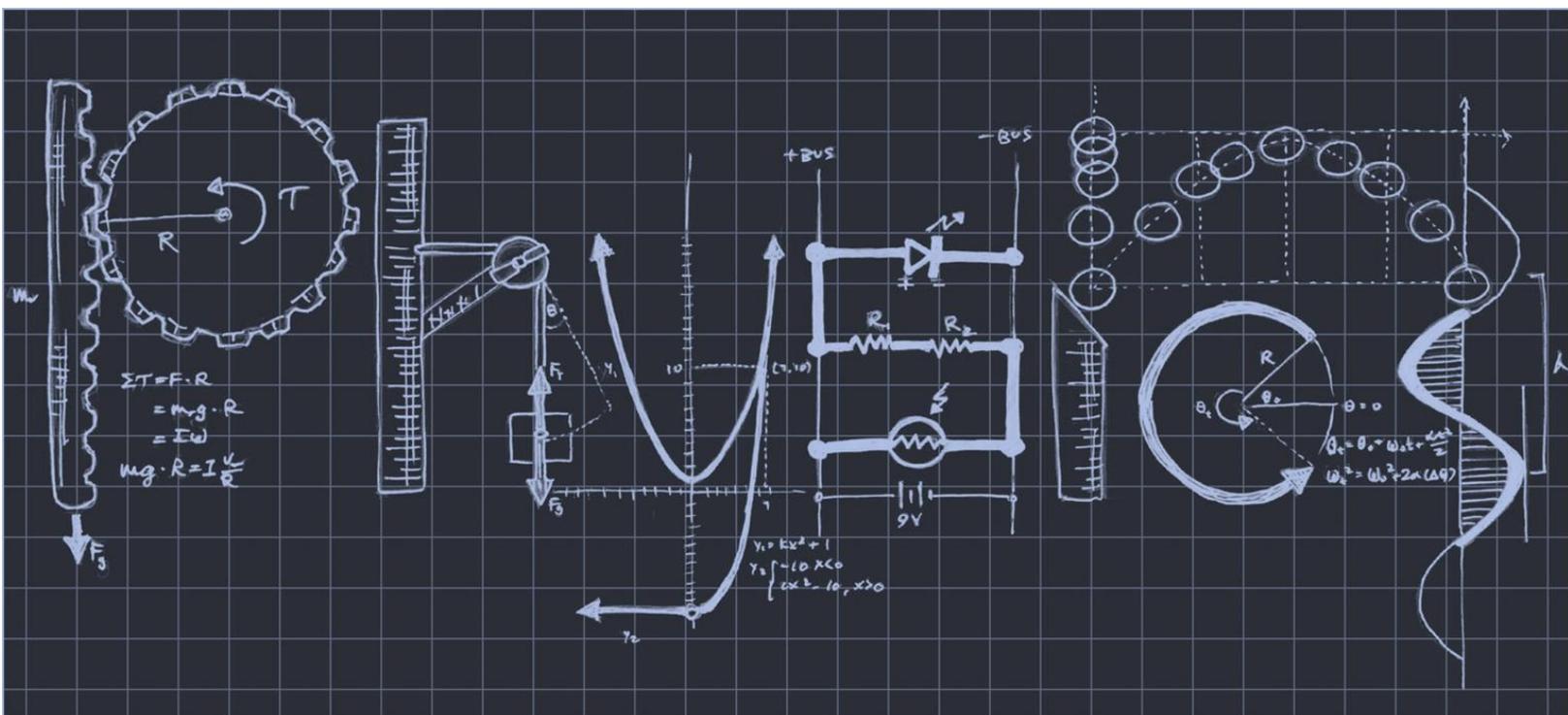


XI PHYSICS

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[THE SCOPE OF PHYSICS] CHAPTER NO. 1

The study of NATURE starts with some very basic concepts or some basic mathematical tools to understand the phenomena of PHYSICS. We'll be learning here Physical Quantities, Dimensions, Units and their conversion plus significant figures.

THE SCOPE OF PHYSICS

Chap#1

Physics:

Branches of Physics:

Question:

Define any 3 Branches:

i.

ii.

iii.

Physical Quantities:

“The physical quantity is defined as a physical property of a body or phenomenon that can be measured.”

Examples:

- i. _____
- ii. _____
- iii. _____
- iv. _____

Physical quantities are of two types:

- i. _____
- ii. _____

Define both of them:

- i. _____

- ii. _____

List some of the quantities:

Base Quantities	Derived Quantities

Activity:

List all the “Base Physical Quantities” with their usual symbols and their units.

Name	Symbol	Unit	Unit's symbol

Activity:

Complete the following table for given “Derived Physical Quantities” for their symbols and units.

Name	Symbol	Unit	Unit's symbol
Velocity			
Density			
Force			
Power			
Charge			
Electric field			
Planck's Constant			
Frequency			

Dimensions:

Dimensions are defined as the relation between based quantities and derived quantities.

Dimensions for base quantities:

Name	[Dimension]
Length	[L]
Mass	[M]
Time	[T]
Current	[I]
Temperature	[θ]
Amount of substance	[N]
Luminous Intensity	[J]

Dimensions for derived quantities:

1. Velocity

2. Acceleration

3. Force

4. Kinetic Energy

5. Work

6. Torque

7. Momentum

Activity:

Prove that the following equations are dimensionally correct:

<p>1. $v_f = v_i + at$</p>	<p>2. $S = v_i t + \frac{1}{2}at^2$</p>
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3. $2aS = v_f^2 - v_i^2$

4. $a = \frac{m_1 - m_2}{m_1 + m_2} g$

5. $T = 2\pi \sqrt{\frac{l}{g}}$

System of Units:

There are three generally known systems of units:

i. _____

ii. _____

iii. _____

Conversion of Units:**Length Conversion**

i) $2.61 \text{ km} = \text{_____ m}$

ii) $36 \text{ km} = \text{_____ m}$

iii) $61160 \text{ m} = \text{_____ km}$

iv) $64600000 \text{ cm} = \text{_____ km}$

v) $0.000238 \text{ m} = \text{_____ cm}$

vi) $0.00817 \text{ km} = \text{_____ cm}$

vii) $0.0079 \text{ cm} = \text{_____ mm}$

viii) $19246 \text{ km} = \text{_____ km}$

ix) $14800 \text{ cm} = \text{_____ m}$

x) $0.0000000 332 \text{ km} = \text{_____ mm}$

xi) $27 \text{ ft} = \text{_____ yd}$

xii) $8 \text{ yd} = \text{_____ ft}$

xiii) $12 \text{ ft} = \text{_____ in}$

Scale:

$$1 \text{ km} = 1000 \text{ m}$$

$$1 \text{ m} = 100 \text{ cm}$$

$$1 \text{ m} = 1000 \text{ mm}$$

$$1 \text{ mm} = 1 \mu\text{m}$$

$$1 \text{ ft} = 12 \text{ in}$$

$$1 \text{ yd} = 3 \text{ ft}$$

$$1 \text{ m} = 3.28 \text{ ft}$$

Mass Conversion

- i) 600 gm = _____ kg
- ii) 610 mg = _____ g
- iii) 4800 g = _____ kg
- iv) 0.00065 mg = _____ μ g
- v) 0.89 μ g = _____ mg
- vi) 3 mg = _____ g
- vii) 77 kg = _____ g
- viii) 1800 g = _____ kg
- ix) 320 μ g = _____ g
- x) 88.7 kg = _____ mg
- xi) 13 oz = _____ lbs
- xii) 12391.14 lbs = _____ oz
- xiii) 53.9 lbs = _____ kg
- xiv) 1.5 ton = _____ oz
- xv) 1420 kg = _____ ton

Scale:

1 kg = 1000 g
1 g = 1000 mm
1 mg = 1000 μ g
1 oz = 0.028 kg
1 lb = 16 oz
1 ton = 2000 lbs.
1 ton = 907.2 kg

Time Conversion

- i) 19 min = _____ s
- ii) 4 weeks = _____ days
- iii) 55 min = _____ s
- iv) 1.3 hr = _____ min
- v) 12 days = _____ weeks
- vi) 1 s = _____ hr
- vii) 231 min = _____ hr
- viii) 0.5 hr = _____ min
- ix) 52 weeks = _____ s
- x) 10 Jupiter days = _____ Earth days

Scale:

1 week = 7 days
1 day = 24 hrs
1 hr = 60 mins
1 min = 60 s
1 s = 1000 ms (milliseconds)
1 Earth day = 2.41 Jupiter day

Rules for determining "Significant Figures":

Rule	Example
1. All non-zero numbers are significant.	1233.13 contains
2. If zeros are present between two non-zero numbers then these zeros will be considered as significant.	4610014 contains
3. Zeros on the left of non-zero numbers are not significant.	0.000148 contains only
4. Zeros on the right of non-zero numbers before decimal are not significant.	18100 contains only
5. Zeros on the right of non-zero numbers after decimal are significant.	918.00 contains

Activity:

State the number of significant figures in the following. If there is not enough information then tell so:

- | | |
|----------------------|---------------------------|
| i) 493 | ix) 21 |
| ii) 0.0005 | x) 8.817 |
| iii) 1000.101 | xi) 9.30×10^{-6} |
| iv) 5.00 | xii) 0.00500010 |
| v) 2.1×10^6 | xiii) 331000000 |
| vi) 1.000 | xiv) 6.0005 |
| vii) 52.098 | xv) 2131.900013 |
| viii) 0.00008550 | |