Class 9 – Easy Notes - Physics

CHAPTER 1 – PHYSICAL QUANTITIES & MEASUREMENTS

Reading and Critical Thinking Questions

مندرجہ ذیل سوالات کو ایسے انداز میں حل کیا گیا ہے کہ وہ ذہین، اوسط اور نسبتاً کمزور طلبہ کے لیے یکساں طور پر فائدہ مند ہوں۔ یہ جوابات بورڈ ممتحن کی توقعات کو مد نظر رکھتے ہوئے تیار کیے گئے ہیں، تاکہ طلبہ انہیں یاد کر کے امتحان میں مکمل نمبر حاصل کر سکیں۔۔

Short Answer Questions

1.1 Can a non-physical quantity be measured? If yes, then how?

Ans: For topper to average students:

Non-physical quantities like love and fear etc cannot be measured using tools and instruments but they can be described or compared using certain criteria or techniques.

For weak students:

We cannot measure non physical quantities using tools but we can describe or compare them.

1.2 What is measurement? Name its two parts

Ans: For all students:

Measurement is the process of comparing an unknown quantity with a known and accepted standard quantity.

It has two parts:

i. A number
ii. A unit

1.3 Why do we need a standard unit for measurements?

Ans: For topper to average students:

In the past, different countries used different units, which caused problems in trade and sharing information. To solve this, people agreed on standard units that everyone could use for better communication, business, and science

For weak students:

In the past, every country used different units. This caused confusion in trade and sharing ideas. So, the same standard units were made for all to use.

1.4 Write the names of 3 base quantities and 3 derived quantities

Ans: For toppers to average students:

	Base quantities	Units
1	Length	meter (m)
2	Mass	kilogram (kg)
3	Time	Second (s)

	Derived quantities	Units
1	Area	square metre (m^2)
2	Volume	cubic metre (m^3)
3	Speed	metre per second (ms^{-1})

For weak students:

Base quantities are length, mass and time.

Derived quantities are area, volume and speed.

1.5 Which SI unit will you use to express the height of your desk?

Ans: For all students:

Height is a form of length. The SI unit for measuring length is meter (m). Therefore, we will use meter (m) to express the height of a desk.

1.6 Write the name and symbol of all SI base units.

Ans: For all students:

Sr.	Physical Quantity	Unit	Symbol
1	Length	meter	m
2	Mass	kilogram	kg
3	Time	second	s
4	Temperature	kelvin	k
5	Electric current	ampere	a
6	Intensity of light	candela	cd
7	Amount of substance	mole	mol

1.7 Prefix is used? Name three sub-multiples and three multiple prefixes with their symbols.

Ans: For toppers and average students:

The SI system is a decimal system. Prefixes are used to express very large or very small quantities easily using powers of 10. For example, writing 5000 m as 5×10^3 m or 0.04 m as 4×10^{-2} m makes it simpler.

Three multiples prefixes:

i. kilo (k)
ii. mega (M)
iii. giga (G)

Three submultiples prefixes:

i. milli (m)
ii. micro (μ)
iii. nano (n)

For weak students:

Prefixes help us write very big or very small numbers easily. For example: 5000 m = 5×10^3 m and 0.04 m = 4×10^{-2} m.

Multiples: kilo (k), mega (M), giga (G)

Submultiples: milli (m), micro (μ), nano (n)

1.8 What is meant by:

For all students:

(a) $5\ pm = 5\ pico\ meter = 5 \times 10^{-12} m = 0.000000000005\ m$

(b) $15\ ns = 15\ nano\ second = 15 \times 10^{-9} s = 0.000000015\ s$

(c) $6\ \mu m = 6\ micrometer = 6 \times 10^{-6} m = 0.000006\ m$

(d) $5\ fs = 5\ femto\ second = 5 \times 10^{-15} s = 0.000000000000015\ s$

1.9 For all students:

(a) For what purpose, a Vernier Calipers is used:

It is the instrument used to measure small lengths down to 1/10th of a milli meter. It can be used to measure the thickness, diameter, width or depth of an object.

(b) Name its two main parts:

i. Main scale: This is the fixed scale. It gives measurement in millimeters.

ii. Vernier scale: This is the sliding scale. Its length is 9mm and it is divided into 10 equal parts.

(c) How is least count found?

The least count of a Vernier caliper is found by calculating the difference between the value of one main scale division and one Vernier scale division.

Least count = 1 M.S div – 1 V.S div = 1 mm – 0.9 mm = 0.1 mm

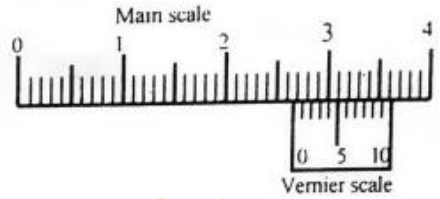
(d) What is meant by zero error?

Zero error happens when an instrument shows a reading even when it should show zero.

Zero error is found by noting the Vernier scale division that exactly aligns with any main scale division when the jaws are closed. Multiply that division number by the least count. This value is the zero error.

$$\text{Zero Error} = \text{Vernier Scale Reading (VSR)} \times \text{Least Count (LC)}$$

1.10 State least count and vernier caliper scale reading as shown in figure and hence, find the length.



For all students:

$$least\ count = \frac{smallest\ reading\ on\ MS}{no.\ of\ divisions\ on\ VS} = \frac{1mm}{10} = 0.1\ mm = 0.01\ cm$$

$$VS\ reading = 4\ \times 0.1\ mm = 0.4\ mm$$

$$MS\ reading = 26\ mm$$

$$length = MS\ reading + VS\ reading = 26 + 0.4 = 26.4\ mm$$

1.11 Which reading out of A, B and C shows the correct length and why?

For all students:

B is the correct length because eye is exactly above and in line with the meter rule.