

Physics (New Book) - 9th Class Physics Chapter 1 Long Question Preparation

Q1. What are measuring instruments, write the name of some length measuring instruments

Ans 1: Measuring instruments; Measuring instruments are used to measure various physical quantities such as length, mass time, volume etc. measuring instruments used in the past for example sundial, water cock and other time measuring devices used around 1300 AD were quite crude/ on the other hand, digital clocks and watches used now a day are highly reliable and accurate

Ans 2: Length measuring instruments: length measuring instruments are following
meter rule, measuring tape. vernier caliper. screw gauge

Q2. Write a note on mass measuring instruments

Ans 1: Introduction: Pots were used to measure grain in various part of the world in the ancient time. However, balances were also in use by Greeks and Romans.

Ans 2: beam balance: Beam balances are still in use at many places. In a beam balance, the unknown mass is placed in one pan. It is balanced by putting known masses in the other pan. Today people use many types of mechanical and electronic balances. you might have seen electronic balances in sweet and grocery shops. There are more precise than beam balances and are easy to handle.

Ans 3: Physical Balance: a physical balance is used in the laboratory to measure the mass of various objects by comparison
Construction: It consists of a beam resting at the centre on a fulcrum. The beam carries scale pans over the hooks on either side. unknown mass is placed on the left pan. Find some suitable standard masses that cause the pointer to remain at zero on raising the beam

Ans 4: Lever Balance: A lever balance consists of a system of levers. When lever is lifted placing the object in one pan and standard masses on the other pan, the pointer of the lever system moves. The pointer is brought to zero by varying standard masses. LC of lever balance is 0.01g or 10mg

Ans 5: Electronic balance: Electronic balance comes in various ranges; milligram range, gram ranges and kilogram ranges. Before measuring the mass of a body, it is switched on and its reading is set to zero. Next place the object to be weighed. The reading on the balance gives you the mass of the body placed over it.

Q3. Write note on significant figure

Ans 1: Significant figure: All the accurately known digits and the first doubtful digit in an expression are called significant figures. It reflects the precision of the measured value of a physical quantity

Explanation: The value of a physical quantity is expressed by a number, along with suitable units. The accuracy in the measurement of a physical quantity depends upon

The quality of the measuring instrument

The skills of the observer

The number of observations made

The improvement in the quality of measurement can be made by using better measuring instrument, the more is the value of precision more significant figures mean greater precision

Ans 2: Rules of significant figures: The following rules are helpful in identifying significant figures

Non zero digits are always significant

Zeros between two significant figures are also significant

Final or ending zeros on the right in decimal fraction are significant

Zeros written on the left side of the decimal point for the purpose of spacing the decimal point are not significant

In whole numbers that end in one or more zeros without a decimal point these zeros may or may not be significant. In such case, express the quantity using scientific notation to find the significant zeros

Q4. Define physics and explain its branches.

Ans 1: Physics: Physics is a branch of science that deals with matter, energy and their relationship. Branches of Physics:

Following are branches of physics: 1- Mechanics: It is the study of motion of objects, its causes and effects. 2- Heat: It deals with the nature of heat, modes of transfer and effects of heat 3- Sound: It deals with the physical aspects of sound waves, their production, properties and applications. 4- Light: It is the study of the physical aspects of light, its properties, working and use of optical instruments. 5- Electricity and Magnetism: It is the study of the charges at rest and in motion their effects and their relationship with magnetism. 6- Atomic Physics: it is the study of the structure and properties of atom 7- Nuclear Physics: It deals with the properties and behavior of nuclei and the particle within the nuclei: 8- Plasma Physics: It is the study of production, properties of the ionic state of matter 9- GeoPhysics It is the study of the internal structure of the Earth.

Q5. What are prefixes, explain it with examples

Ans 1: Prefixes; The words or letters added before a unit and stand for multiples or sub multiples of that unit are known as prefixes
Examples; kilo, mega, nano, micro etc.

Note; The prefixes are useful to express very large or small quantities.

double prefixes are not used for examples no prefix is used with kilogramme

Q6. What is meant by Vernier callipers? Write its construction.

Ans 1: Vernier Callipers: A vernier callipers consist of two jaws. One is a fixed jaw with main scale attached to it. Main scale has centimeter and millimeter marks on it the other jaw is a moveable jaw, it has a vernier scale having 10 divisions over it such that each of its divisions is 0.9mm. The difference between one small division on main scale division and one vernier scale division is 0.1mm. It is called least count of the vernier callipers. Least count of = Smallest reading on main scale / no. of divisions on vernier scale Vernier Callipers $LC = 1\text{mm}/10\text{divisions} = 0.1\text{mm}$ $LC = 0.1\text{mm} = 0.01\text{cm}$ Zero Error and Zero Correction: First of all find the zero error. To find the zero error close the jaws of Vernier callipers gently. Zero error will exist if zero line of the vernier scale is not coinciding with the zero of main scale. Knowing the zero error, necessary correction can be made to find the correct measurement is called zero correction. Taking a Reading on Vernier Callipers: Find the diameter of a solid cylinder using vernier Callipers. Close the jaws till they press the opposite sides of the object gently. Note the complete divisions of main scale past the vernier scale zero in a tabular form. Next find the vernier scale division that is coinciding with any division on the main scale. multiply it by least count of vernier Callipers and add it in the main scale reading. This is equal to the diameter of the solid cylinder. Add zero correction (Z.C) to get correct measurement Repeat the above procedure and record at least three observations with the solid cylinder displaced or rotated each time

Q7. Define unit and what is international system of units

Ans 1: Unit: A standard quantity needed for measuring unknown quantities is called unit.

Example: Standard unit for measurement of mass is kilogram(kg), For length is meter(m) and for time is seconds(s)

Ans 2: System of units: A set of base and derived units is called system of units

International system of units: A world wide acceptable system of measurements is called international system of units. It is commonly referred as S.I.

It was adopted in 11th General conference on weight and measures held in 1960 in Paris

Ans 3: Types: There are two types of units

Base units, Derived units

Ans 4: Base units: The units that describe table quantities are called base units .

Following table shows the S.I.units of base quantities and their symbols

Name: Length, Mass, Time, Electric current, Intensity of light, Temperature, Amount of substance Meter, kilogram, Second, Ampere, Candela, kelvin, Mole

Ans 5: Derived Units: Units used to measure derived quantities are called derived units.

Derived units are defined in terms of base units and are obtained by multiplying or dividing one or more base units with each other.

The units of area(meter) and the unit of volume(meter) are based on the unit of length, which is meter. Thus the unit of length is the base unit while the unit of area and volume are derived units. speed is defined as distance covered in unit time ;therefore its unit is meter per second. In the same way the unit of density, force, pressure, power etc. can be derived using one or more base quantities. Some derived units are as follow

Name; Speed , acceleration , volume ,force , pressure, density, charge, meter per second, meter per second per second, cubic meter, newton , pascal . kilogram per cubic meter and coulomb

Q8. write a note on stopwatch and its types

Ans 1: Definition: A stopwatch is used to measure the time interval of an event

Types of stop watch: There are two types of stopwatches:

mechanical stopwatch, Digital stopwatch

Ans 2: Mechanical stopwatch: A mechanical stopwatch can measure a time interval up to a minimum 0.1 second. It contains a knob that is used to wind the spring that powers the watch. It i also used as start stop and reset button. When the knob pressed once the watch start. When the button is pressed second time, the watch stops. When the button is pressed third time, the needle comes back to zero position

Ans 3: Digital stopwatch: digital stopwatch commonly used in laboratories can measure a time interval as small as 1/100 seconds or 0.01 second. The digital stopwatch starts to indicate the time lapsed as the start stop button is pressed. As soon as start stop button pressed again, it stops and indicates the time interval noted by it between start and stop of an event. A reset button restore its initial zero setting

Q9. Define physical quantities and explain its types

Ans 1: Physical quantities: All measurable quantities are called physical quantities

Example: length, mass, time, temperature etc

Ans 2: Characteristics: A physical quantity possesses at least two characteristics:

Numerical magnitude , A unit in which it is measured

Example: If length of student is 104 cm then 104 is numerical magnitude

Ans 3: Types: physical quantities are of two types

Base quantities, Derived quantities

Ans 4: Base quantities: base quantities are those on the basis of which other quantities are expressed

Example: There are seven base quantities

length, time, mass, temperature. electric current, intensity of light, amount of a substance.

Ans 5: Derived quantities: The derived quantities are those quantities which are expressed in term of base quantities

Example: Area, volume, speed, force , work , energy, power , electric charge, electric potential etc

Q10. Define science and describe how science was divided into various branches

Ans 1: Science :The knowledge gained through observations and experiments is called science .The wor science is derived from the Latin word "scientia", which means knowledge. Science was divided into various branches initially as described below;

Ans 2: Natural Philosophy: Not until eighteen century is known as natural philosophy. Later on as knowledge increased natural philosophy we divided into two branches.
biological sciences , physical sciences

Ans 3: Biological sciences: The branch of natural philosophy which deals with the study of living things is called biological sciences

Ans 4: physical sciences: The branch of natural philosophy which deals with the study of non-living things is called physical sciences. Physical sciences were divided into five distinct disciplines
physics, chemistry , geology , astronomy , meteorology
