**Unit 1: Mechanics**

**Measurement:**

The Comparison of a Physical quantity with a standard quantity is called measurement.

**Physical Quantities:**

Any quantity which can be measurable is known as a physical quantity.

**Types of Physical quantities:**

1. **Fundamental physical quantities:**

The basic quantities which are independent of each other.

E.g.: Mass, length and time.

1. **Derived physical quantities:**

The physical quantities which are derived from one or more fundamental physical quantities.

E.g.: Area, volume, speed, velocity, density, force, etc.

**Unit:**

Unit is the standard of reference used to express a physical quantity.

**Types of Fundamental Units:**

1. **Fundamental Units:**

Units of fundamental physical quantities are called fundamental units.

E.g.: Centimetre, metre, second, gram, kilogram, foot, pound, etc.

Almost all the physical quantities occurring in mechanics can be expressed in the units of length, mass and time.

1. **Derived Units:**

Derived units are the units of physical quantities which are derived from of fundamental units.

E.g.:

|  |  |  |
| --- | --- | --- |
| Quantity | Units | Symbol |
| 1. Velocity | metre/second | ms-1 |
| 1. Acceleration | metre/second2 | ms-2 |
| 1. Power | watt | W |
| 1. Energy, Work | joule | J |
| 1. Force | newton | N |

**SI System of Units:**

This system is widely used in all scientific measurements throughout the world. SI is the abbreviation of System of International unit in French which means International system of Units.

In SI System there are 7 basic units and 2 supplementary units. They are:

**Basic Units:**

|  |  |  |  |
| --- | --- | --- | --- |
| Sl No. | Quantity | Unit | Symbol |
| 1 | Length | metre | m |
| 2 | Mass | Kilogram | Kg |
| 3 | Time | Second | S |
| 4 | Temperature | Kelvin | K |
| 5 | Electric current | Ampere | A |
| 6 | Luminous intensity | Candela | Cd |
| 7 | Amount of substance | Mole | mol |

**Supplementary Units:**

|  |  |  |  |
| --- | --- | --- | --- |
| Sl No. | Quantity | Unit | Symbol |
| 1 | Plane angle | Radian | Rad |
| 2 | Solid angle | Steradian | Sr |

**Advantages of SI System:**

* In the