Physical Quantity and Measurement

1. **What is Measurement?**
   Ans. Measurement is the process of comparing an unknown quantity with a known fixed quantity of the same Kind.

2. **What is Physical Quantity?**
   Ans. the quantity that can be measured is called Physical quantity.
   Ex: Mass, Length, Volume

3. **Which are essential to measure a physical quantity?**
   Ans. to measure a physical quantity we need-
   a. A unit (A known fixed quantity)
   b. A Numerical value (A number that indicates how many times the unit is present in that fixed quantity.)

4. **What is called Unit?**
   Ans. A known fixed quantity that is used to measure the physical quantity of the same kind is called a Unit.
   Ex. If we say that a rope is 12 m long, we mean that the length of the rope is 12 times of 1 m length. Here, while measuring the length of the rope, we have compared it with the standard unit of length i.e metre (m).

SYSTEM OF UNITS	LENGTH	MASS	TIME
M.K.S SYSTEM	metre (m)	kilogram (kg)	second (s)
C.G.S SYSTEM	centimetre (cm)	gram (g)	second (s)
F.P.S SYSTEM	foot (ft)	pound (lb)	second (s)

5. **What is Magnitude?**
   Ans. The value we get on measuring a physical quantity is called its magnitude.

6. **What is the relation between Unit and Measurement?**
   Ans. The relation between Unit and measurement are
   $Q = n \times u$
   Q= Magnitude of the physical quantity
   n= Numerical value
   u= Unit

7. What are SI Units?

Ans. A unit is accepted by scientists all over the world as a basic unit of measurement is called a standard or SI unit.

Physical quantity	SI unit	Symbol
Length	Meter	m
Mass	Kilogram	Kg
Time	Second	S
Temperature	Kelvin	K
Electric Current	Ampere	A

8. Write the characteristics of SI unit.

Ans. A standard unit should be

a. Universally accepted
b. Of convenient size.
c. Defined accurately and exactly.
d. Have the same value everywhere, i.e. no change within location and time.

9. What is called multiple of unit?

Ans. Units that are used to measure large quantities are called Multiples of Unit.
Ex: 1 Kilometer= 1000 meter

10. What is called Sub-multiple of Unit?

Ans. Units that are used to measure smallest quantity are called sum-multiples of Unit.
Ex: 1 cm= 10^{-2} m

11. Write down the rules for writing symbols of SI Units

Ans. The rules are:

a. Symbols for unit are written in a small letter.
b. Symbols for units named after various scientists are always written in capital letters.
   Ex: K for Kelvin
   N for Newton
c. Symbols are not followed by full stop.
d. Symbols are never written in plurals.
e. For compound units, which are formed by dividing one unit by another negative powers are used.
f. A compound unit formed by multiplying two or more units is written with a dot or space between the two symbols.

12. What is length?

Ans. Length is the distance between any two points or places.

13. What are the units of Length?

Ans. The CGS units is Centimeter, SI Unit is Meter

14. Define 1 Meter.

Ans. One meter is defined as the length between the two marks on a platinum-iridium bar (90% Platinum and 10% Iridium) kept at 0^0C at the International Bureau of weights and measures at Paris in France.

15. **What is the definition of One Meter on the basis of speed of Light?**
    Ans. The distance travelled by light in air or vacuum in 1/792,458 of second is called 1 meter.

16. **Which Instrument is used to measure any length?**
    Ans. To measure length we can use measuring tape or Scale. Etc.

17. **Which type of precautions are taken when we measure any length through Scale?**
    Ans. To correctly measure any length of an object the following precautions must be taken.
    a. Correct placement of the scale
    b. Worn out zero end
    c. Correct position of eye.

18. **What is Parallax Error.**
    Ans. While taking a reading through scale an error can occur due to the wrong position of eye. This error is called Parallax Error.

19. **What is Mass?**
    Ans. the quantity of matter contained in an object is called mass.
20. **What is the SI unit of Mass and defined it?**
    Ans. The Si Unit of Mass is Kilogram (Kg)
    One kilogram was defined as the mass of a cylindrical piece of platinum-iridium alloy kept at the International Bureau of Weight and Measures at Paris in France.

21. **Which devices are used to measure Mass?**
    Ans. To measure mass Beam balance, Electronic Balance are used.

22. **What is Time?**
    Ans. Time is the interval between two events.

23. **What is the SI unit of Time? Define it**
    Ans. Second is a fraction of a mean solar day.

    1 sec= $\frac{1}{86400}^{th}$ part of a mean solar day

24. **What is Solar Day?**
    Ans. A solar day is the time taken by the Earth to complete one rotation.

25. **What is Mean Solar Day?**
    Ans. A mean solar day is the mean of 365 solar days.

26. **Name of the devices which are used to measure time.**
    Ans. Sundial, Sand Clock, Pendulum Clock, Digital Clock etc.

27. **What is One Oscillation?**
    Ans. When the bob of a pendulum moves from one point and come back to the same point. The distance traveled by the bob is called One Oscillation.

28. **What is Temperature?**
    Ans. Temperature is the degree of hotness or coldness of an object.

29. What is the SI Unit of Temperature?
Ans. The Si unit of Temperature is Kelvin (K)

30. Which device is used too measure Temperature?
Ans. Thermometer.

31. How many scales are used in Thermometer?
Ans. There are three types of Scales are used to measure Thermometer.
a. Kelvin Scale
b. Celsius Scale
c. Fahrenheit Scale

32. What are the Relations between Kelvin Scale, Celsius Scale and Fahrenheit Scale?
Ans The Relations are as below

K= C+ 273

$$\frac{C}{5}=\frac{F-32}{9}$$

Where K= Kelvin Temperature
C= Celsius Temperature
F= Fahrenheit Temperature.

33. Which are the most commonly used Thermometer?
Ans. Most commonly used Thermometers are
a. Laboratory Thermometer
b. Clinical Thermometer

34. What is Stem of Thermometer?
Ans. A laboratory thermometer consists of a very fine capillary tube which is protected by a thick glass tube called the stem of Thermometer.

35. To measure the temperature in human body which thermometer is used?
Ans. Clinical Thermometer

36. Which precautions are taken while using Clinical Thermometer?
Ans. Precautions to be taken while using Clinical Thermometer are:
a. Wash the thermometer before and after use.
b. Read the thermometer by holding at horizontally.
c. Handle the thermometer with care. If hits against some hard object it can break.
d. Do not hold the thermometer by the both while reading it.
e. Do not sterilize the thermometer in boiling water. It may break the bulb.
f. Do not keep the thermometer under the Sun or near a flame. It may break.

37. What is defined Area?
Ans. The total surface enclosed by a figure or an object is called its area or surface area.

38. What is the SI Unit of Area? Define it.

Ans. The SI unit of area is Square Meter

One square meter is the area of a square each of whose sides is 1 meter in length.

39. What is the CGS Unit of Area? Define it.

Ans. The CGS unit of Area is Square Centimeter.

One square Centimeter is the area of a square each of whose sides is 1 centimeter in length.

40. Write the area of Regular Surfaces

Ans.

Shape	Formula of Area
Square	Side × Side × Side
Rectangle	Length × Breadth
Triangle	½ × Base × Height
Circle	$\Pi \times (\text{Radius})^2$