

## **CLASS IX PHYSICS**

### **CHAPTER 1. MEASUREMENT AND EXPERIMENTATION**

#### **SUMMARY**

- 1. Measurement is the process of comparison of the given physical quantity with the known standard quantity.**
- 2. A physical quantity needs a unit and a numerical value for its expression.**
- 3. Fundamental units are those units which are independent of any other unit. Example: The unit of length, mass, time, temperature, current, angle, solid angle, luminous intensity, and amount of substance.**
- 4. Derived units can be expressed in terms of fundamental units. Examples: units of force, speed, acceleration.**
- 5. The S.I unit of length is metre and cgs unit is cm. Other units are mm, km, nm, micrometer. Non-metric units are astronomical unit, parsec, light year.**
- 6. The S.I unit of mass is Kg and cgs unit is gram. Other units are mg, quintal, tons.**
- 7. The S.I unit of time is second and it has same cgs unit. Other units are minute, hour, day, month, year, decade, century, millennium.**
- 8. Vernier caliper is an instrument to measure length accurately up to two decimal places. It has two scales – a Vernier scale which can be slide over a main scale and the main scale.**
- 9. The least count of the Vernier scale is given as value of one main scale division(x)/ total number of divisions on Vernier(n).**
- 10. When the outer and inner jaws of the Vernier do not coincide on bringing them together, we say that the scale has zero error. If they coincide it is free of error.**
- 11. There are two types of zero error- positive and negative zero error.**
- 12. If the zero of the Vernier lies right of the zero mark of the main scale, then it is positive zero error. If it lies left of the zero mark of main scale it is negative zero error.**
- 13. Screw gauge is an instrument to measure the thickness of a paper, diameter of a wire etc. accurately up to three decimal places.**
- 14. It has two scales: head scale or circular scale and the main scale.**
- 15. The pitch of the screw gauge is the distance moved by the screw along its axis in one complete rotation of its head.**

- 16.L.C of screw gauge = pitch of screw/ total number of divisions on circular scale.
- 17.On bringing the screw near the stud if the zero mark of the circular scale lies on the base line of the main scale then the instrument is free from any error but if it does not coincide then the instrument has zero error.
- 18.If the zero mark of the circular scale lies above the base line, then it is negative zero error and if it lies below the base line it is positive zero error.
- 19.Simple pendulum is a heavy point mass called the bob suspended from a rigid support by a massless and inextensible string.
- 20.Relationship between time period and frequency is  $f = 1/T$ .
- 21.The graph of  $T$  vs  $\sqrt{l}$  is a straight line and the graph of  $T^2$  vs  $l$  is also a straight line.
- 22.The Time period of a simple pendulum depends directly on the square root of the effective length of it and is inversely proportional to the square root of acceleration due to gravity.
- 23.The time period  $T = 2\pi\sqrt{l/g}$ .
- 24.Second's pendulum: A pendulum with a time period of oscillation equal to two seconds, is known as second's pendulum.

## **WORKASHEET**

### **VERY SHORT ANSWER TYPE QUESTIONS**

#### **1.A. Complete the following:**

- a)1 light year = -----m
- b)1 micron = -----Å
- c)1 quintal = -----kg
- d)1 year = ----- sec
- e)1 nano sec = -----sec

#### **B. CHOOSE THE CORRECT OPTION**

- a) The pitch of a screw means:
  - i) area of its head ii) thickness of the screw iii) the length of threading

iv) the distance moved in one rotation

b) If the length of a simple pendulum is made one-fourth, its time period becomes:

- i) 4- times    ii)  $\frac{1}{4}$  th times    iii) double    iv) half

### **SHORT ANSWER TYPE QUESTIONS**

2. Name three fundamental quantities and their respective units.

3) Name three derived quantities and state the fundamental quantities involved in it.

4) What are the requisites while choosing a unit?

5) Name two units of length which are bigger than a metre.

6) Name two non – metric units for measuring length.

7) Explain the meaning of 'Least count of an instrument'.

8) What is meant by zero error of a Vernier calipers? How is it determined?

9) The pitch of a screw gauge is 0.5 mm and the head scale are divided into 100 divisions. What is the least count of the screw gauge?

### **LONG ANSWER TYPE QUESTIONS**

10) Draw a simple pendulum and explain the terms: oscillation, frequency, time period, amplitude, effective length.

11) Plot and discuss the nature of the graphs:  $T^2$  vs  $l$  and  $T$  vs  $\sqrt{l}$ .

12) If the effective length of a simple pendulum is made 9 times the original, what will be the new time period? Find the ratio of the two time periods.

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