

CH # 2 MEASUREMENT

2.1 (a) From diagram 1 calculate the zero error. (b) From diagram 2 shows the reading obtained for the diameter of the sphere using the same caliper. Calculate the diameter of the sphere.

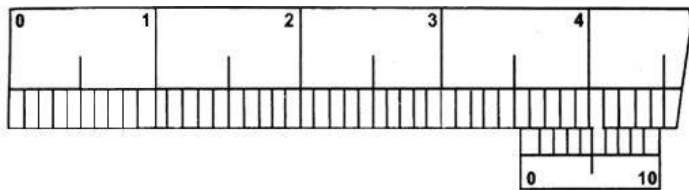
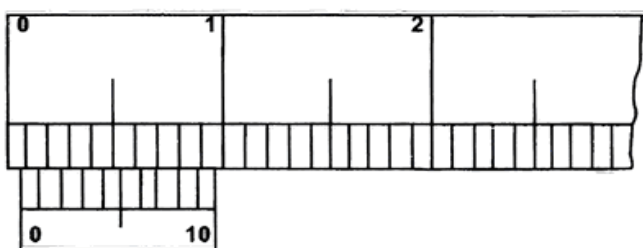


Diagram - 1

Diagram - 2



2.2: The mass of an electron is 9.11×10^{-31} Kg. Convert it in gm, mg and microgram.

SOLUTION:

Mass in gm:

$$\text{Mass of electron} = m = 9.11 \times 10^{-31} \text{ Kg}$$

$$\text{Since } 1 \text{ Kg} = 1000 \text{ gm}$$

$$m = 9.11 \times 10^{-31} \times 1000 \text{ gm}$$

$$m = 9.11 \times 10^{-28} \text{ gm}$$

Mass in mg:

$$\text{Since } 1 \text{ gm} = 1000 \text{ mg}$$

$$m = 9.11 \times 10^{-28} \times 1000$$

$$m = 9.11 \times 10^{-25} \text{ mg}$$

Mass in μg :

$$\text{Since } 1 \text{ mg} = 1000 \mu\text{g}$$

$$m = 9.11 \times 10^{-25} \times 1000$$

$$m = 9.11 \times 10^{-22} \mu\text{g}$$

2.3: The radius of hydrogen atom is 0.53×10^{-10} m. Convert it in cm, mm, nm.

SOLUTION:

Radius in cm:

$$\text{Radius of hydrogen atom} = r = 0.53 \times 10^{-10} \text{ m}$$

$$\text{Since } 1 \text{ m} = 100 \text{ cm}$$

$$r = 0.53 \times 10^{-10} \times 100$$

$$r = 0.53 \times 10^{-8} \text{ cm}$$

Radius in mm:

$$\text{Radius of hydrogen atom} = r = 0.53 \times 10^{-10} \text{ m}$$

$$\text{Since } 1 \text{ cm} = 10 \text{ mm}$$

$$r = 0.53 \times 10^{-8} \times 10$$

$$r = 0.53 \times 10^{-7} \text{ mm}$$

Radius in nm:

$$\text{Radius of hydrogen atom} = r = 0.53 \times 10^{-10} \text{ m}$$

$$\text{Since } 1 \text{ m} = 10^9 \text{ nm}$$

$$r = 0.53 \times 10^{-10} \times 10^9$$

$$r = 0.53 \times 10^{-9} \text{ nm}$$

2.4: The time taken by an electron to complete one rotation about its nucleus is 0.5×10^{-18} Sec. Convert it into minutes, hours and microseconds.

SOLUTION:

Time in minutes:

$$\text{Time} = t = 0.5 \times 10^{-18} \text{ Sec}$$

$$\text{Since } 1 \text{ min} = 60 \text{ sec}$$

$$t = \frac{0.5 \times 10^{-18}}{60}$$

$$t = 8.33 \times 10^{-21} \text{ min}$$

Time in hours:

$$\text{Time} = t = 0.5 \times 10^{-18} \text{ Sec}$$

$$\text{Since } 1 \text{ hr} = 3600 \text{ min}$$

$$t = \frac{0.5 \times 10^{-18}}{3600}$$

$$t = 1.38 \times 10^{-22} \text{ hr}$$

Time in microseconds:

$$\text{Time} = t = 0.5 \times 10^{-18} \text{ Sec}$$

$$\text{Since } 1 \text{ sec} = 10^6 \mu\text{sec}$$

$$t = \frac{0.5 \times 10^{-18}}{10^{-6}}$$

$$t = 0.5 \times 10^{-12} \mu\text{Sec}$$

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