

**UNIT-1****STRUCTURED QUESTIONS****1**

<b>Column A [ Action ]</b>	<b>Column B [ Branch ]</b>
<b>Cooking Bar B.Q</b>	<b>Thermodynamics</b>
<b>Turning the Bulb on</b>	
<b>Riding the bicycle</b>	
<b>Looking for Giant Galaxies</b>	
<b>Producing a loud sound</b>	
<b>Describing an atom</b>	
<b>Obtaining energy from earth</b>	

**SOLUTIONS**

<b>Column A [ Action ]</b>	<b>Column B [ Branch ]</b>
<b>Cooking Bar B.Q</b>	<b>Thermodynamics</b>
<b>Turning the Bulb on</b>	<b>Electricity</b>
<b>Riding the bicycle</b>	<b>Mechanics</b>
<b>Looking for Giant Galaxies</b>	<b>Astrophysics</b>
<b>Producing a loud sound</b>	<b>Acoustics</b>
<b>Describing an atom</b>	<b>Atomic physics</b>
<b>Obtaining energy from earth</b>	<b>Geo Thermal Energy</b>

**2 complete the given table**

PHYSICAL QUANTITY	S.I UNIT	TYPE
Ampere		
	$m^3$	
	sec	Base
Temperature		Base
	N	
Density	Kg per $m^3$	
Acceleration		

**SOLUTIONS**

PHYSICAL QUANTITY	S.I UNIT	TYPE
Ampere	Electric current	Base
Volume	$m^3$	Derive
Time	sec	Base
Temperature	kelvin	Base
Force	N	Derive
Density	Kg per $m^3$	Derive
Acceleration	$m \text{ per } s^2$	Derive

3 Convert the following values.

$$(a) 230 \text{ cm} = \frac{230}{100} = 2.3 \text{ m}$$

$$(b) 250 \text{ g} = \frac{250}{1000} = 0.25 \text{ kg}$$

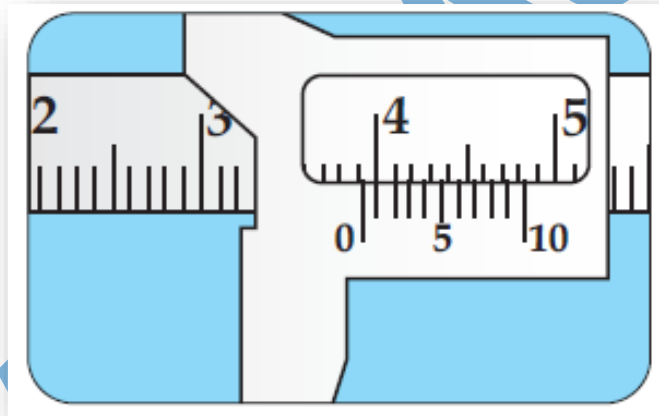
$$(c) 0.5 \text{ s} = \frac{0.5}{1000} \times 1000 \text{ s} = \frac{0.5 \times 1000}{10^3} \text{ s} = 500 \times 10^{-3} \text{ s} = 500 \text{ ms}$$

$$(d) 0.8 \text{ m} = \frac{0.8}{1000} \times 1000 \text{ m} = \frac{0.8 \times 1000}{10^3} \text{ m} = 800 \times 10^{-3} \text{ m} = 800 \text{ mm}$$

$$(e) 350 \text{ ms} = 350 \times 10^{-3} = \frac{350}{10^3} = 0.35 \text{ s}$$

$$(c) 1.2 \text{ kg} = 1.2 \times 10^3 = 1.2 \times 1000 = 1200 \text{ g}$$

4 An engineer measures the width of an aluminum sheet using Vernier caliper as shown in fig.



a) What is the measurement of the width of aluminum sheet

*main scale reading = 3.9 cm*

*vernier scale reading = 1 div*

*fractional part = 1 × 0.01 = 0.01 cm*

*measurement of width = 3.9 + 0.01*

*measurement of width = 3.91 cm*

b) Which gives more precise measurement Vernier caliper, Screw Gauge or meter rule?

**Screw Gauge are more precise measurement tools**

5. A pendulum swings as shown in figure from X to Y and back to X again

i) What would be the most accurate way of measuring time for one oscillation? with the help of a Stop Watch.

a) Record time for 10 oscillations and multiply by 10

*time for 10 oscillation = t seconds*

*time for 10 oscillation  $\times$  10 = (10 t) s*

b) Record time for 10 oscillation and divide by 10

*time for 10 oscillation and divided by 10 =  $\frac{(t)}{10}$  seconds*

c) Record time for one oscillation

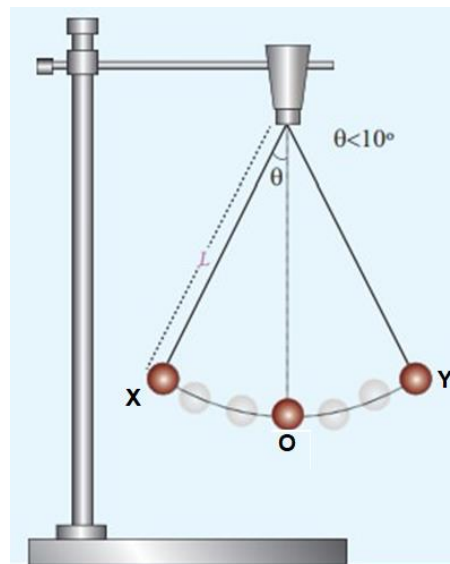
*time for one oscillation (T) =  $\frac{t}{10}$  seconds*

d) Record time from X to Y and double it

*time from x to y =  $\left(\frac{T}{2}\right) s = 2 \left(\frac{T}{2}\right) s = T s$*

ii) Suggest an instrument for measuring time period more accurately.

*digital stop watch*



6. write the correct prefix of notion

a)  $75000m = 750 \times 10^2 m = 750 hm$

b)  $\frac{1}{1000} sec = 1 \times 10^{-3} sec = 1 ms$

c)  $\frac{1}{1000000} g = 1 \times 10^{-6} g = 1 \mu g$

d)  $1000000000 m = 1 \times 10^9 m = 1 Gm$

### SCIENTIFIC NOTATION

7. Write values in standard and scientific notation

a) The radius of 1st orbit of Hydrogen atom is  $r = 0.53 \text{ \AA} = 0.53 \times 10^{-10} m$

$$r = 5.3 \times 10^{-1} \times 10^{-10} m$$

$$r = 5.3 \times 10^{-11} m$$

b) 1 light year is  $2628000000000 m = 2.6280 \times 10^{12} m$

c) Vacuum pressure  $2.7 \times 10^{-4} \text{ torr} = 2.7 \times 10^{-4} \text{ torr}$

## DENSITY AND VOLUME

8. A wooden piece is made in different shapes take length (L) = radius (r) = 2m  
Calculate its volume as a:

- a) Sphere                      b) Cube  
c) Cylinder                    d) Pyramid

(a) *Volume of sphere* =  $\frac{4}{3} \pi r^3$

*Volume of sphere* =  $\frac{4}{3} \pi (2)^3 = \frac{4}{3} \pi (8) = 33.51 \text{ m}^3$

(a) *Volume of cube* =  $L \times L \times L = L^3$

*Volume of cube* =  $(1)^3 = 1.0 \text{ m}^3$

(a) *Volume of cylinder* =  $\pi r^2 h = \pi r^2 L$

*Volume of cylinder* =  $\pi (2)^2(1) = \pi (4)(1) = 12.56 \text{ m}^3$

(a) *Volume of pyramid* =  $\frac{1}{3} (\text{base area}) (\text{height})$

*Volume of pyramid* =  $\frac{1}{3} (L \times b)(h) = \frac{1}{3} (1 \times 1)(1) = 1.0 \text{ m}^3$

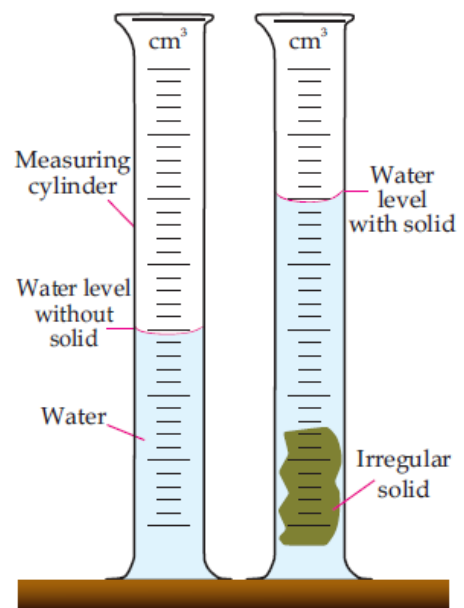
9 Find the density of wood as sphere and cube if the mass of wood is 1kg. Is there any change in density due to shape?

Ans

The density of the wood does not depend on its shape. Therefore, the density of the wood will be the same for both the sphere and the cube.

10 A measuring cylinder is filled with 500cc water. A stone of mass 20g is immersed in to the cylinder such that, water level rises up to 800cc. Which statement is correct?

- (a) The difference between the readings gives the density of stone.  
**incorrect**
- (b) The difference between the readings gives volume of the stone  
**correct**
- (c) The final reading gives the density of stone  
**incorrect**
- (d) The final reading gives the volume of stone  
**incorrect**



## SIGNIFICANT FIGURES

11. Write significant numbers in the following values.
- a) 980 has 2 Significant numbers.
- b) 91.60 has 4 Significant numbers.
- c) 10010.100 has 8 Significant numbers.
- d) 0.0086 has 2 Significant numbers.

### WORKED EXAMPLE

- 1 What is the mass a solid iron wrecking ball of radius 18 cm. if the density of iron is 7.8 gm/cm<sup>3</sup>?

#### DATA

$$r = 18 \text{ cm}$$

$$\rho = 7.8 \text{ g/cm}^3$$

$$m = ?$$

#### SOLUTIONS

*Volume of solid iron ball*

$$V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} \pi (18)^3$$

$$V = \frac{4}{3} (3.141) (5832)$$

$$V = 24424 \text{ cm}^3$$

#### SOLUTIONS

$$\rho = \frac{m}{v}$$

$$m = (\rho) (V)$$

$$m = (7.8) (24424)$$

$$m = 190507 \text{ gram}$$

Mass in kilogram

$$m = 190507 \text{ g}$$

$$m = \frac{190507}{1000} = 190.507 \text{ kg}$$