GIRLS' HIGH SCHOOL AND COLLEGE, PRAYAGRAJ

WORKSHEET – 2
SESSION 2020-2021
CLASS 7th (A, B, C, D, E, F)
SUBJECT: PHYSICS

NOTE – Parents are expected to ensure that the child reads scientific description about Density from the book of class 7th or internet. **Read the given passage carefully and answer the questions.**

Chapter 1 – Physical Quantities and Measurements

Topic 2 – DENSITY

In order to compare the 'heaviness' or 'lightness' of two different materials we need to compare the masses of objects of the same size or volume. **The density of a material is equal to its mass per unit volume.**

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

For example, we would express the common observation that iron is heavier than wood more accurately as "the density of iron is greater than that of wood". Density is a physical quantity with a magnitude that can be measured.

SI unit of Density is Kilogram per Cubic Metre, written in symbols as kg/m^3. Another unit of density that is in common use is gm/cm^3.

The relation between the two unit is - $1000 \ kg/m^3 = 1 \ gm/cm^3$

DENSITIES OF SOME COMMON SUBSTANCES

Substances	Density in kg/m^3	Relative Density
Water	1000	1.0
Kerosene	800	0.8
Mercury	13600	13.6
Gold	19300	19.3
Cork	200	0.2
Copper	8900	8.9

RELATIVE DENSITY

The Relative density of a body is defined as the ratio of the density of the material of the body to that of water. The density of water is taken as the standard with which the densities of other substances are compared.

$$\text{Relative Density} = \frac{\text{density of substance}}{\text{density of water}} = \frac{\text{Mass of unit volume of substance}}{\text{Mass of unit volume of water}}$$

As it is the ratio of two similar quantities, it has no unit.

Note: 1. The relative density of water is 1.
2. When the Relative Density of a substance, is less than Relative Density of water, the substance will float.
3. Things that are heavier than water, sink in water and those that are lighter than water, float on water.

Answer the following questions:-

Q.1 What is meant by density of a substance?
Q.2 Write the SI unit of density?
Q.3 What is the relative density of a substance?
Q.4 Which of the following would sink in water?
   a) Kerosene ($800 \ kg/m^3$)
   b) Gold ($19300 \ kg/m^3$)
   c) Ice ($916 \ kg/m^3$)
Q.5 Why does mercury sink in water?

Numerical – Example: A metal ball weighs 1.8 kg. The volume of the ball is 250 cc. Find the density of the metal.

Solution –   Weight of metal ball = 1.8 kg
        Volume of metal ball = 250 cc = $250 \times 10^{-6} \ m^3$
          [$1 \ m^3 = 10^6 \ cc$]
        Density $= \dfrac{M}{V} = \dfrac{1.8}{250 \times 10^{-6}} = \dfrac{1.8 \times 10^6}{250}$

          $= \dfrac{18 \times 10^4}{25}$

          $= 7200 \ kg/m^3$ **ANSWER**

Q.1 A box weighs 28 kg. The volume of a box is 320 cc. Find the density of the box.
Q.2 Find the mass of an ice cube of edge 2 cm. The density of ice is $916 \ kg/m^3$.
Q.3 A metallic object with a mass of 120 gram occupies a volume of 60 cm^3. Calculate the density of this metal.