* Define the term "Density" of a substance. State its S.I. and C.G.S unit and their relation -

A) The density of a substance is defined as the mass of a unit volume of that substance. Its S.I. Unit is $kg\,m^{-3}$ and C.G.S unit is $g\,cm^{-3}$.

RELATIONSHIP BETWEEN $kg\,m^{-3}$ and $g\,cm^{-3}$.

$1\,kg = 1000\,g$

or $1\,g = \frac{1}{1000}\,kg$

And,

$1\,m^3 = (100\,cm)^3$

$= (100 \times 100 \times 100)\,cm^3$

$= 10,00,000\,cm^3$

Or $1\,cm^{-3} = \frac{1}{10,00,000}\,m^3$

Now,

$1\,g\,cm^{-3} = \frac{1\,g}{1\,cm^3}$

$= \frac{\frac{1}{1000}\,kg}{\frac{1}{10,00,000}\,m^3}$

$= \frac{10,00,000}{1000}\,kg\,m^{-3}$

$= 1000\,kg\,m^{-3}$

Thus $1\,g\,cm^{-3} = 1000\,kg\,m^{-3}$

* How does the density of water change when it is heated from $0^\circ C \to 4^\circ C$?

A) The water contracts on heating from $0^\circ C \to 4^\circ C$ and the density increases.

*) How will density change with temperature?

A) When the water will be heated from $0^\circ C \to 4^\circ C$ the density will increase and when it is heated from $4^\circ C$ to above the density decreases.

*) The mass of 5 L water is 5 kg. Find the Density of water in gm/cm^3.

A) Density of water = $\frac{M}{V}$

$\Rightarrow \frac{\text{Mass}}{\text{Volume}} = \frac{5kg}{5l} = 1 g\,cm^{-3}$