$$B=\mu_0 \mathrm{H}(1+Xm) \qquad (\because 1+Xm=\mu_r)$$

$$B=\mu_0\mu_r H \qquad [\because \mu_r=\frac{\mu}{\mu_o}]\ (\mu=\mu_r\ X\ \mu_0)$$

$$\therefore\ B=\mu H$$

- **Diamagnetism/Diamagnetic substances**

Substances having atoms or molecules of xero magnetic moment and which are weakly repelled by a magnet are called Dia-magnetic substances.
E.g. Copper, gold, air, mercury, antimony, air, water, hydrogen.

Properties

1. Weakly magnetized in the direction, opposite to the external magnetic induction $\vec{B}$.
2. Permeability μ <1, but not very less than 1.
3. They lose their magnetism on removal of external magnetic field.
4. If placed in a non-uniform magnetic field a diamagnetic substance tents to move from the stronger part to the weaker part of the field.
5. The magnetic susceptibility is negative.
6. If a magnetic field is applied to a diamagnetic liquid in one arm of a u-tube, the liquid level lowers in that arm.

- **Para-magnetism/Paramagnetic substance**

Substances having atoms or molecules of non-zero or finite magnetic moment and which are really weakly attracted by a magnet are called para-magnetic substances.
E.g. Aluminum, platinum, chromium, oxygen, manganese, titanium, crown glass.

Properties

1. Weakly magnetized in the direction of the external magnetic induction $\vec{B}$.
2. Permeability $\mu > 1$, but not very larger than 1.
3. Loose their magnetism on removal of external field, they cannot be used to make permanent magnets.
4. If placed in a non-uniform magnetic field paramagnetic substance tents to move from the weaker part to the stronger part.
5. The susceptibility is positive and small.
6. If a magnetic field is applied to a paramagnetic liquid in one arm of a u-tube, the level rises in that arm.
7. The susceptibility decreases with rise in temp $[Xm \propto \frac{1}{T}]$.