

## **5. Chemical Properties of Materials:**

A study of chemical properties of materials is necessary because most of the engineering materials, when they come in contact with other substances with which they can react, tend to suffer from chemical deterioration.

The chemical properties describe the combining tendencies, corrosion characteristics, reactivities, solubilities, etc., of substances.

### **Some of the chemical properties are:**

- (i) Corrosion resistance.
- (ii) Chemical composition.
- (iii) Acidity or alkalinity

## **4. Magnetic Properties of Materials:**

Those materials in which a state of magnetisation can be induced are called “magnetic materials”. Such materials create a magnetic field in the surrounding space.

The magnetic properties of materials arise from the spin of electrons and the orbital motion of electrons around the atomic nuclei. In several atoms the opposite spins neutralise one another, but when there is an excess of electrons spinning in one direction, magnetic field is produced. All substances except ferromagnetic material which can form permanent magnets, exhibit magnetic effects only when subjected to an external electromagnetic field.

**Some of the important magnetic properties are:**

- (i) Permeability.
- (ii) Coercive Force.
- (iii) Magnetic hysteresis.

- **Absolute Permeability:**

It is the ratio of the flux density in a material to the magnetising force producing that flux density and is denoted by  $\mu$ ;  $\mu = \mu_0 \mu_r$  where  $\mu_0$  is the permeability of free space.

- **Coercive Force:**

- It may be defined as the magnetising force which is necessary to neutralise completely the magnetism in an electromagnet after the value of magnetising force becomes zero.