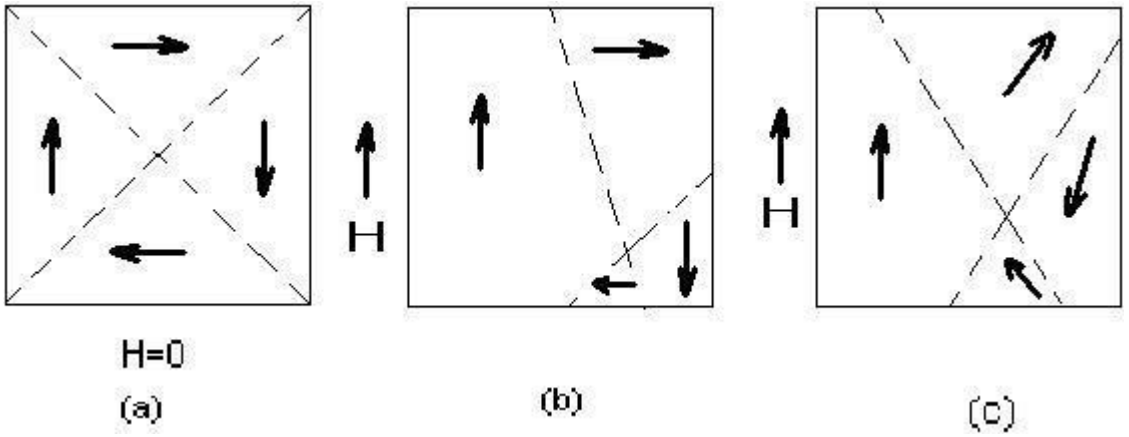
Domain theory of ferromagnetic materials:

A magnetic domain is a region within a magnetic material in which the magnetization is in a uniform direction. Ferromagnetic materials tend to form magnetic domains. Each domain is magnetized in a different direction. Applying a field changes domain structure. Domains with magnetization in the direction of the field grow. (Domain growth) Domain structure minimises energy due to stray fields. Domains with magnetization in the direction of the field grow while other domains shrink. Applying very strong fields can saturate magnetization by creating a single domain. (Domain rotation)

Hysteresis: The property of Ferromagnetic materials which gives the relation between Magnetization and the strength of Magnetic field is called Hysteresis. The magnetization of



the specimen increases from zero to higher values and attains its maximum value at a point referred to as Saturation Magnetization. When we further increase Magnetic field H there is no further increment in

magnetic moment.When we decrease Magnetic field H to Zero, the Magnetization M attains point Q referred to as Residual Magnetization. Further if we change the magnetic field from zero to negative values, the magnetization of material becomes zero at a point R, where magnetic field Hc is referred to as Coercivity of the specimen. If we increase Magnetic field H in reverse direction Magnetization of material reaches its peak value at a point S. The area of loop indicates the amount of energy wasted in one cycle of operation

Hysteresis loop

The loop traced out by magnetization in a ferromagnetic or ferrimagnetic material as the magnetic field is cycled.