1. Explain B-H hysteresis and hysteresis loss.

When a ferromagnetic material is made to undergo through a cycle of magnetization the variation of B with respect to H can be represented by a closed hysteresis loop or curve that is it refers to the lagging of magnetization behind the magnetizing field.

If a magnetizing field H is applied to a ferromagnetic material and if H is increased to $H_{\text{max}}$ the material acquires magnetism so the magnetic induction also increases represented by ‘Oa’ in the fig. Now if the magnetic field is decreased from $H_{\text{max}}$ to zero, the magnetic induction will not fall rapidly to zero, but falls to “b” rather than zero. This shows that even when the applied field is zero or removed, the material still acquires some magnetic induction “ob”. This property of existence of magnetic induction, even when the applied field is zero is called residual magnetism or retentivity. Inorder to make this residual magnetism zero, the magnetic field strength is reversed and increased to $-H_{\text{max}}$ while increasing the reverse field the value of magnetic induction reaches zero at the point c. Thus the magnetic field required to bring the magnetic induction (B) into zero (Oc) is called Coercivity and hence we get the curve “bcd”. Then the reverse field $-H$ is reduced to zero and the corresponding curve “de” is obtained and by further increasing H to H max the curve “efa” is obtained. The lagging of flux density with respect to magnetizing field H is called Hysteresis and the closed loop is known as hysteresis loop.

**Hysteresis Loss**

To produce a magnetic field, a certain amount of energy needs to be applied. In the case of ferromagnetic material all the energies supplied for producing magnetic field cannot be utilized in which part of the energy is lost in the form of heat.

The loss of energy during one complete cycle of magnetization is observed to be proportional to the area of hysteresis loop. The energy which appears as heat energy during magnetization is called hysteresis loss.

The loss is represented by the area enclosed by the hysteresis loop. The shape of the B-H curve depends upon the nature of the ferromagnetic material.