Determination of Hysteresis loss :-

Let us consider a ring of specimen circumference l metres, cross-sectional area a metre^2 and having N turns of an insulated wire. Let the current flowing through the coil be of I amperes

$$\text{Magnetizing force, } H = \frac{NI}{l}$$

$$\text{or, } I = \frac{Hl}{N}$$

Let the flux density at this instant be B. Total flux through the ring,

$$\phi = B \cdot a \text{ webers.}$$

When the current flowing through the solenoid alters, the flux produced in the iron ring also alters, so the emf (e') is induced, whose value is given by

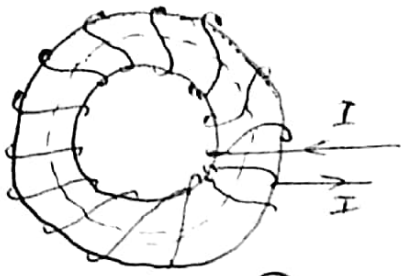

Fig-①

$$e' = -N\frac{d\phi}{dt} = -N\frac{d(B\cdot a)}{dt}$$

$$= -Na\frac{dB}{dt}$$

According to Lenz's law this induced emf will oppose the flow of current, therefore, in order to maintain the current I in the

coil, the source of supply must have an equal and opposite emf.

Hence applied emf, $e = -e'$

$$= N a \frac{dB}{dt}$$

Energy consumed in short time dt, during which flux $d\phi$