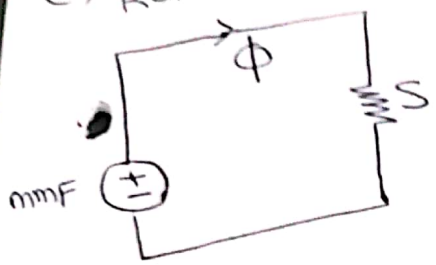
Difference between magnetic ckt and Electric Circuit :-

Magnetic Circuit

1). Flow is of Flux

2). mmf is the cause of flux

3) $\frac{mmf}{Reluctance} = \frac{NI}{S} = \phi$



4):- $S = \frac{L}{\mu_0 \mu_r A}$

5):- $Permeance = \frac{1}{S}$

6):- Magnetic Field density =

$$B = \frac{\phi}{A}$$

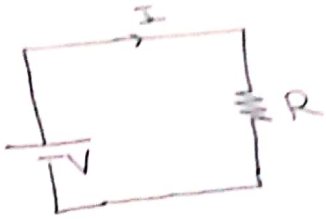
i.e Flux per unit area

Electric Field

1). Flow is of current

2). EMF is the cause of current

3). $I = \frac{V}{R}$



4):- $R = \frac{\rho L}{A}$

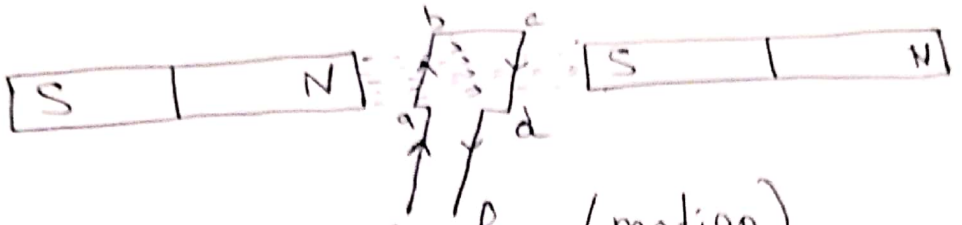
5):- $Conductance = \frac{1}{R}$

6):- current density $(\bar{J}) = \frac{I}{A}$

i.e current per unit Area

Flemings left hand rule :-

→ This rule is used in motors to find out the direction of force on a current carrying conductor in a magnetic field.



- Thumb = direction of force (motion)
- First finger = direction of flux
- middle finger = direction of current.
- place all the 3 fingers at right angle to eachother.

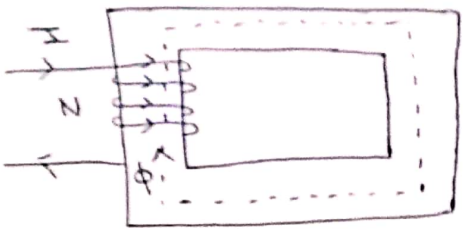
→ In the above case, direction of current is from Left of right and direction of current in section a-b is inside. Then in this case, direction of force will be downward.

suppose in section c-d, current will flow outward. So in this section, direction of force will be upward.

Remember F·L·R is used in DC motor while R·R is used in DC generators.

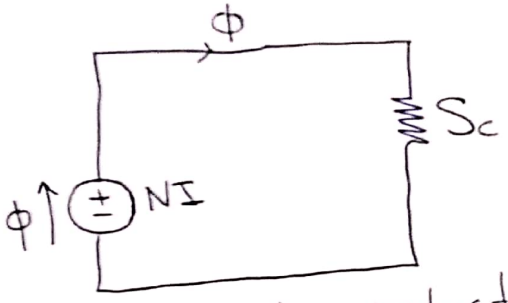
Ckt 1:-

model the below given magnetic circuit into electrical circuit.



{ Direction of ϕ, can be found by Right hand thumb rule

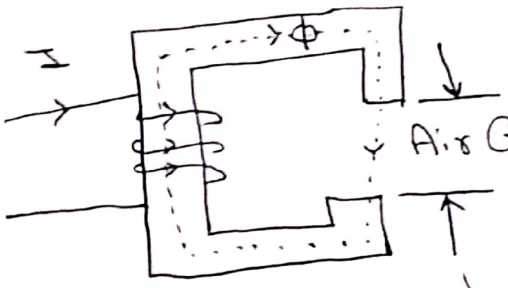
Ans:- The equivalent electrical circuit is shown below.



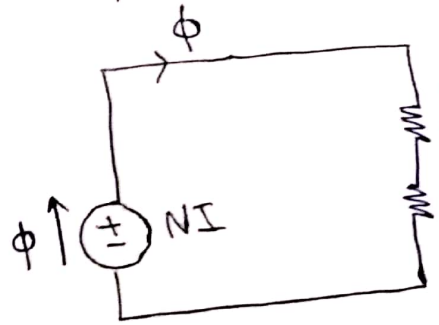
where S_c is the reluctance of the core.

Ckt #2:-

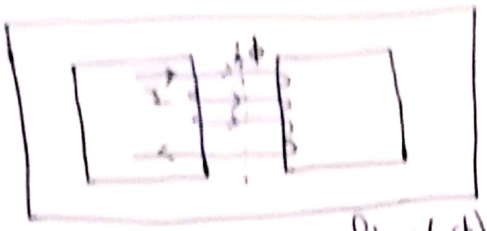
model the below given magnetic ckt into electrical ckt.



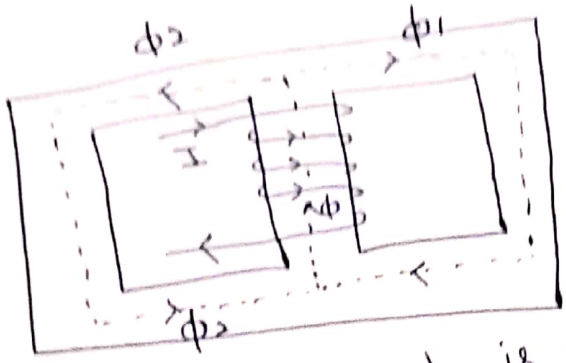
The equivalent electrical ckt is shown below:-



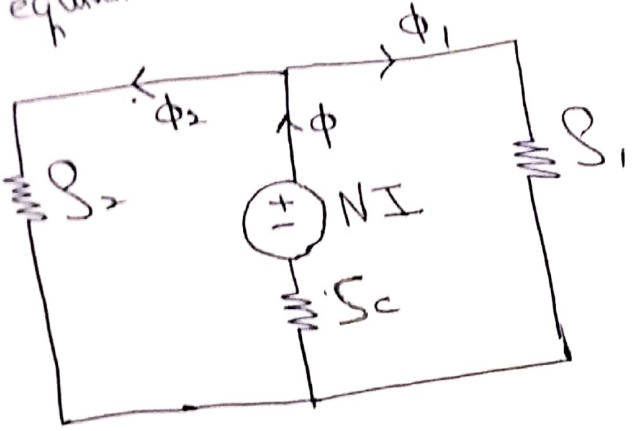
ckt 3:-



In this case, the total flux(ϕ) will divide itself into 2 fluxes, ϕ_1 & ϕ_2. as shown below:-



The equivalent electrical ckt is shown below:-

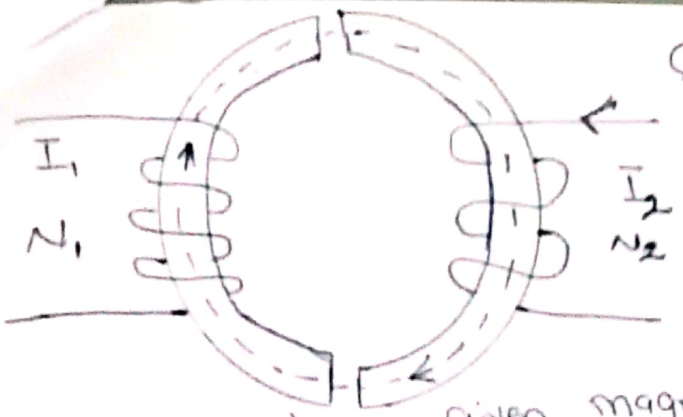


where S_c = Reluctance of the core.

S_1 = Reluctance of Right portion of the core

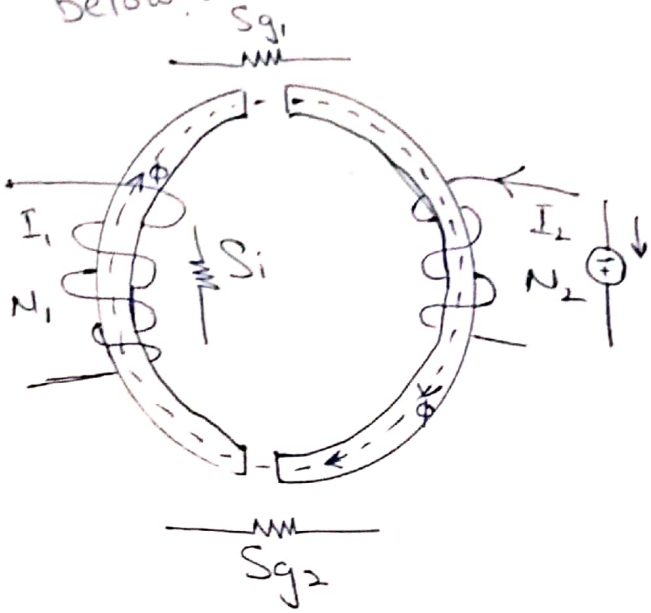
S_2 = Reluctance of Left portion of the core.

Ckt 4..

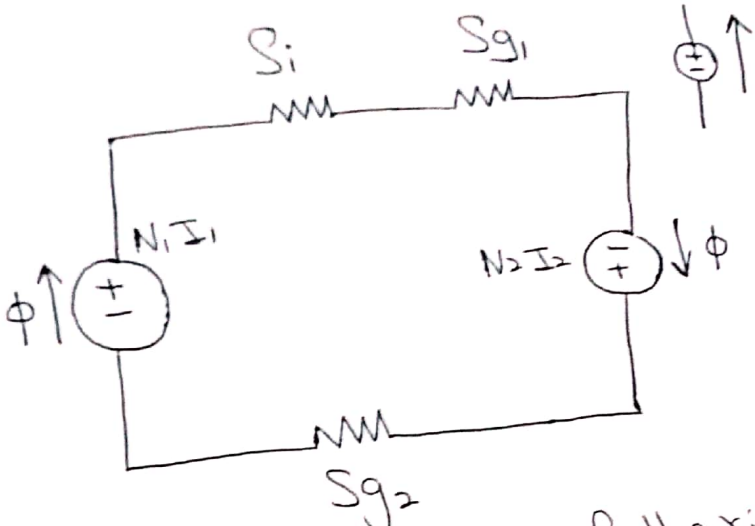


Model the above given magnetic Circuit as electrical circuit.

Ans:- i):- First of all we will find the direction of flux by right hand thumb rule as shown below.-



ii):-



where S_i = Reluctance of the ring

Sg_1 = Reluctance of above air gap (b/w ring)

Sg_2 = " " below " " (" ")