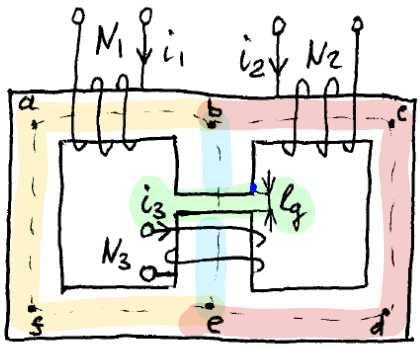
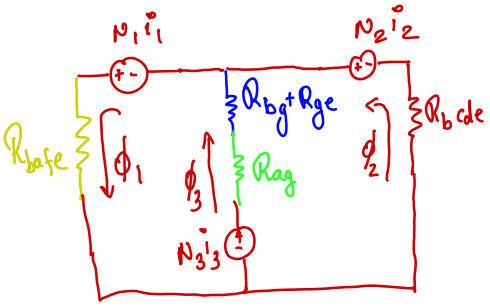
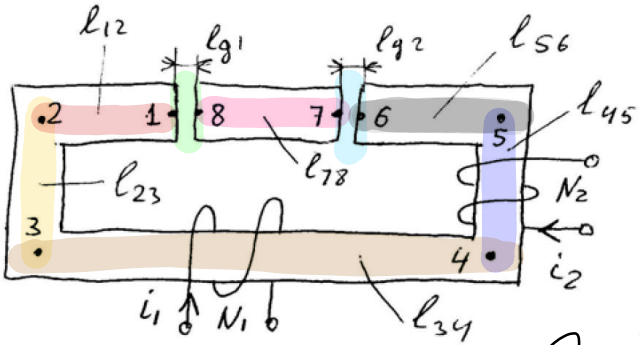
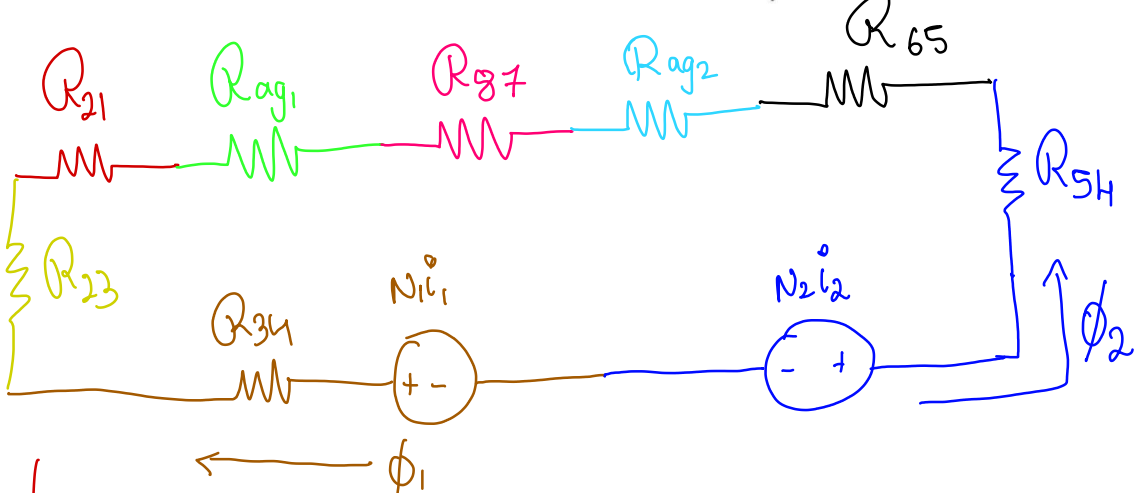
For the given magnetic system, draw the equivalent magnetic circuit and label mmf sources, reluctances, and fluxes (include directions).

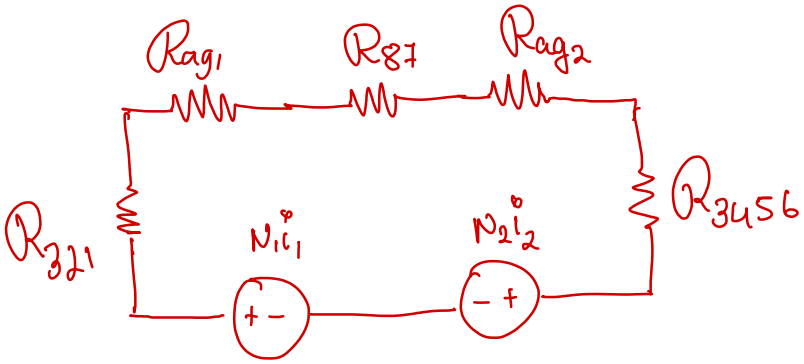








more simpler



Problem 1.2:

In the magnetic system of Fig. P1.2 two sides are thicker than the other two sides. The depth of the core is 10 cm, the relative permeability of the core $\mu_r = 2000$, the number of turns $N = 300$, and the current flowing through the coil is $i = 1$ A.

(a) Determine the flux in the core.

(b) Determine the flux densities in the parts of the core.

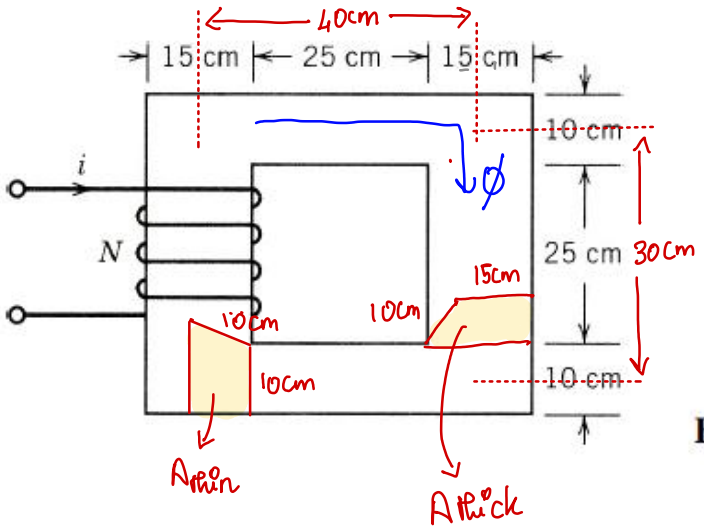
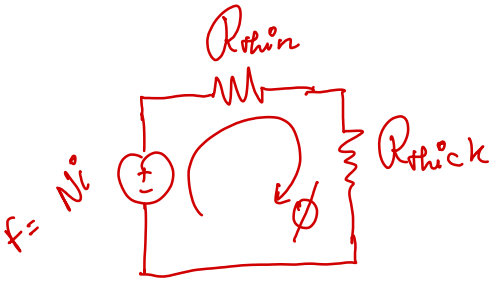


FIGURE P1.2

given
$\mu_r = 2000$
$N = 300$
$i = 1A$



$$F = \phi(R_{thin} + R_{thick})$$

$$\phi = \frac{F}{R_{thin} + R_{thick}}$$

$$R_{thin} = \frac{l^c_{mean}}{\mu_0 \mu_r A_{thin}} = \frac{80 \times 10^{-2}}{4\pi \times 10^{-7} \times 2000 \times 10 \times 10 \times 10^{-4}} = 31830.91$$

$$R_{thick} = \frac{l^c_{mean}}{\mu_0 \mu_r A_{thick}} = \frac{70 \times 10^{-2}}{4\pi \times 10^{-7} \times 2000 \times 10 \times 15 \times 10^{-4}} = 18568.03$$

$$F = Ni = 300 \text{ At}$$

$$\phi = \frac{300}{31830.91 + 18568.03} = 5.952 \times 10^{-3} \text{ Wb}$$

$$B_{thick} = \frac{\phi}{A_{thick}} = \frac{5.952 \times 10^{-3}}{10 \times 15 \times 10^{-4}} = 0.3968\ T$$

$$B_{thin} = \frac{\phi}{A_{thin}} = \frac{5.952 \times 10^{-3}}{10 \times 10 \times 10^{-4}} = 0.595\ T$$