

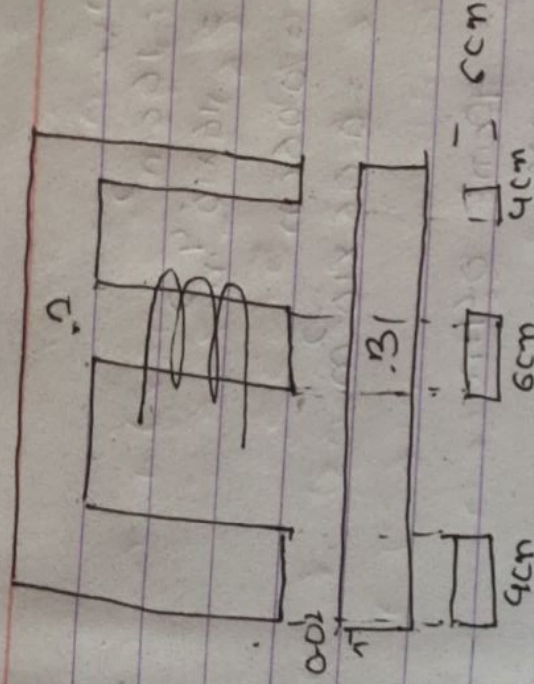
Soln

$$l_{c1} = 0.5 \text{ m} = l_{c2}$$

$$l_{c3} = 0.2 \text{ m}$$

$$\phi = 0.75 \times 10^{-3} \text{ wb}$$

$$\mu_r = 5000$$



$$R_{c1} = R_{c2} = \frac{l_{c1}}{\mu_0 \mu_r A_{c1}}$$

$$= 0.5$$

$$= \frac{5000 \times 40 \times 24 \times 10^{-4}}{}$$

$$= 33157.27$$

$$R_{g1} = R_{g2} = \frac{l_{g1}}{\mu_0 \mu_r A_{g1}} = \frac{0.02 \times 10^{-2}}{4024 \times 10^{-4}} = 56314.56$$

$$R_{g3} = \frac{l_{c3}}{\mu_0 \mu_r A_{c3}} = \frac{0.02 \times 10^{-2}}{48 \times 10^{-3} \times 36 \times 10^{-4}} = 44209.706$$

$$R_{c3} = \frac{l_{c3}}{\mu_0 \mu_r A_{c3}} = 0.2$$

$$= \frac{40 \times 5000 \times 36 \times 10^{-4}}{}$$

$$= 8841.34$$

$$R_{eq} = ?$$

$$R_{eq} = [R_{c1} + R_{g1}] / [R_{c2} + R_{g2}]$$

$$+ [R_{c3} + R_{g3}]$$

$$= \frac{99471.83 \times 99471.83}{99471.83 + 99471.83}$$

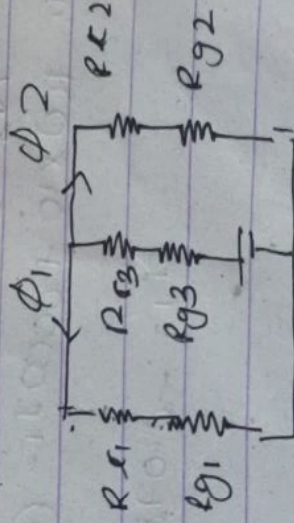
$$= 102787.561$$

$$+ 53051.646$$

$$\text{we know, } mmf = \phi R_{eq}$$

$$mmf = 0.75 \times 10^{-3} \times 102787.561$$

$$= 77.09 \text{ Amp turn}$$



Given

$$A = 16 \text{ cm}^2$$

$$= 16 \times 10^{-4} \text{ m}^2$$

$$l_g = 0.06 \text{ cm}$$

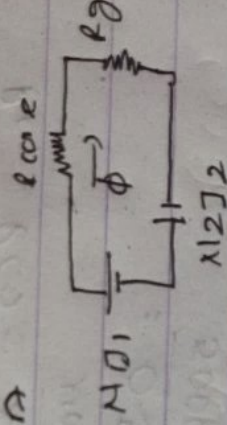
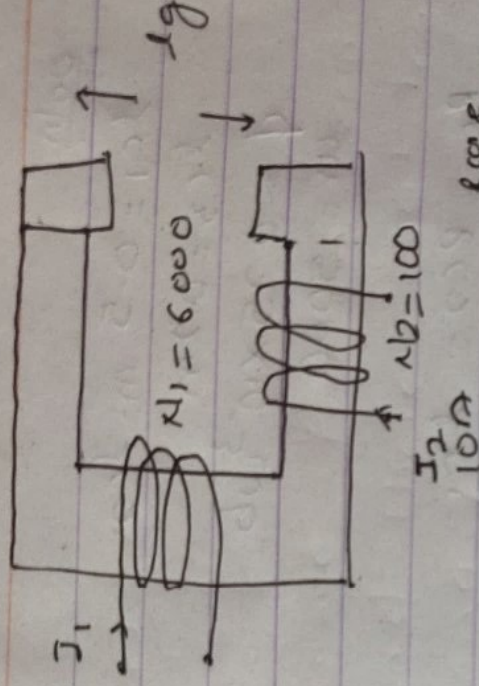
$$= 0.06 \times 10^{-2} \text{ m}$$

$$l_c = 40 \text{ cm} = 0.4 \text{ m}$$

$$\mu_r = 6000$$

$$B = 1 \text{ T}$$

$$\phi = 16 \times 10^{-4} \text{ wb}$$



$$R_{\text{core}} = \frac{l_c}{\mu_r \mu_0 A} = 0.4$$

$$= \frac{0.4}{6000 \times 4\pi \times 10^{-7} \times 16 \times 10^{-4}}$$

$$= 2.316 \times 10^4 \text{ AT/wb}$$

$$R_g = \frac{l_g}{\mu_0 A} = \frac{0.06 \times 10^{-2}}{4\pi \times 10^{-7} \times 16 \times 10^{-4}}$$

$$= 29841 \times 10^4 \text{ AT/wb}$$

Now using KVL

$$N_2 I_2 + N_1 I_1 - \phi R_g - \phi R_{\text{core}} = 0$$

$$\text{or, } 100 \times 10 + 6000 I_1 - (16 \times 10^{-4}) \times 29841 \times 10^4 - (16 \times 10^{-4}) \times 2.316 \times 10^4 = 0$$

$$I_1 = -0.078 \text{ A}$$