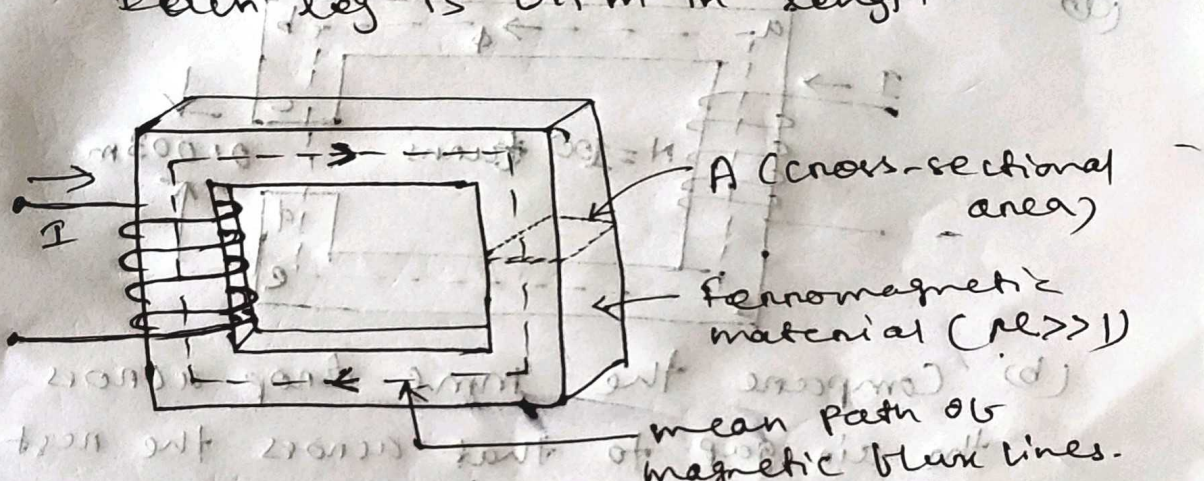
Assignment -2 [Magnetic Circuit]

Q-1 Determine the reluctance of the structure of fig.-1 as shown if the cross-sectional area is $0.01 \times 0.01\ m^2$ & $\mu_r = 2000$. Assume that each leg is 0.1 m in length and that the mean magnetic path runs through the exact center of the structure.

Given: $A = 0.01 \times 0.01\ m^2$

$\mu_r = 2000$

Each leg is 0.1 m in length.

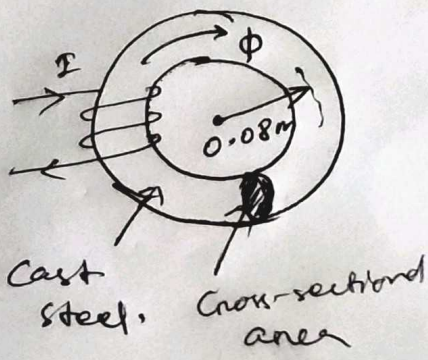


Q-2 (i) Find the reluctance of a magnetic circuit if a magnetic flux $\phi = 4.2 \times 10^{-4}$ Wb is established by an impressed mmf of 400 AT.

(ii) Find the magnetizing force 'H' in SI units if the magnetic circuit is 6 inch long.

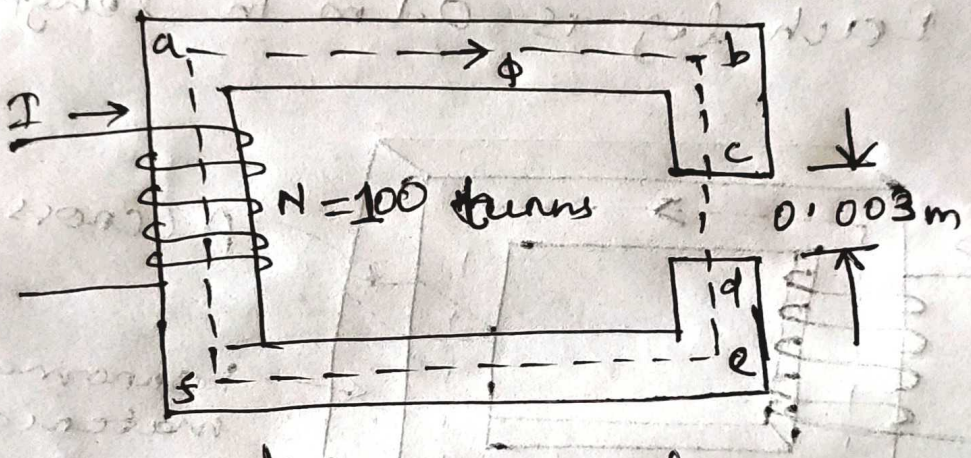
Q-3 Find the magnetic flux ϕ established in the series magnetic circuit of the figure shown. Given: Current = 2A, $r = 0.08$ m, Area of cross-section = $A = 0.009\ m^2$

$\mu_r = 1000$, length (l) $= 2\pi r$.



Q-4 (a) Find the current I required to established a flux $\phi = 2.4 \times 10^{-4}$ wb in the magnetic circuit of the fig shown. Here area (throughout) $A = 2 \times 10^{-4}\ m^2$, $l_{ab} = l_{ef} = 0.05\ m$, $l_{af} = l_{be} = 0.02\ m$, $l_{bc} = l_{dc} = 8.5 \times 10^{-3}\ m$ & the material is steel. Given; $\mu_r = 1000$

(b)



(b) Compare the mmf drop across the air gap to that across the rest of the magnetic circuit. Discuss your results, using the value of μ for each material.