

Given:

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

$$l_g = 0.2 \text{ mm} = 0.2 \times 10^{-3} \text{ m}$$

$$l_i = 0.33 \text{ m}$$

$$l_{\text{steel}} = 0.33 \text{ m}$$

$$\phi = 8 \times 10^{-4} \text{ Wb}$$

$$\mu_i = 166$$

$$\mu_{\text{steel}} = 800$$

$$\text{Total mmf } F = \phi \times S_{\text{Total}}$$

$$= \phi [S_{\text{iron}} + S_{\text{air gap}} + S_{\text{steel}}] \quad \text{--- (1)}$$

$$S_{\text{iron}} = \frac{l_i}{\mu_0 \mu_i a_i} = \frac{0.33}{4\pi \times 10^{-7} \times 166 \times 10 \times 10^{-4}}$$

$$= 1581961.78$$

$$S_{\text{air gap}} = \frac{2 l_g}{\mu_0 a_g} = \frac{2 \times 0.2 \times 10^{-3}}{4\pi \times 10^{-7} \times 10 \times 10^{-4}}$$

$$= 318309.89$$

$$S_{\text{steel}} = \frac{l_{\text{st}}}{\mu_0 \mu_{\text{steel}} a_{\text{st}}} = \frac{0.33}{4\pi \times 10^{-7} \times 10 \times 10^{-4}}$$

$$= 328257.1$$

Plans (1)

$$F = 1782.82 \text{ AT} \quad \text{Answer}$$