

Arbeitsunterlagen "Materie im mag. Feld"

(BSP)

$$B = 1,2 \text{ T}$$

$$l_m = 40 \cdot 10^{-2} \text{ m}$$

$$H = 5 \frac{\text{A}}{\text{cm}} = 500 \frac{\text{A}}{\text{m}}$$

$$\Phi = H \cdot l_m$$

$$500 \frac{\text{A}}{\text{m}} \cdot 40 \cdot 10^{-2} \text{ m} = \underline{\underline{200 \text{ A}}}$$

$$H = \frac{I \cdot N}{l_m}$$

$$B = H \cdot \mu \quad | : \mu_0$$

$$\mu_R = \frac{B}{\mu_0 \cdot H} = \frac{1,2 \text{ T}}{1,257 \cdot 10^{-6} \cdot 500 \frac{\text{A}}{\text{m}}} = \underline{\underline{1900}}$$

1) $A = 25 \text{ cm}^2 = 25 \cdot 10^{-4} \text{ m}^2$

$$H = 20 \text{ A/cm} = 2000 \frac{\text{A}}{\text{m}}$$

$$B = 1,6 \text{ T}$$

$$\Phi = B \cdot A = \underline{\underline{0,4}}$$

$$B = H \cdot \mu$$

2) a) $H = 2 \frac{\text{A}}{\text{cm}} \quad \mu_R = \frac{1 \text{ T}}{1,257 \cdot 10^{-6} \cdot 200} = \underline{\underline{3977,772}}$

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

b) $B = 0,8 \text{ T} \quad \mu_R = \frac{0,8 \text{ T}}{1,257 \cdot 10^{-6} \cdot 170 \frac{\text{A}}{\text{m}}} = \underline{\underline{374374}}$

$$H = 1,7 \frac{\text{A}}{\text{cm}}$$

$$\mu_R = 374374$$

c) $H = 1400 \frac{\text{A}}{\text{cm}} = \underline{\underline{14000 \frac{\text{A}}{\text{m}}}}$

$$B = 1,8 \text{ T}$$

$$\mu_R = \frac{1,8 \text{ T}}{1,257 \cdot 10^{-6} \cdot 14000} = \underline{\underline{10218,5}}$$

d) $H = 8 \frac{\text{A}}{\text{cm}} = \underline{\underline{800 \frac{\text{A}}{\text{m}}}}$

$$B = 0,2 \text{ T}$$

$$\mu_R = \frac{0,2 \text{ T}}{1,257 \cdot 10^{-6} \cdot 800} = \underline{\underline{198,89}}$$

$$\mu_R = 10218,5$$

e) $B = 0,8 \text{ T}$

$$H = 40 \frac{\text{A}}{\text{cm}}$$

$$\mu_R = \frac{0,8 \text{ T}}{1,257 \cdot 10^{-6} \cdot 4000} = \underline{\underline{159,11}}$$

f) $H = 20 \frac{\text{A}}{\text{cm}} = 2000 \frac{\text{A}}{\text{m}}$

$$B = 0,6 \text{ T}$$

$$\mu_R = \frac{0,6 \text{ T}}{1,257 \cdot 10^{-6} \cdot 2000} = \underline{\underline{238,66}}$$

$$\mu_R = 238,66$$

3) $A = 30 \cdot 10^{-3} \cdot 40 \cdot 10^{-3} = \underline{\underline{0,0012 \text{ m}^2}}$

$$U = R \cdot I$$

$$l_m = 500 \text{ mm} = 500 \cdot 10^{-3} \text{ m}$$

$$I = \frac{U}{R} = \underline{\underline{0,275 \text{ A}}}$$

$$N = 1600 \quad \mu = 1,275 \cdot 10^{-6}$$

$$H = \frac{0,275 \text{ A} \cdot 1600}{500 \cdot 10^{-3} \text{ m}} = \underline{\underline{880 \frac{\text{A}}{\text{m}}}}$$

$$R = 400 \Omega \quad B = 880 \frac{\text{A}}{\text{m}}$$

$$880 \frac{\text{A}}{\text{m}} = \underline{\underline{8,8 \frac{\text{A}}{\text{cm}}}}$$

$$U = 110 \text{ V}$$

$$\Phi = B \cdot A$$

$$\frac{0,22}{880 \frac{\text{A}}{\text{m}} \cdot 1,275 \cdot 10^{-6}} = \mu_R$$

$$B = 0,22 \text{ T}$$

$$\mu = 1,275 \cdot 10^{-6} \cdot \mu_R$$

$$\mu_R = \underline{\underline{146,1}}$$

$$\Phi = 0,22 \text{ T} \cdot 0,0012 \text{ m}^2 = \underline{\underline{9,264 \text{ mWb}}}$$