

PHYS 1304 Test #3

$$1-) L = \frac{N\Phi_B}{I} \Rightarrow \Phi_B = \frac{LI}{N}$$

$$\Phi_B = \frac{(3.1 \times 10^{-3}) \times (3 \times 10^{-3})}{120} \Rightarrow \boxed{\Phi_B = 7.75 \times 10^{-8}}$$

$$2-) V_{rms} = I_{rms} \cdot Z$$

$$120 = 3 \cdot Z$$

$$Z = 40 \Omega$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$40 = \sqrt{17^2 + (3769 - X_C)^2}$$

$$X_C = 3733$$

$$X_L = \omega L = 2\pi f L = \text{vowen } 2\pi \cdot 60 \cdot 10 = 3769 \Omega$$

$$X_C = \frac{1}{\omega C} = \frac{1}{2\pi f C}$$

$$C = \frac{1}{2\pi f X_C} \Rightarrow$$

$$\boxed{C = 7.1 \times 10^{-7}}$$

$$(\Delta V_{coil})_{rms} = I_{rms} \cdot \sqrt{R^2 + X_L^2} = 3 \cdot \sqrt{17^2 + 3769^2}$$

$$(\Delta V_{coil})_{rms} \approx 11309 \text{ V}$$

$$3-) \lambda = 650 \text{ nm} \Rightarrow \text{Red Light}$$

$$f = \frac{c}{\lambda} = \frac{3 \times 10^8}{650 \times 10^{-9}}$$

$$\boxed{f = 4.62 \times 10^{14} \text{ Hz}}$$

$$4-) \quad \frac{n_1}{n_2} = \frac{\sin \theta_2}{\sin \theta_1} \Rightarrow n_2 = n_1 \frac{\sin \theta_1}{\sin \theta_2} = 1,33 \cdot \frac{\sin 32}{\sin 20}$$

$$n_2 = 2,06$$

$$v_2 = \frac{c}{n_2} = \frac{3 \cdot 10^8}{2,06} \Rightarrow \boxed{v_2 = 1,46 \times 10^8 \text{ m/s}}$$

$$5-) \quad \frac{1}{f} = \frac{1}{p} + \frac{1}{q}$$

$$\frac{1}{f} = \frac{1}{32} + \frac{1}{8}$$

$$\boxed{f = 6,4 \text{ cm}}$$

$$M = -\frac{q}{p} = -\frac{8}{32} \Rightarrow \boxed{M = -0,25}$$