

6-3 Soln)

A)

$$\mathcal{E} = (-)L \frac{dI}{dt}$$
$$L = (-) \frac{\mathcal{E}}{\frac{dI}{dt}} = \frac{1.6}{0.4} = 4 \text{ H} .$$

B) We showed in class that the inductance of a solenoid is (approximately)

$$L_{\text{Solenoid}} = \frac{\mu_0 N^2 A}{l} = \frac{\mu_0 N^2 \pi d^2}{4l} ,$$

So,

$$N = \sqrt{\frac{4lL}{\mu_0 \pi d^2}} = \sqrt{\frac{4(0.0254)(4)}{(4\pi \times 10^{-7})\pi(0.00635^2)}} = 50,500 \text{ turns} .$$

Hahahahaha!