

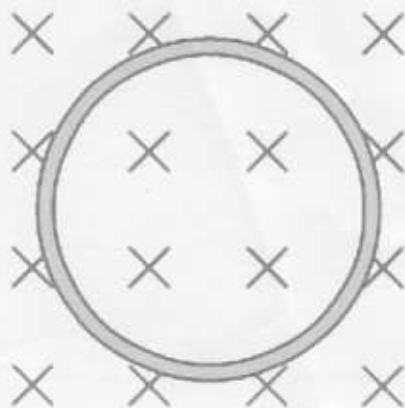
SOLUTION QUIZ 2

NAME: _____

Quiz #2a:
Phys270

SECTION 0104

1. [10 pts] A loop of wire with $N=100$ turns and a radius of 3m is situated in a decreasing magnetic field of 1T/sec whose direction is depicted below.
- a. [3 pts] What is the direction of the induced current? Draw the direction of the diagram and explain your reasoning
- Clockwise
The clockwise current tends to reinforce the decreasing $\otimes \vec{B}$ field inside the loop (Lenz's law)
- b. [7 pts] What is the magnitude of the current if the resistance of the loop is 10 Ohms ?



Induced potential

$$\mathcal{E}_{\text{ind}} = \left| - \frac{d\Phi}{dt} \right|$$

$$= N \pi r^2 \left| \frac{dB}{dt} \right|$$

$$= 100 \times \pi (3)^2 \times 1$$

$$= 900\pi \text{ volts}$$

$$R = 10 \Omega$$

$$\therefore I_{\text{ind}} = \frac{900\pi}{10} = 90\pi \text{ A}$$