

SOLUTION QUIZ 2

NAME: _____	Quiz #2b: Phys270
_____	SECTION 0102

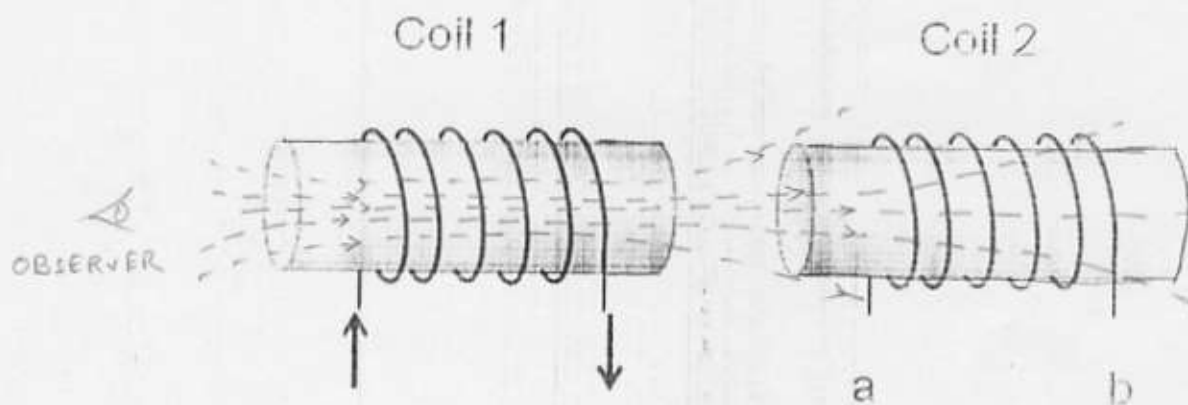
1. [3 pts] A solenoid of radius R , length L , and a total of N turns carries a current I . Assume that the length is much longer than the radius (that is, assume the solenoid is infinitely long). What is the expression for the magnitude of the magnetic field inside the solenoid?

number of turns/length = $N/L = n$

$$|\vec{B}| = \mu_0 n I = \mu_0 \frac{N}{L} I$$

[Since $L \gg R$, hence we assume infinite solenoid]

2. In the figure below, the current direction in coil #1 is given by the black arrows:



- a. [3 pts] What is the direction of the B-field produced by coil #1 inside of coil #2? Draw your answer on the diagram and explain your reasoning.

As seen by the observer

Coil 1 $\rightarrow$ clockwise current

$\therefore B$ is from left to right

- b. [4 pts] Given that the current in coil #1 is decreasing, which point is at a higher potential (voltage), point "a" or "b"? Explain your reasoning.

If current in coil 1 is decreasing then $\vec{B}$ in coil 2 is decreasing too. Hence a clockwise current in coil 2 is induced. Therefore current flows from 'a' $\rightarrow$ 'b'

Hence 'a' is at higher potential.