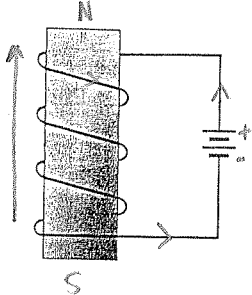


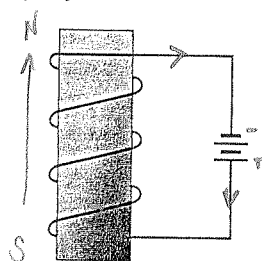
# R.H.R. #2 Homework

1. Copy the following images of a solenoid into your notebook. For each current-carrying coil, sketch a view of the magnetic field around the coil, based on the direction of current flow shown. On each, label the polarity (north and south) of the electromagnet.

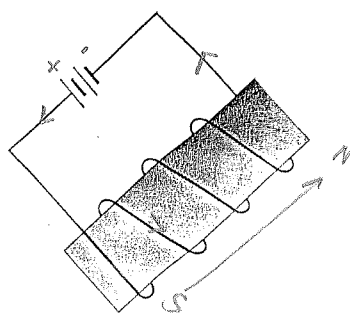
a) Fig.9.23a



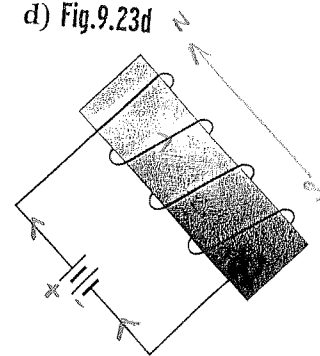
b) Fig.9.23b



c) Fig.9.23c

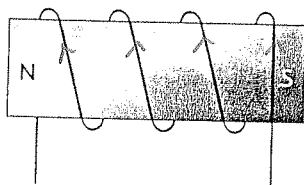


d) Fig.9.23d

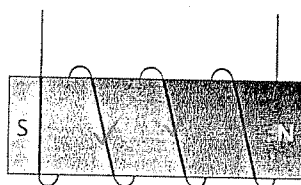


2. Copy the following images of solenoids into your notebook. For each coil, show the direction of current flow that would cause the labelled magnetic polarity.

a) Fig.9.24a



b) Fig.9.24b



- 14-gauge copper wire can safely carry a current of 12 A. How many turns must be wound on a coil 15 cm long in order to produce a magnetic field strength of  $5.0 \times 10^{-2}$  T? ( $5.0 \times 10^2$ )
- What is the magnetic field strength in the core of a coil 10 cm long, with 420 turns and a current of 6.0 A? ( $3.2 \times 10^{-2}$  T)
- A coil 8.0 cm long is composed of 400 turns of wire, and produces a magnetic field of strength  $1.4 \times 10^{-2}$  T in its core. What is the current flowing through the coil? (2.2 A)

# RIGHT HAND RULE #2 HOMEWORK ANSWERS

3.  $I = 12A$   
 $L = 15cm$   
 $= 0.15m$

$$B = \frac{\mu_0 N I}{L} \Rightarrow N = \frac{BL}{\mu_0 I}$$

$B = 5.0 \times 10^{-2} T$   
 $N = ?$

$$N = \frac{(5.0 \times 10^{-2} T)(0.15m)}{(4\pi \times 10^{-7})(12A)}$$
$$= 5.0 \times 10^2$$

4.  $B = ?$   
 $L = 10cm$   
 $= 0.10m$

$$B = \frac{\mu_0 N I}{L}$$

$N = 420$   
 $I = 6.0A$

$$= \frac{(4\pi \times 10^{-7})(420)(6.0A)}{0.10m}$$
$$= 3.2 \times 10^{-2} T$$

5.  $L = 8.0cm$   
 $= 8.0 \times 10^{-2} m$

$$B = \frac{\mu_0 N I}{L} \Rightarrow I = \frac{BL}{\mu_0 N}$$

$N = 400$   
 $B = 1.4 \times 10^{-2} T$   
 $I = ?$

$$I = \frac{(1.4 \times 10^{-2} T)(8.0 \times 10^{-2} m)}{(4\pi \times 10^{-7})(400)}$$

$$I = 2.2 A$$