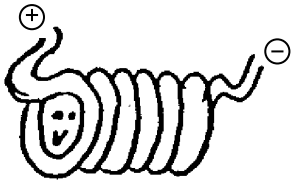
1.

x

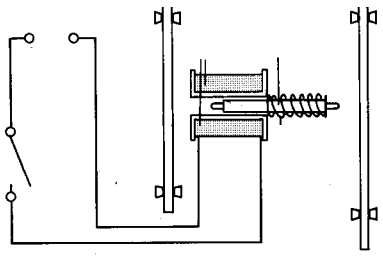
a) Draw the representation of the magnetic field of this current as arrows. The electrons move away from you (into the paper).
b) If a little magnet is placed into the field at the point x, how will it align? Draw it in the picture.
(little magnet: N S)

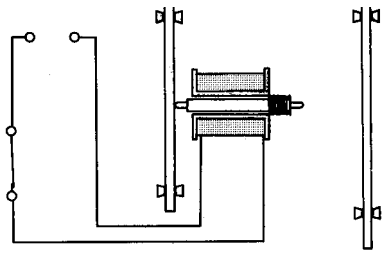
2. Here's a current carrying solenoid.
a) Draw the representation of the magnetic field as arrows.
b) If a little magnet is placed into the field at the point x, how will it align? Draw it in the picture.
(little magnet: N S)



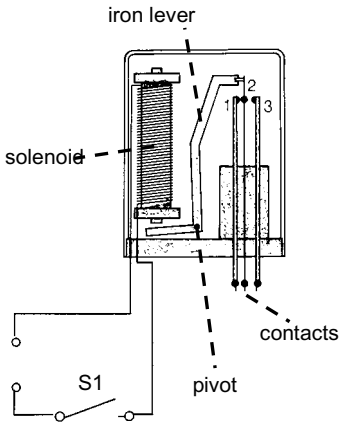
x

3. Here's an electric doorbell. If you push the button, it goes „ding", if you release the button, it goes „dong".
a) Label the different parts in the picture: *iron rod*, *"ding" plate*, *"dong" plate*, *coil*, *button*, *spring*
b) Explain what happens in detail (see picture).
„pushing the button closes the circuit and a current passes through the coil. The magnetic field inside the coil pulls the ..... "





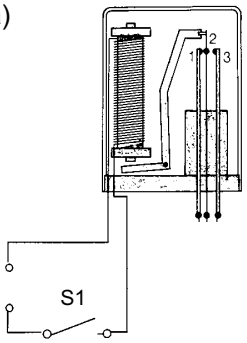
4. A relay is a switch which opens and closes contacts using an electromagnet. This allows for more options than what a simple ordinary switch can do.
a) Draw the path of the current, if the switch S1 is closed. What is the purpose of the solenoid?
b) The lever can turn around the pivot (see picture). Draw the position of the lever if a current passes through the solenoid.
c) Which contacts (1, 2, 3) touch, if the switch S1 is closed?
d) Which contacts (1, 2, 3) touch, if the switch S1 is open?
e) Would the relay work, if the lever were made of aluminium instead of iron? Give reasons for your answer.



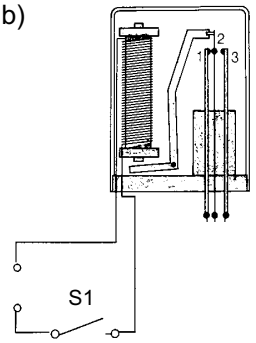
5. This relay has three contacts (see picture). One or two light bulbs can be turned on or off connecting them to the relay in different ways. Pay attention to the fact that an extra voltage source is needed for the lamps - the one in the drawing is used to turn the current for the solenoid on and off
   Complete the picture. Draw circuit diagrams using the contacts of the relay in such a way that

a) one lamp is lit, while pushing the button, and it goes off when releasing the button
b) one lamp is lit, while the button is released, and it goes off while pushing the button
c) two lamps are lit and go off in turns. If the switch is closed, lamp 1 shall be lit while lamp 2 is off, and if the switch is open, lamp 2 shall be lit while lamp 1 is off.

a)



b)



c)