Prof. Dr. Ullrich Pietsch   Siegen, 4/12/2019
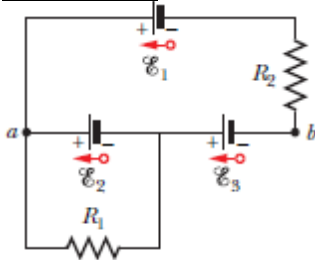Ali Al Hassan, Özgül Kurtulus
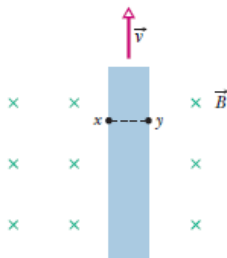Solid State Physics

Physics 1 for Nano: written Exercises 5
### WS 2019 (sheet 5)

Exercise 25

Determine the current through R_1 and R_2 and the potential difference between points a and b of the device given below. The EMF are E_1 =6.0 V and E_2 = 5.0 V and E_3 =4.0 V, R_1= 100 Ω , R_2 =50 Ω.

Exercise 26.

A metal stripe (length 6.5cm, width 0.85cm and thickness 0.76mm) moves with constant velocity, v, through a homogeneous magnetic field B=1.2 mT directed perpendicular to the stripe. The measured potential difference across the width is V =3.90 µV. Determine the velocity v of their stripe.

Exercise 27
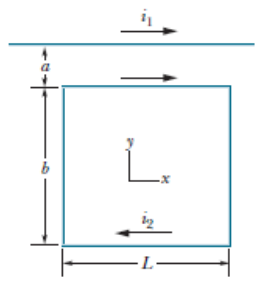
A long straight wire carries a current of 30A, their rectangular loop a current 0f 20A. How large is the resulting force acting at the loop for a=1.0cm, b=8.0cm and L= 30cm.

Exercise 28

An electron of kinetic energy 1.2 keV circles in a plane perpendicular to a uniform magnetic field. The orbit radius is 24.0 cm. Find (a) the electron speed, (b) the magnetic field magnitude, (c) the circling frequency and (d) the period of motion.

Exercise 29

Estimate the total path length traveled by a deuteron in a cyclotron of radius r= 53 cm and operating frequency of 12 MHz during (entire) acceleration process. Assume that the accelerating potential between the dees is 80keV.

Exercise 30
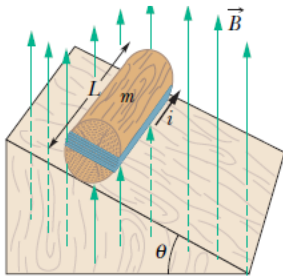
In figure left a wood cylinder of mass 0.25 kg and length L= 10cm is wrapped by N = 10 turns of wire, so that the plane of the wire coil contains the long central axis of the cylinder. The cylinder is released on a plane inclined by an angle $\theta = 30°$ to the horizontal, with the plane coil parallel to the incline plane. If there is a vertical uniform magnetic field of B= 0.5 T, what is the least current I through the coil that keeps the cylinder from rolling down the plane ?

Note:
Exercises have to give back at lecture 10.12.19. It will be discussed in exercise hours at 11.12.19