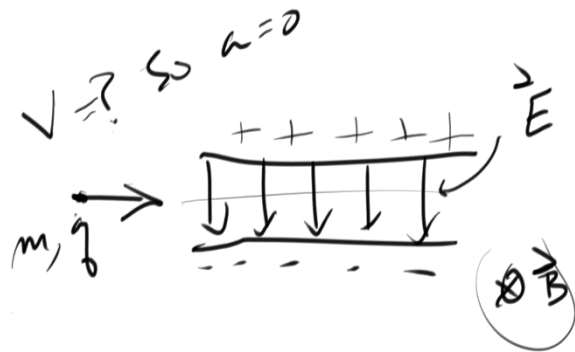


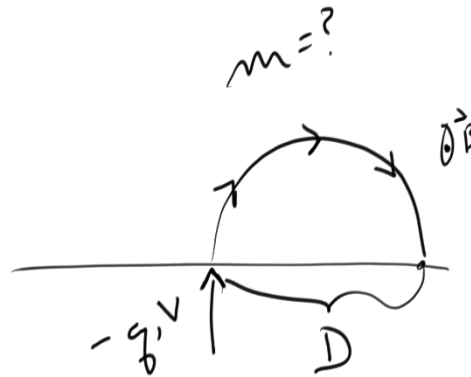
Physics 2B Quiz Set 5: The magnetic force meets  $F=ma$ , among other things.

1. Find the period,  $T$ , of the circular motion of a charge  $q$  of mass  $m$  in a uniform  $B$  field. Let the plane of the charge's circle be perpendicular to the  $B$  field to make it easy.

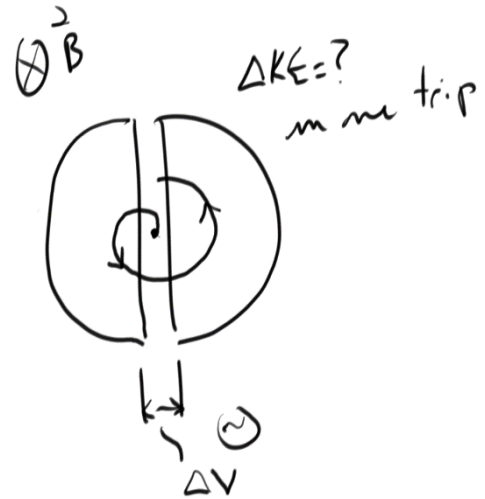
2. Velocity selector: Consider the diagram. An electric field is "crossed" with a magnetic field such that a charge  $q$  is not accelerated through the region (and thereby is allowed to travel through the region). Find the single velocity where this can occur.



3. Mass spectrometer: From the diagram, a charge  $q$  is injected with a known velocity into the region. With the diameter measured as  $D$ , find the mass of the charge.

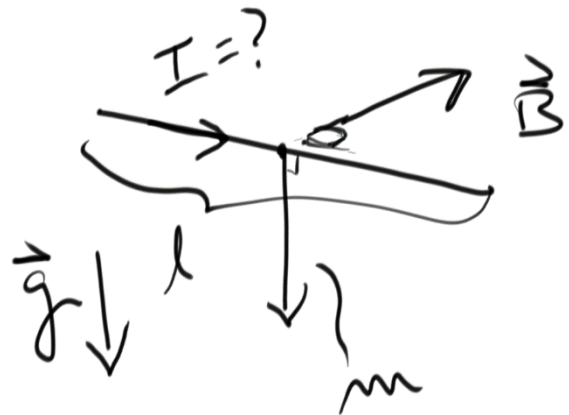


4. From the diagram, find the increase in kinetic energy after the charge makes one full cycle around the cyclotron.



5. Prove that the magnetic field does no work.

6. Force on a current. For what current will the length of wire carrying it have a zero acceleration? There is gravity in this problem.



7. Find the net torque on the loop of current from the uniform B field.

