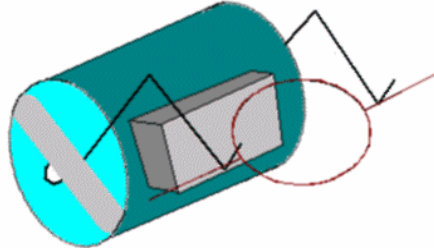Due 19 March 2008 at 6:00 pm

Pre-Project 1

Beakman's Motor

Note the basic components – a D-Cell battery, a rubber band, two paper clips, a ceramic permanent magnet and a coil of wire. Beakman's Motor (originally shown on the TV show *Beakman's World*) makes a very interesting little project. There is some excellent background information and some construction hints at the website http://fly.hiwaay.net/~palmer/motor.html which is also listed in the website of the general engineering course *Electronic Instrumentation* website under Project 1:*Beakman's Motor.* (See http://hibp.ecse.rpi.edu/~connor/education/EILinks.html#Proj1) There is a second source of information on this motor also available directly at http://hilaroad.com/camp/projects/magnet.html. Going to the EI webpage is probably worthwhile, since it contains other helpful project info. There is some excellent background information and some construction hints at the website http://fly.hiwaay.net/~palmer/motor.html. Another good reference can be found at http://www.scitoys.com/scitoys/scitoys/electro/electro.html#motor. If you Google *Beakman's Motor* you will find many other useful references, such as http://www.simplemotor.com/bmotor.htm These and other links are also posted on the Supplementary Materials website for this course.

Materials Required: (**Only those items marked with an X will be provided**)

One D-Cell Battery (this can be replaced by any other 1.5 volt battery)
One Wide Rubber Band -**X**
Two Large Paper Clips (these must be included in your design) - **X**
One Ceramic Magnet **- X**
Magnet Wire (the kind with enamel insulation) **-X**
One Toilet Paper Tube
Fine Sandpaper or Emory Paper (**Available in the studio**) - **X**
Optional: Glue, Small Block of Wood for Base, and …

Please note: YOU MUST NOT SAND THE WIRE DIRECTLY ON THE COUNTERTOPS IN THE STUDIO. The surface has already been damaged by past classes. Wooden sanding blocks are provided for this purpose.

For today's class, you are to build a simple motor that spins on its own. It is not necessary for it to spin smoothly or fast. It is only necessary for it to spin long enough for you to measure the speed. To measure the speed, follow the directions given in slides 10-12 of the PowerPoint presentation from Electronic Instrumentation, where it suggests that you connect the minigrabber adapters to each of the paperclips of your motor. You will have to adjust the time scale on the scope until you can see 3-6 cycles of the coil connecting and disconnecting as it spins. From the period of the squarish pulses you can determine the frequency. Use the *Agilent Intuilink* software to capture the image.

Overall, your purpose today is to build a prototype and go through the steps for measuring the speed. This should give you the background to design a much better motor.

Speed of Prototype Motor _____

Observed by TA _____

Save this form and hand it in with your final report.

Team Members: _____

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