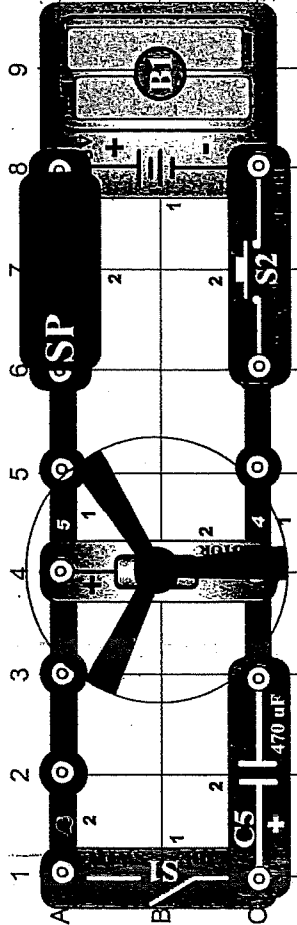


Project #296

Quieting a Motor

OBJECTIVE: To show how capacitors can filter out electrical disturbances.



WARNING: Moving parts. Do not touch the fan or motor during operation. Do not lean over the motor.

Place the fan on the motor (M1) and turn off the slide switch (S1). Press the press switch (S2) and listen to the motor.

As the motor shaft spins around it connects/ disconnects several sets of electrical contacts. As these contacts are switched, an electrical disturbance is created, which the speaker converts into sound.

Turn on the slide switch and push the press switch again. The fan spins just as fast, but the sound is not as loud. Capacitors, like the 470µF capacitor (C5), are often used to filter out undesired electrical disturbances. If you replace C5 with one of the other capacitors in your set then the sound will not be changed as much.

(1) Determining the Equivalent Series Resistance of the battery.

Voltage across battery (not turned on) _____

Voltage across battery (yes turned on) _____

Change (drop in battery volts) _____

Current through battery _____

$$E.S.R = \frac{\Delta V}{I} = \underline{\hspace{2cm}}$$

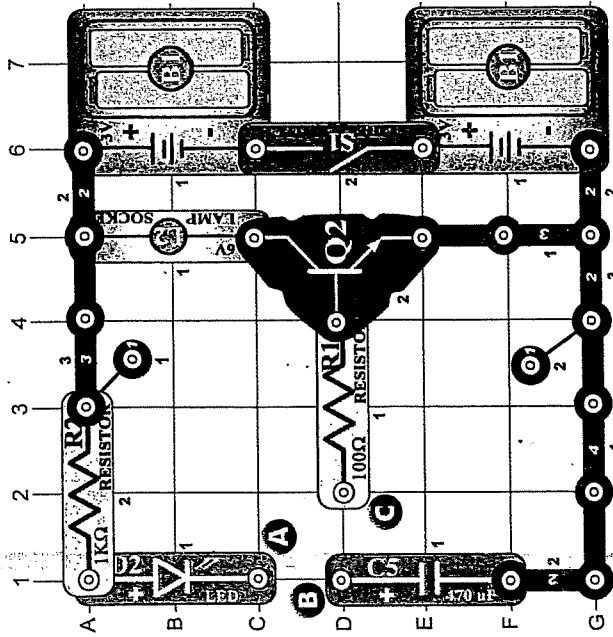
(2) Write a summary of how and why the capacitor affects the circuit



Project #252

Storing Electricity

OBJECTIVE: To store electricity in a capacitor.



Turn the slide switch (S1) on and connect points A & B with a 2-snap wire. The green LED (D2) will flash and the 470μF capacitor (C5) will be charged with electricity. The electricity is now stored in the capacitor. Disconnect points A & B. Connect points B & C and there will be a flash from the 6V lamp (L2).

The capacitor discharges through the resistor to the base of the NPN transistor (Q2). The positive current turns on the transistor like a switch, connecting the lamp to the negative (-) side of the batteries. The light will go out after the capacitor discharges, because there is no more current at the base of the transistor.

write a summary of how and why the capacitor affects this circuit