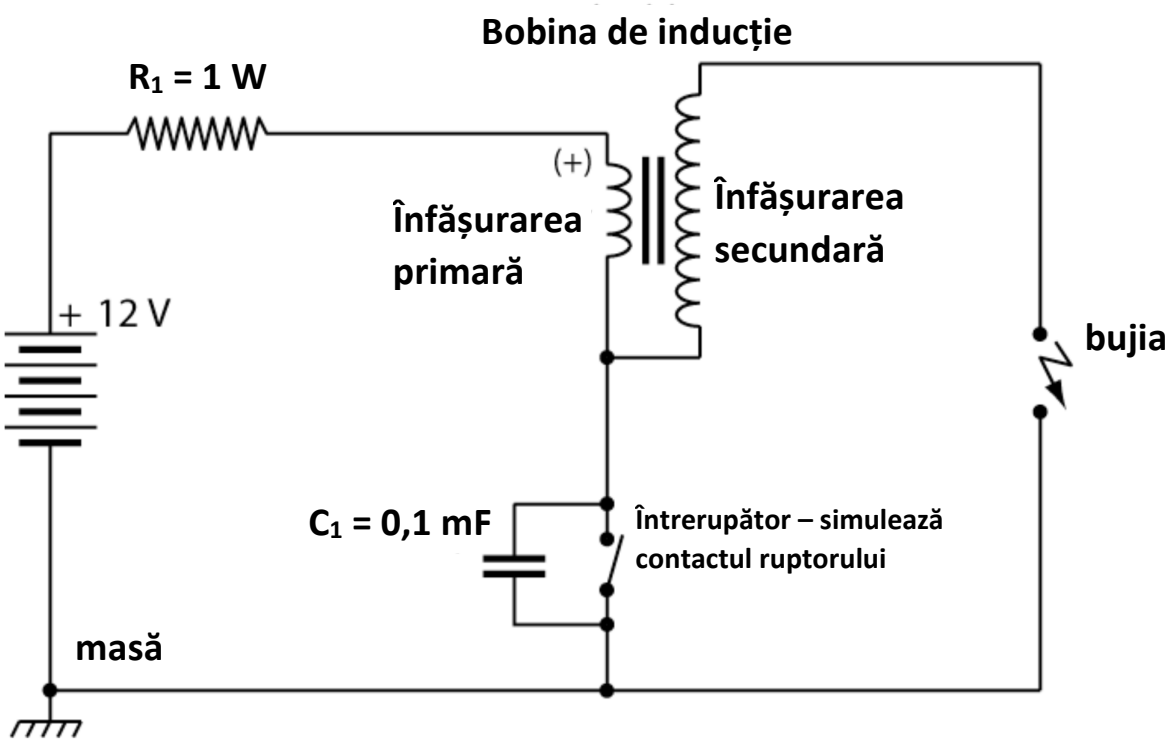


1. Măsurați și notați rezistența înfășurărilor primare și secundare ale bobinei de inducție.
2. Pentru circuitul de mai sus calculați curentul ce trece prin primarul bobinei de inducție.
3. a) Luând în considerare valoarea determinată la punctul 2, în cât timp se descarcă bateria de 45Ah a unui autovehicul dacă sistemul de aprindere rămâne cuplat.
   b) Calculați puterea absorbită de bobina de inducție și comparați valoarea determinată cu puterea absorbită de un bec auto de 5 W/12V.
4. Luând in considerare cele de mai sus, care este rolul rezistorului de 1 W din figură.

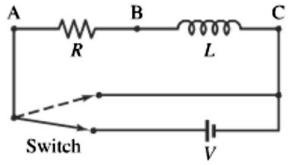
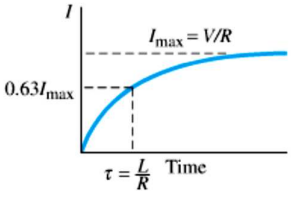
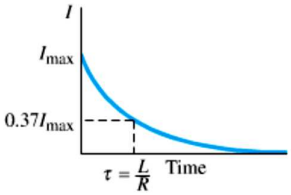


FIGURE 21–33 *LR* circuit.

FIGURE 21–34 (a) Growth of current in an *LR* circuit when connected to a battery; (b) decay of current when the *LR* circuit is shorted out (battery is out of the circuit).



(a)



(b)

* 21–11 *LR* Circuit

Any inductor will have some resistance. We represent this situation by drawing the inductance L and the resistance R separately, as in Fig. 21–33. The resistance R could also include a separate resistor connected in series. Now we ask, what happens when a dc source is connected in series to such an LR circuit? At the instant the switch connecting the battery is closed, the current starts to flow. It is opposed by the induced emf in the inductor because of the changing current. However, as soon as current starts to flow, there is a voltage drop across the resistance ($V = IR$). Hence, the voltage drop across the inductance is reduced, and there is then less impedance to the current flow from the inductance. The current thus rises gradually, as shown in Fig. 21–34a, and approaches the steady value $I_{max} = V/R$ when all the voltage drop is across the resistance. The shape of the curve for I as a function of time is

$$I = \left(\frac{V}{R}\right)(1 - e^{-t/\tau}), \qquad [LR \text{ circuit with emf}]$$

where e is the number $e = 2.718\cdots$ (see Section 19–6) and $\tau = L/R$ is the **time constant** of the circuit. When $t = \tau$, then $(1 - e^{-1}) = 0.63$, so τ is the time required for the current to reach $0.63I_{max}$.

If the battery is suddenly removed from the circuit (dashed line in Fig. 21–33), the current decreases as shown in Fig. 21–34b. This is an exponential decay curve given by

$$I = I_{max}e^{-t/\tau}. \qquad [LR \text{ circuit without emf}]$$

The time constant τ is the time for the current to decrease to 37% of the original value, and again equals L/R.

These graphs show that there is always some "reaction time" when an electromagnet, for example, is turned on or off. We also see that an LR circuit has properties similar to an RC circuit (Section 19–6). Unlike the capacitor case, however, the time constant here is *inversely* proportional to R.

D.C. Giancoli – Physics , Principles with applications 6th ed.

Porsche 944/951 – bobina de inducție a sistemului de aprindere (https://rennlist.com/forums/944-turbo-and-turbo-s-forum/740107-tech-the-944-951-ignition-system.html)



Bosch (OEM)



MSD Blaster Coil



MSD HVC-II

Știind că, pentru figurile de mai jos (U = 13,8 V), gradațiile de la osciloscop corespund la 1.5A/div. respectiv 1ms/div.,

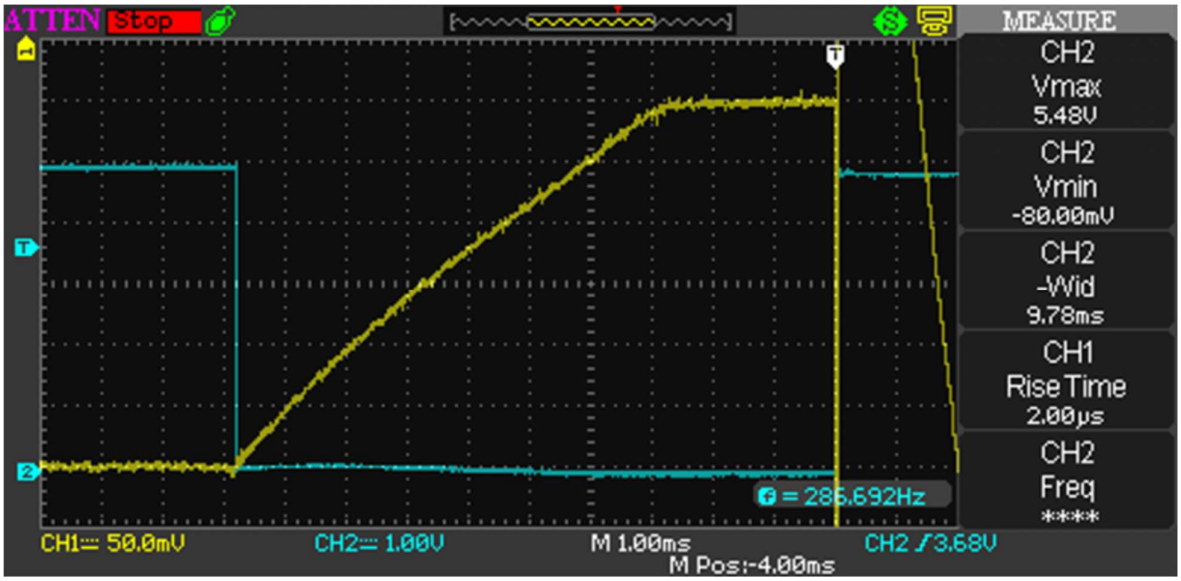


Fig. A

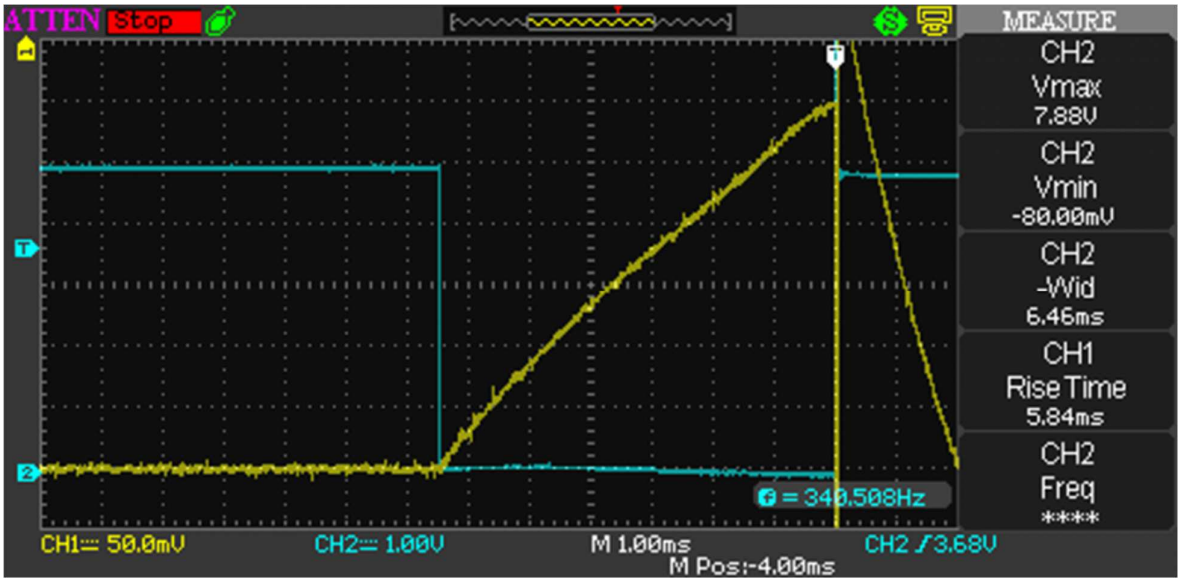


Fig. B

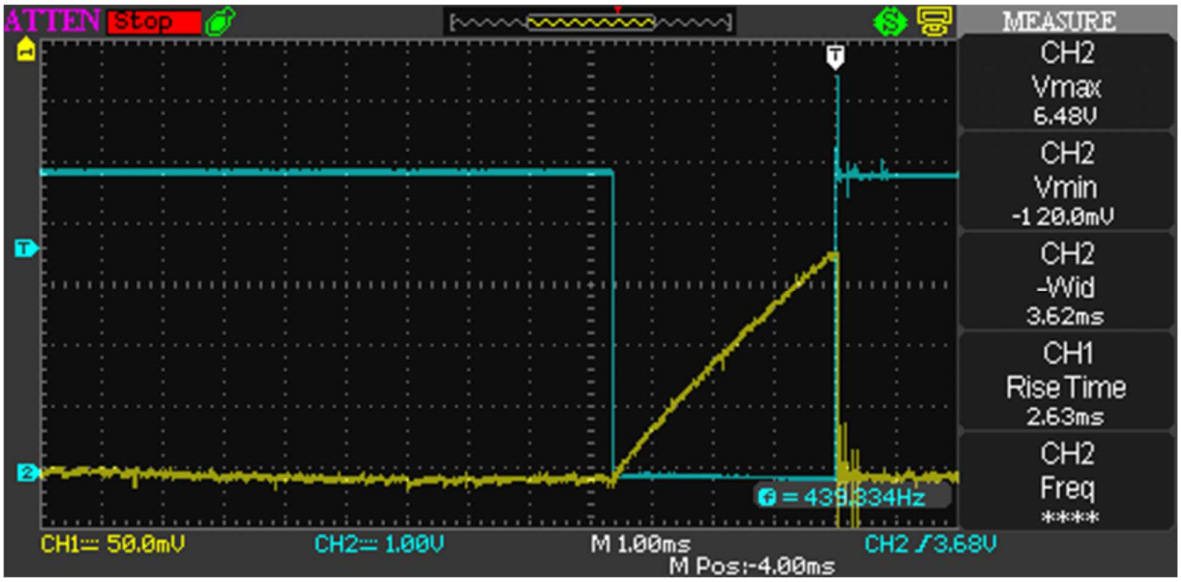


Fig. C

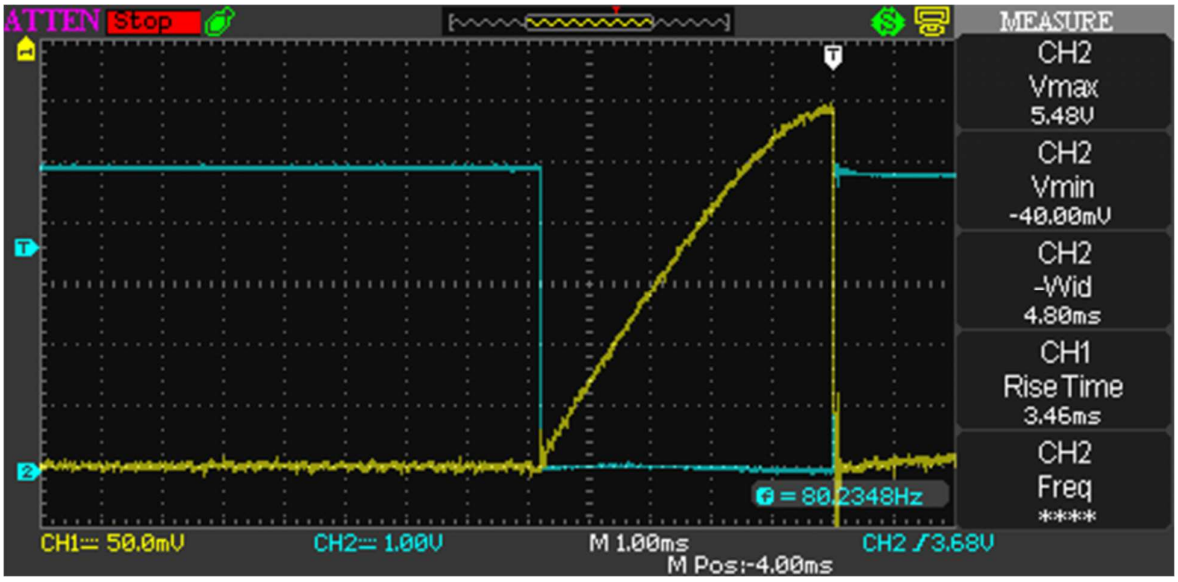


Fig. D

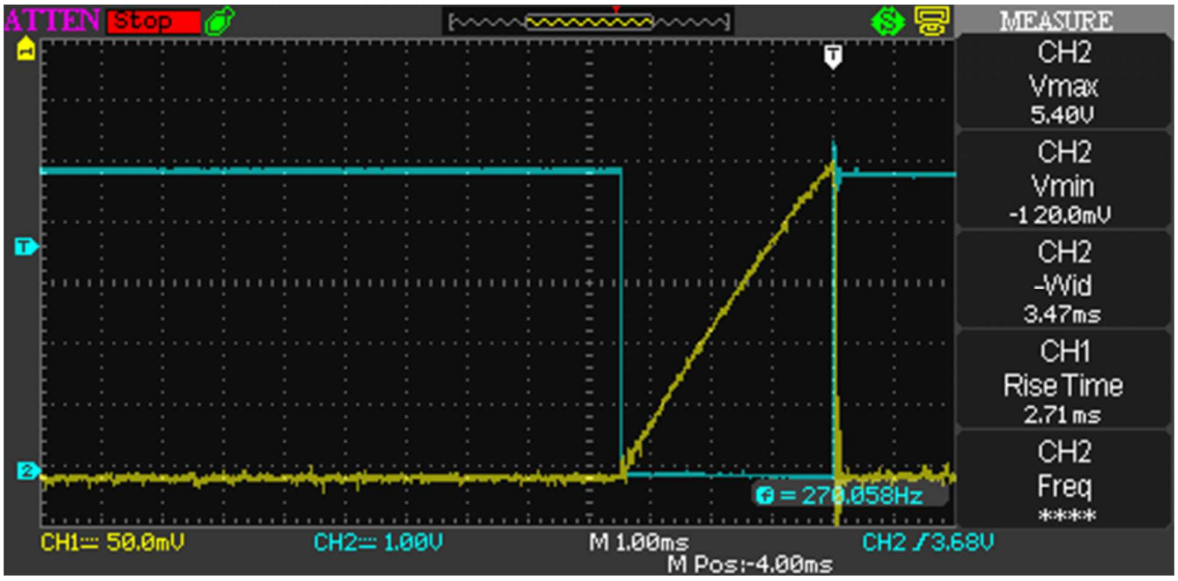


Fig. E

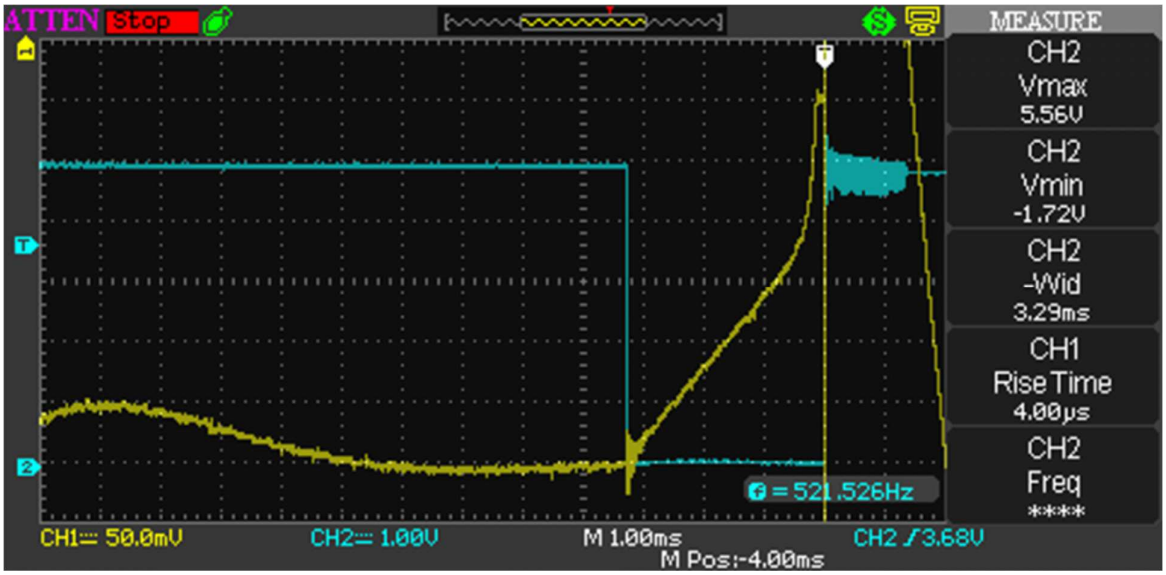
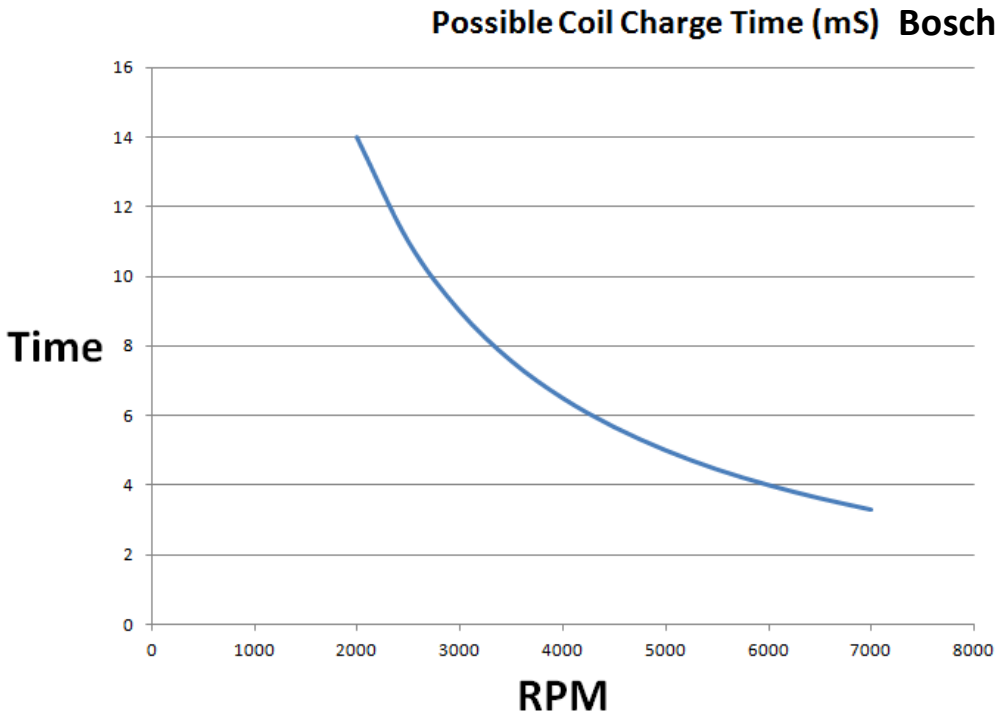


Fig. F



Determinați grafic și calculați:

Tip bobină de inducție	Bosch L = 5,85 mH			MSD Blaster Coil L = 4,36 mH		MSD HVC-II L = 6,23 mH
	Fig. A	Fig. B 6500 rpm	Fig. C	Fig. D	Fig. E 6500 rpm	Fig. F 6500 rpm
Care este valoare maximă a curentului înregistrat [A]						
Care este durata de energizare a bobinei [ms]						
Care este valoarea energiei stocate în bobină $E = \frac{L \cdot I^2}{2}$ [J]						
Reprezentați în graficul de mai sus timpii corespunzători pentru cele 3 bobine						
Pentru cei 3 timpi de mai sus, reprezentați energia corespunzătoare cu ajutorul unei noi axe în grafic.						

Porsche 944 ignition system – schematics (https://www.porscherepair.us)

