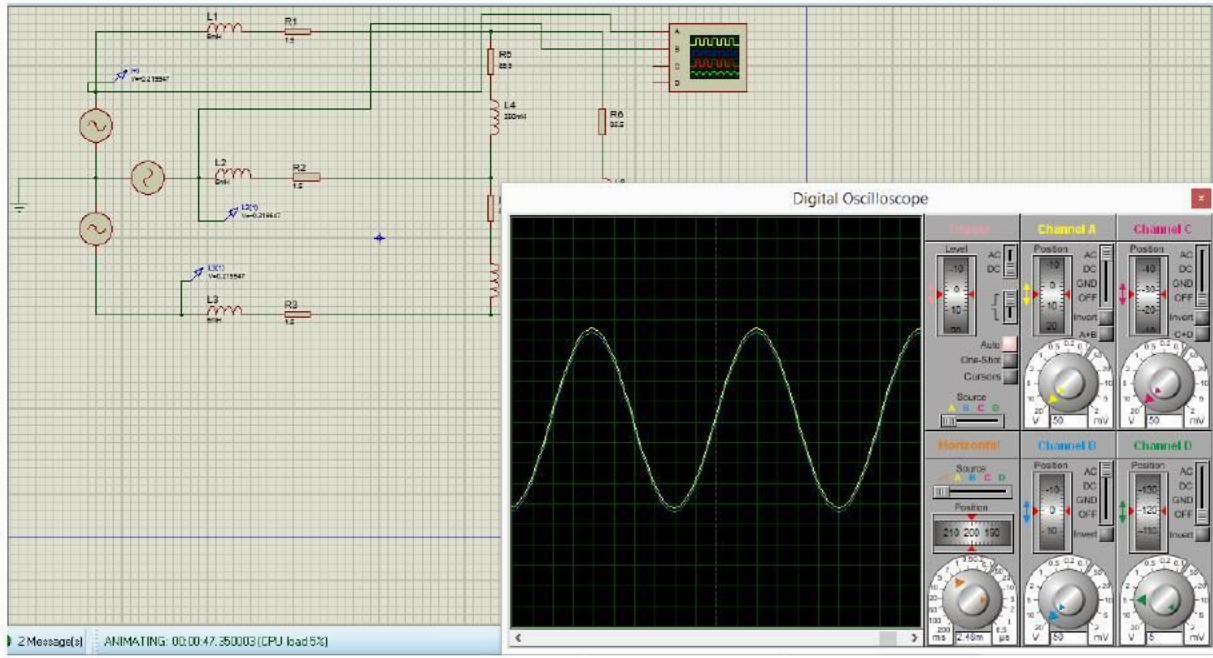
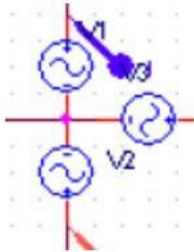




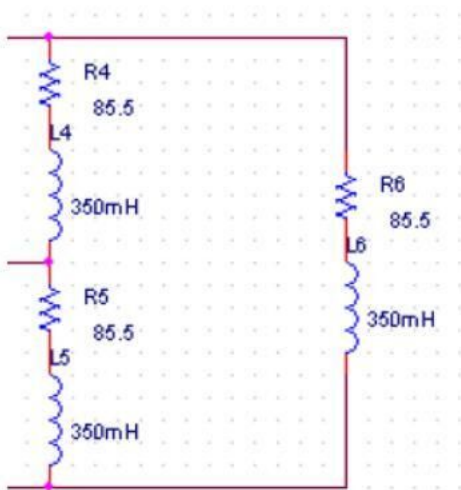
A)

1) Devre dengelidir, çünkü 3 fazlı devrelerdeki kurallara uygundur. Bu kurallar; kaynak veya yüklerin yıldız veya üçgen şeklinde bağlı olmasıdır. Ayrıca derste gördüğümüz bütün devreler dengelidir.

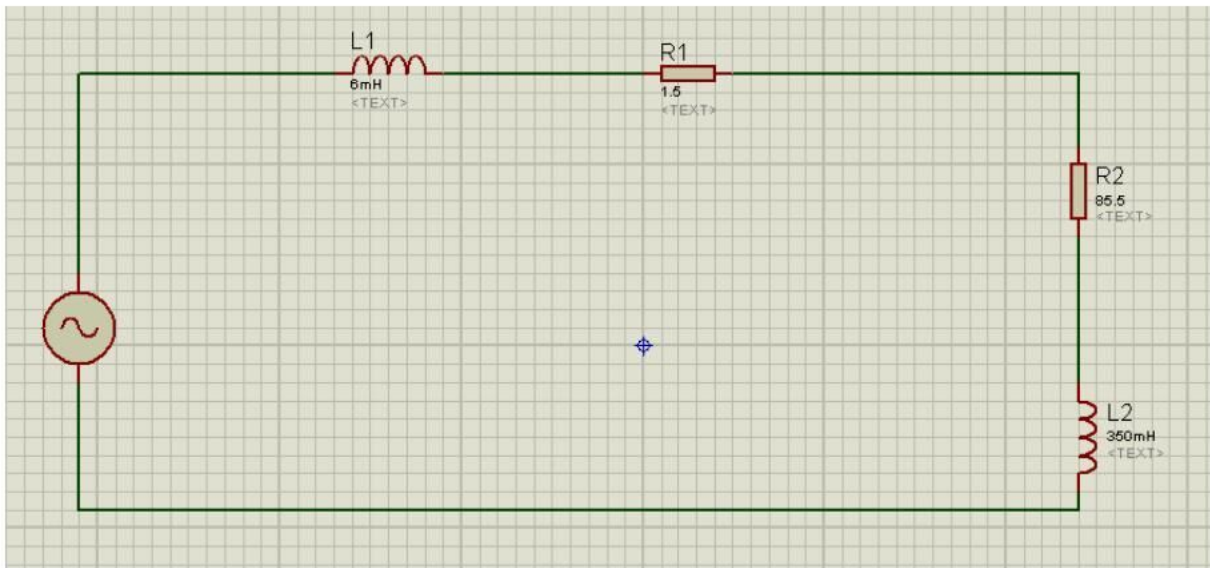
2) Kaynaklar yıldız bağlıdır.



3) Yükler üçgen bağlıdır.



B)



$f=50 \text{ Hz}$, $V=311 \text{ } 0^\circ \text{ V}$, $I_a=I_{AB} \cdot (1.73) \text{ } -30^\circ$, Pozitif faz sırası alındı.

$$Z_{L1}=j\omega L1=1.88$$

$$Z_{L2}=j\omega L2=109.9$$

$$\omega=2 \cdot (3.14) \cdot f= 314 \text{ rad/s}$$

$$I_a=(311 \text{ } 0^\circ) / (141.65 \text{ } 52.11^\circ)=2.20 \text{ } -52.11^\circ \text{ A}$$

$$I_b=2.20 \text{ } -172.11^\circ \text{ A}$$

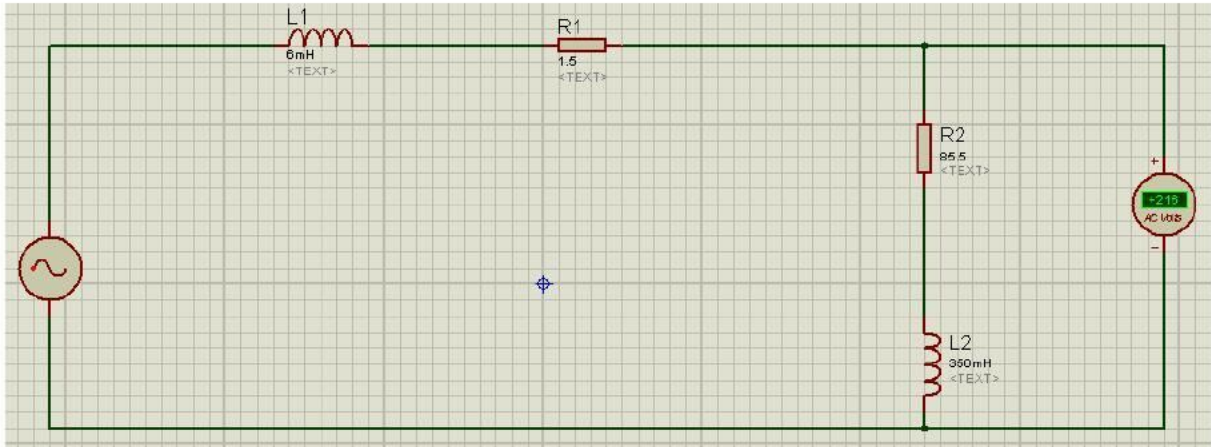
$$I_c=2.20 \text{ } -67.89^\circ \text{ A}$$

$$I_{AB}=I_a / (1.73) \cdot 30^\circ=1.27 \text{ } -22.11^\circ \text{ A}$$

$$I_{BC}=1.27 \text{ } -142.11^\circ \text{ A}$$

$$I_{CA}= 1.27 \text{ } 97.89^\circ \text{ A}$$

c)



$$V_{AN} = 216 \text{ V } 0^\circ \text{ V}$$

$$V_{AB} = 1.73 V_{AN} \ 30^\circ = 373.68 \ 30^\circ \text{ V}$$

$$V_{BC} = 373.68 \ -90^\circ \text{ V}$$

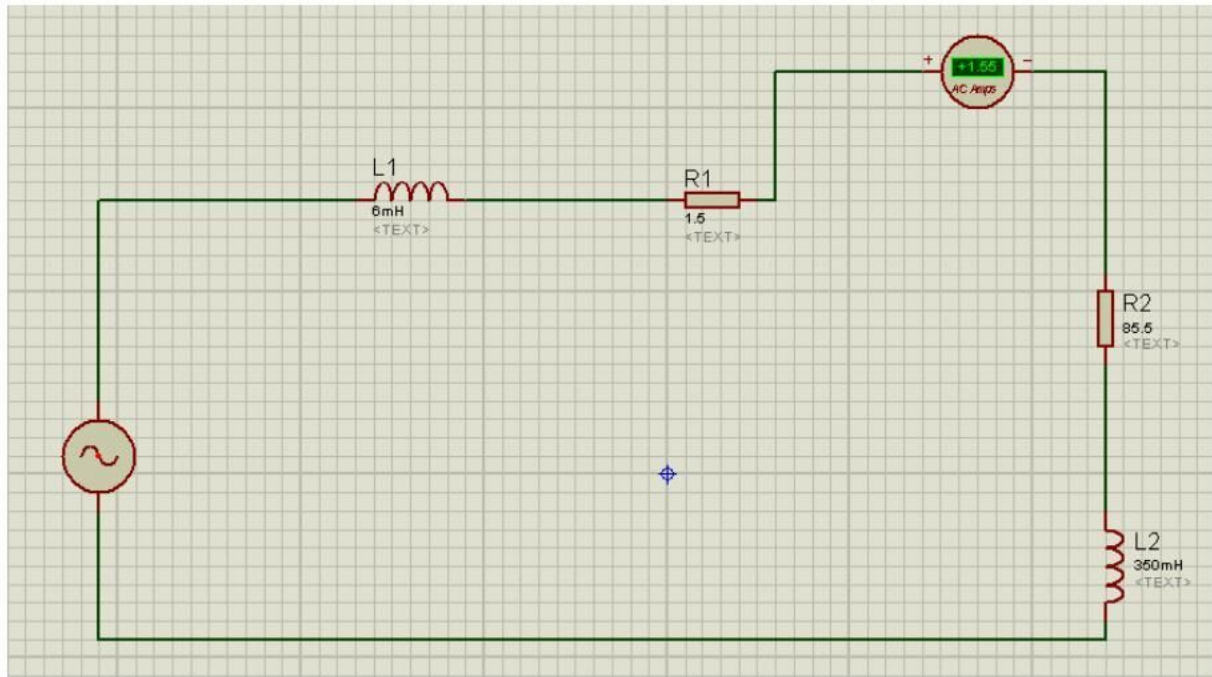
$$V_{CA} = 373.68 \ 150^\circ \text{ V}$$

$$\begin{aligned} V_{an} &= I_a A (1.5 + j1.88) = I_a A (2.41 \ 51.14^\circ) = (2.20 \ -52.11^\circ) \cdot (2.41 \ 51.14^\circ) \\ &= 5.302 \ -0.97^\circ \text{ V} \end{aligned}$$

$$V_{ab} = V_{an}(1.73 \ 30^\circ) = (5.302 \ -0.97^\circ) \cdot (1.73 \ 30^\circ) = 9.17 \ 29.03^\circ \text{ V}$$

$$V_{bc} = 9.17 \ -90.97^\circ \text{ V}$$

$$V_{ca} = 9.17 \ 149.03^\circ \text{ V}$$



$$I_{aA}=1.55 \quad -52.11^\circ \text{ A}$$

$$I_{bB}=1.55 \quad -172.11^\circ \text{ A}$$

$$I_{cC}=1.55 \quad -67.89^\circ \text{ A}$$

$$I_{AB}=(I_{aA}/1.73) \cdot 30^\circ = 2.68 \quad -22.11^\circ \text{ A}$$

$$I_{BC}=2.68 \quad -142.11^\circ \text{ A}$$

$$I_{CA}=2.68 \quad 97.89^\circ \text{ A}$$

$$D) I_{aA}=1.55 \quad -52.11^\circ \text{ A}$$

$$P_{yük} = (1.55) \cdot (1.55) \cdot (85.5) = 250.2 \text{ watt} \quad , \quad P_t = 3 \cdot P_{yük} = 750.6 \text{ watt}$$

$$Q_{yük} = (1.55) \cdot (1.55) \cdot (109.9) = 263.76 \text{ VAr} \quad , \quad Q_t = 3 \cdot Q_{yük} = 791.28 \text{ VAr}$$

$$S_{yük} = P + jQ = 250.2 + j263.76 \text{ VA} \quad , \quad S_t = 3 \cdot S_{yük} = 750.6 + j791.28 \text{ VA}$$

$$S_{kaynak} = (311 \quad 0^\circ) \cdot (0.95 + j1.22) = (311 \quad 0^\circ) \cdot (1.55 \quad 52.09^\circ)$$

$$= 482.05 \quad 52.09^\circ \text{ VA} = 296.18 + j380.33 \text{ VA}$$

$$P_{kaynak} = 296.18 \text{ watt}$$

$$Q_{kaynak} = 380.33 \text{ VAr}$$