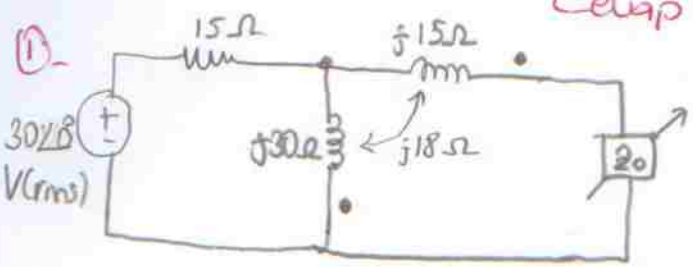
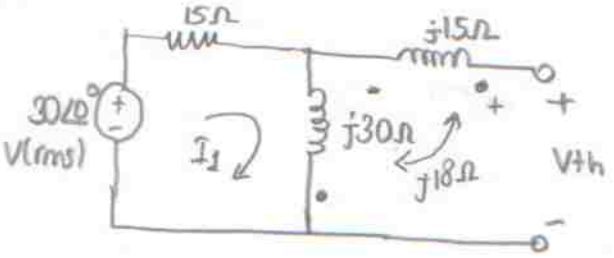
EEM 202 KISA SINAV III

Cevap anahtarı

① -





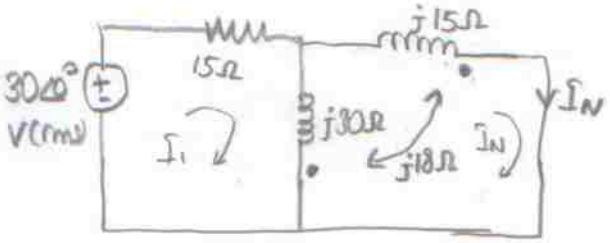
↙ Açık devre gerilimi bulunur

$$I_1 = \frac{30\angle 0^\circ}{15+j30} = 0{,}4 - j0{,}8\ A$$

$$V_{th} = j30\,I_1 - j18\,I_1 = j12\,I_1 = 9{,}6 + j4{,}8 = 10{,}73\angle 26{,}57^\circ\ V$$

Ortak endüktans empedansı · I_1 ⇒ I_1 akımının 2. endüktansda yarattığı gerilim

Kısa devre akımı bulunur:



$$30\angle 0^\circ = 15I_1 + j30(I_1 - I_N) + j18I_N$$

$$0 = j15I_N - j18(I_N - I_1) + j30(I_N - I_1) - j18I_N$$

$$30\angle 0^\circ = (15+j30)\,I_1 - 12j\,I_N$$

$$0 = j15I_N - j18I_N + j18I_1 + j30I_N - j30I_1 - j18I_N$$

$$j9I_N = +j12I_1$$

$$I_1 = \frac{9}{12} I_N = \frac{3}{4} I_N$$

$$30\angle 0^\circ = (15+j30)\frac{3}{4} I_N - j12I_N$$

$$30\angle 0^\circ = (11{,}25 + j22{,}5 - j12)\,I_N$$

$$I_N = \frac{30\angle 0^\circ}{15{,}38\angle 43{,}02^\circ} = 1{,}95\angle -43{,}02^\circ\ A$$

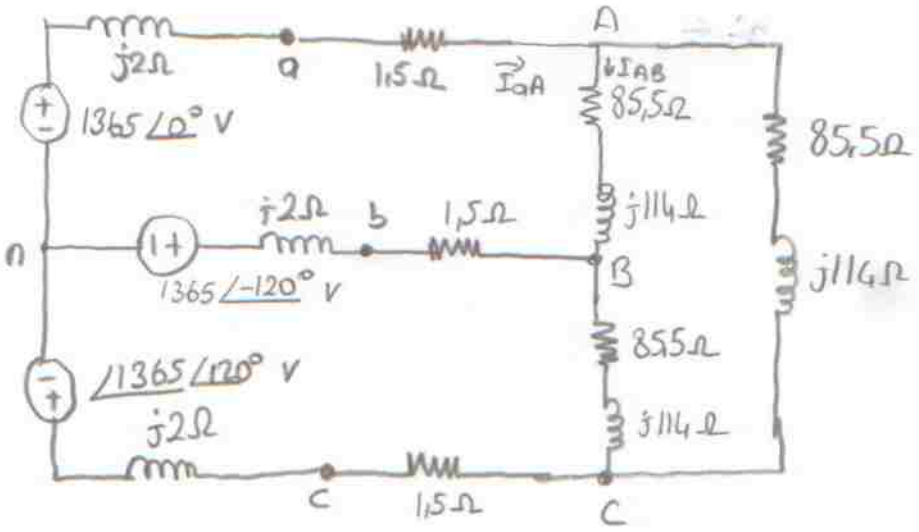
$$Z_{th} = \frac{V_{th}}{I_N}$$

$$Z_{th} = \frac{10{,}73\angle 26{,}57^\circ}{1{,}95\angle -43{,}05^\circ}$$

$$Z_{th} = 1{,}92 + j5{,}16\ \Omega$$

$$\boxed{Z_o = 1{,}92 - j5{,}16\ \Omega}$$

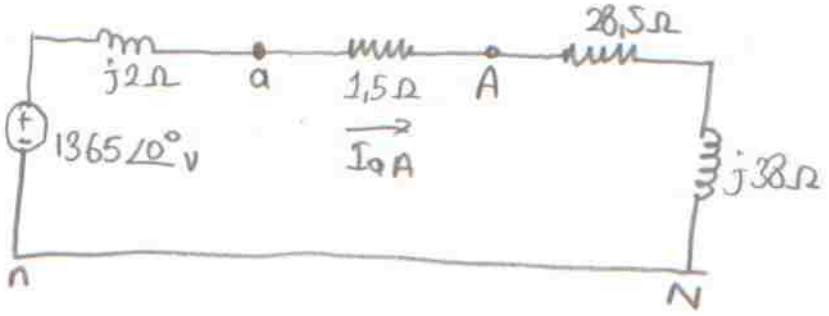
(2)



a) Tek faz eşdeğer devresi için Δ yük – Y yüke dönüştürülür:

$$Z_Y = \frac{Z_\Delta}{3} = \frac{85,5 + j\,114}{3} = 28,5 + j\,38\ \Omega \ //$$

Tek faz eşdeğer devresi:



$$I_{aA} = \frac{1365\angle 0^\circ}{30 + j\,40} = 27,3\angle -53,13^\circ\ A$$

Pozitif sıradan dolayı;

$I_{BB} = 27,3\angle -173,13\ A$

$I_{cc} = 27,3\angle 66,87\ A$

$$I_{AB} = \frac{I_{aA}}{(\sqrt{3}\angle -30^\circ)} = \frac{27,3\angle -53,13^\circ}{(\sqrt{3})\angle -30^\circ} = 15,76\angle -23,13^\circ\ A$$

$I_{BC} = 15,76\angle -23,13^\circ - 120^\circ = 15,76\angle -143,13^\circ\ A$

$I_{CA} = 15,76\angle -23,13^\circ + 120^\circ = 15,76\angle 96,87^\circ\ A$

b) $S_{kaynak} = -1365.(I_{aA}^*) = -22358,75 - j\,29811,56\ VA$

$P_{üretilen} = 22358,75\ kW$

$P_{harcanan,yük} = (I_{aA})^2 (28,5) = 21,241\ kW$

c) $\frac{P_{harcanan}}{P_{üretilen}}\% = \frac{21241}{22359} \cdot 100$

$= \%\,95\ //$