

Note	1. Allowed Tools: Calculators 2. Leaving the classroom during the exam period will be considered as submitting the exam.
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Name : \_\_\_\_\_ SID : \_\_\_\_\_

11.Apr. 2023-2024

- (20%) Assume the angular frequency ( $\omega$ ) of power source is 1 rad/s, write a set of mesh equations in terms of the currents shown in Fig. 1.
- (30%) For the circuit of Fig. 2, compute  $v_1(t)$ ,  $v_2(t)$ , and the average power delivered to each resistor.
- (20%) In Fig. 3, if  $V_s = 1 \angle 0^\circ$  V, find  $V_o$  and equivalent impedances  $Z_{eq1}$ ,  $Z_{eq2}$  and  $Z_{eq3}$ .
- For a balanced circuit of Fig. 4, (a) (10%) convert the  $\Delta$ -connected network into Y-connected network; (b) (10%) find rms values of the line currents  $I_a$ ,  $I_b$ ,  $I_c$  and the line voltages  $V_{AB}$ ,  $V_{BC}$ ,  $V_{CA}$ ; (c) (10%) find the complex power and power factor at the source.

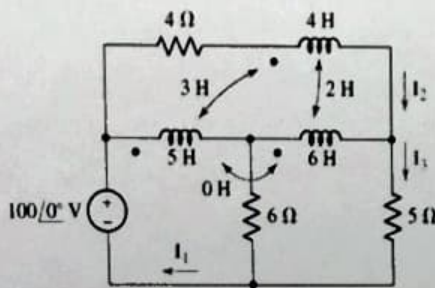


Fig. 1

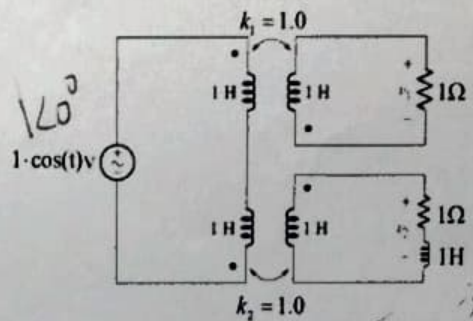


Fig. 2

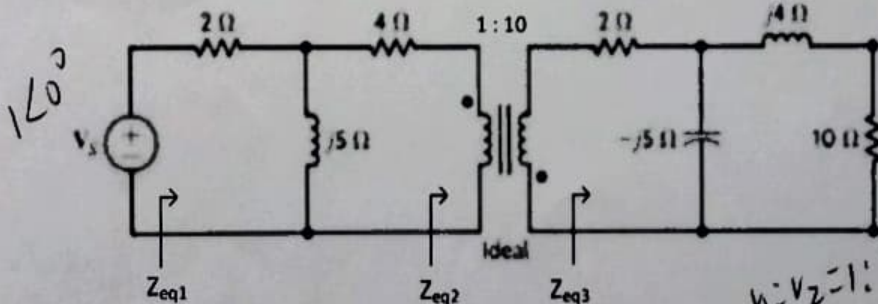


Fig. 3

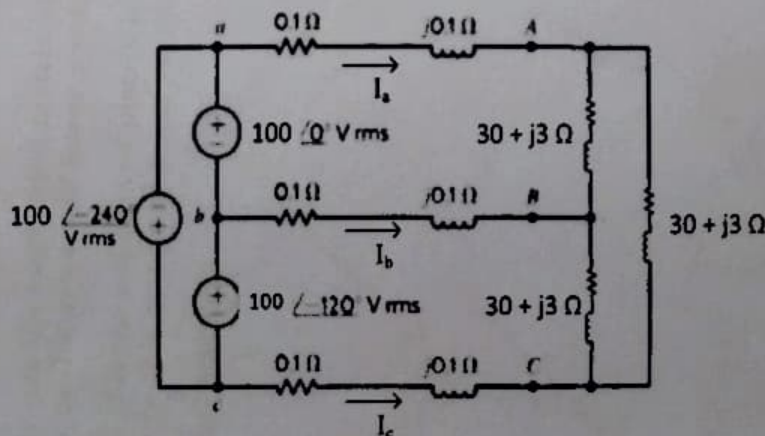


Fig. 4

Handwritten notes and calculations:

- $V_1 = V_2 = 1:2$
- $I_1: I_2 = 2:1$
- $1:2$
- $2:1$
- $V_1 = 2V_2$
- $2I_1 = I_2$
- $I_1 = 4A$
- $V_2 = 2V_1$
- $2I_2 = I_1$
- $2I_1 = \frac{1}{2}I_2$
- $4I_1 = I_2$
- $I_1 = 1A$
- $I_2 = 4A$