

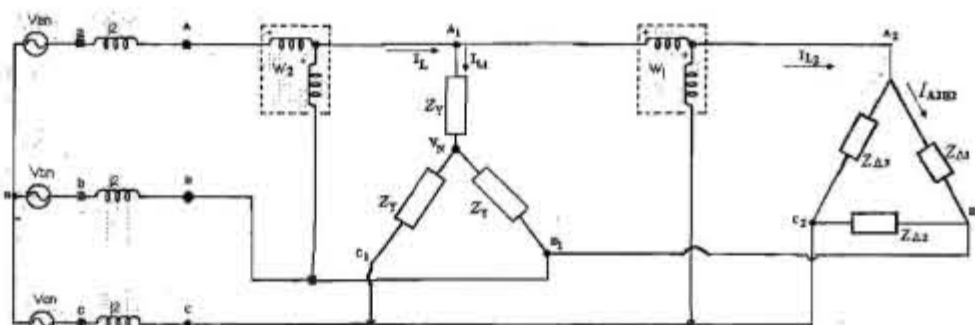
Name & ID # in arabic:

Section: 8:00-9:30 10:00-11:00, 11:00-12:00, 12:00-13:00

Date: December 14th, 2010.....time allowed: 1 1/2 Hour

Problem1 Balanced three phase voltage source positive sequenced has an internal reactance $j2\Omega$. The voltage across the load $V_{CA} = 400\angle 30^\circ V_{rms}$. Two Loads are feed from the source load as shown in the Fig.(1). The Δ load impedances are: $Z_{AB} = 40\angle -60^\circ$, $Z_{BC} = 40\angle 60^\circ$, $Z_{CA} = 40\angle 90^\circ$. The Y load consumes 24 kVA with 0.8 P.F. lagging. Find:

- The reading of the W_1 and W_2 .



Problem2: For the circuit shown in Fig.(2).

Find I_2 , V_2 and the average power delivered by the source and that absorbed by the load of 8Ω .

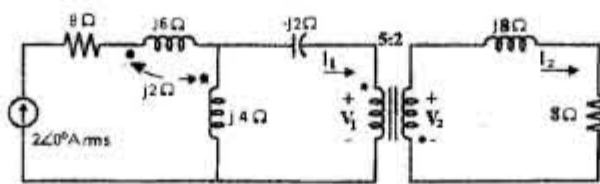


Figure 2

6
13

~~$8 \times 2 = 16$~~
 ~~$16 + 8 = 24$~~

$$V_{Th} = j4 \times 2 + j2 \times 2 = j12$$

$$Z_{Th} = j4$$

$$-j12 + j4I_1 - j2I_1 + 50I_1 + j50I_1 = 0$$

$$\Rightarrow I_2 = (j52 + j50)I_1$$

$$\Rightarrow I_1 = \frac{12}{j52 + j50}$$

$$\Rightarrow I_2 = I_1 \times \frac{5}{2} = \frac{375}{1301} - j \frac{390}{1301} = -0.29 + j3$$

$$V_1 = +j12 - j4I_1 = j12 - \frac{12}{j52 + j50} = \frac{j12 - 12}{j52 + 50} = -12 + j10.84$$

$$V_2 = V_1 \times \frac{2}{5} = \frac{-24}{5} + j4.34 = -4.8 + j4.34$$

$$P_B = I_2^2 \times 8 = \frac{139.28}{2} = 69.64 \text{ W}$$

$$P_S = \frac{(j12)^2}{j4 - j2 + (8 + 8)} = \frac{288}{41} - j \frac{360}{41} = 7 - j8.8 \text{ W}$$

Problem3: For the circuit shown in Fig.(3).

- Write an expression for $\frac{V_{in}(s)}{I_{in}(s)}$.
- Sketch $V_{in}(s)$ versus s if $s = \sigma + j\omega$.

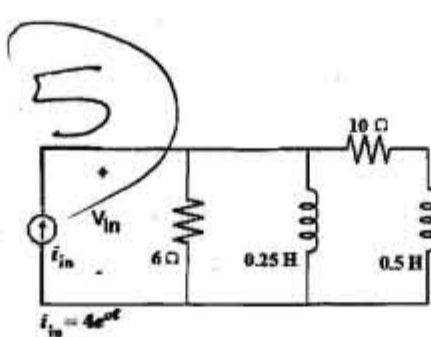


Figure 3

5

~~$(10 + j0.5s) \times 0.25s$~~
 ~~$10 + j0.5s + 0.25s$~~

~~$(10 + 0.5s) \times 0.25s$~~ // 6
 ~~$10 + 0.5s + 0.25s$~~

~~$10 + 0.5s$~~

$$= \frac{2.5s + 0.125s^2}{10 + 0.75s} \times 6$$

$$= \frac{0.5s + 0.125s^2}{10 + 0.75s} + 6$$

$$= \frac{15s + 7.5s^2}{10 + 0.75s}$$

~~$(60 + 4.5s)(0.5s + 0.125s^2)$~~
 ~~$10 + 0.75s$~~

~~$30s + 7.5s^2 + 2.25s^2 + 3.75s$~~
 ~~$5(0.5625s^2 + 2.25s + 3.75)$~~ \Rightarrow الكل