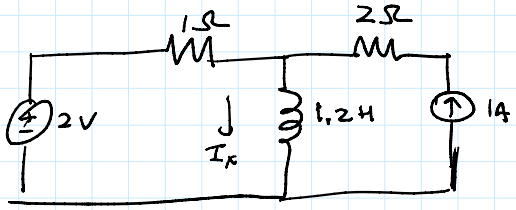
In class Q's

Tuesday, December 10, 2019 7:42 PM

1)



Part 1

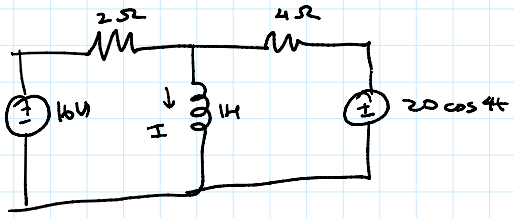
1A

Part 2

$I = \frac{V}{R} = \frac{2}{1} = 2$

3A

2)



Part 1

$I = \frac{V}{R} = \frac{16}{2} = 8$

Part 2

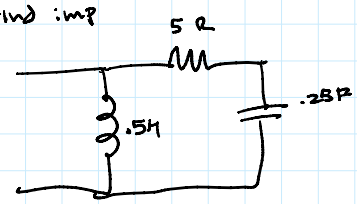
$j\omega L = 1.4$

$\frac{2 \cdot 20}{2+4j}$ =

$8 + 17.8 \cos(4t - 63.43°)$ A

3) $\omega = 10$

find imp



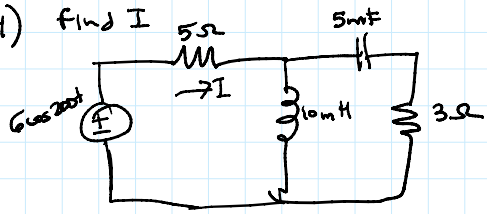
$j\omega L = j \cdot 10 \cdot .5 = 5j$

$\frac{-j}{\omega C} = \frac{-1}{2.5} = -.4j$

$\frac{5j \cdot 5 - .4j}{5j + 5 - .4j}$

$3.69 \angle 42.8° \Omega$

4) find I



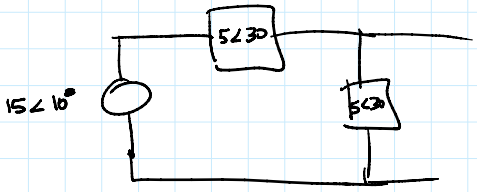
$\frac{-j}{\omega C} = \frac{-j}{200 \cdot .005} = -j$

$j\omega L = j \cdot 200 \cdot .01 = 2j$

$\frac{6}{5 + \frac{2j \cdot (3-j)}{j+3}}$

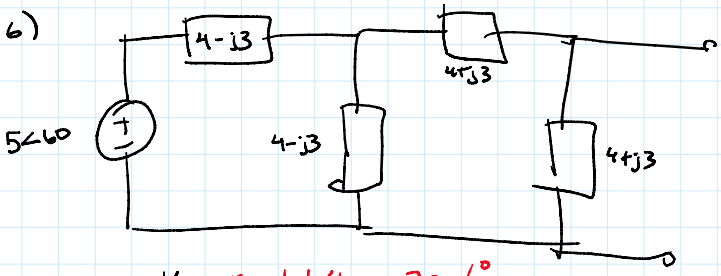
$.937 \angle -14.47°$

5) V_{th}



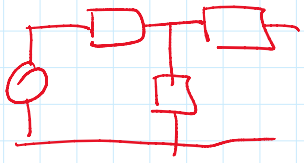
$7.5 \angle 10°$ V

6)



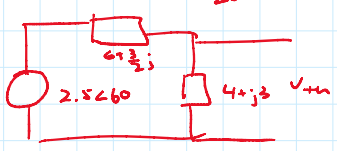
$V_{th} = 1.14 \angle 72.6°$

$R_{th} = 2.81 \angle 26.68°$

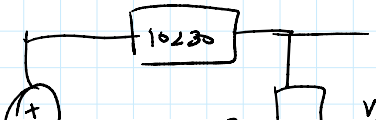


$V_{th} = \frac{4-j3 \cdot 5\angle 60}{8-j6} = 2.5\angle 60$

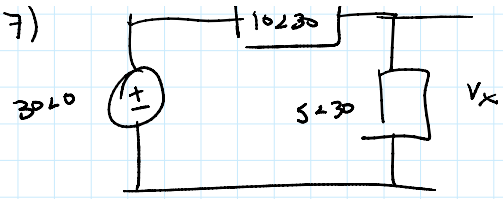
$R_{th} = 6 + \frac{3}{2}j$



7)



7)

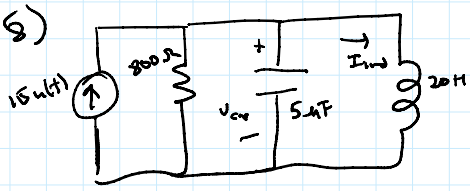


$$\frac{5\angle 30 \cdot 8\angle 0}{5\angle 30 + 10\angle 30} =$$

$V_x = 10\ V$

$$R_{th} = \frac{5\angle 30 \cdot 10\angle 30}{5\angle 30 + 10\angle 30} = \frac{10}{3}\angle 30^\circ\ \Omega$$

8)

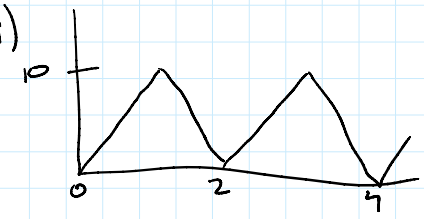


damped, critical, over

$$\alpha = \frac{1}{2RC} = \frac{1}{2 \cdot 800 \cdot 5 \cdot 10^{-6}} = 125$$

$$\omega = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{5 \cdot 10^{-6} \cdot 20}} = 100$$

9)



RMS?

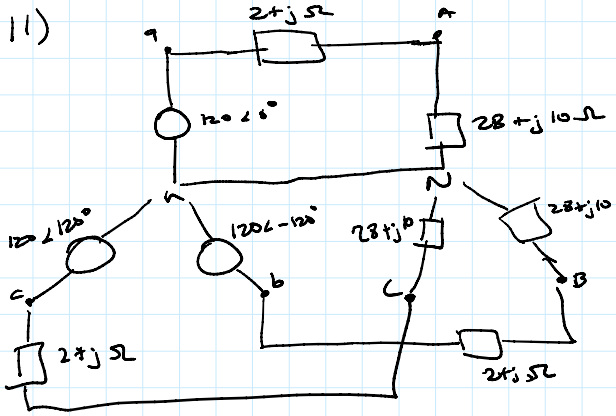
$$\sqrt{\frac{1}{2}\left(\int_0^1 100t^2 \cdot 2\right)}$$

$$\frac{10\sqrt{3}}{3}\ V_{rms}$$

10) when 120V rms 60Hz is applies to (load), the current is 7A rms @ $\angle -20^\circ$

- complex power, $S = 120 \cdot 7 \cdot \cos(20)$
- apparent power, $S = 120 \cdot 7$
- power factor, $pf = \cos(20)$ lagging

11)



Y-Y

find I_a, I_b, I_c

find V_{AN}, V_{BN}, V_{CN}

find complex power S

$$I_a = \frac{120}{30 + 11j} \qquad V_{AN} = I_a \cdot (28 + j10)$$

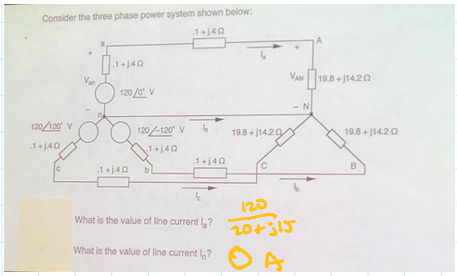
$$I_b = \frac{120\angle -120}{30 + 11j} \qquad V_{BN} = I_b \cdot (28 + j10)$$

$$I_c = \frac{120\angle 120}{30 + 11j} \qquad V_{CN} = I_c \cdot (28 + j10)$$

$$S = 3V_{AN} \cdot I_a^*$$ ← who that?

12)

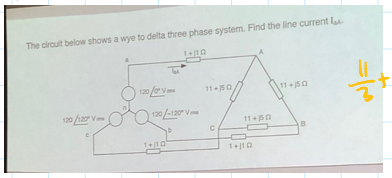
Consider the three phase power system shown below:



$\frac{120}{20+j15}$

0 A

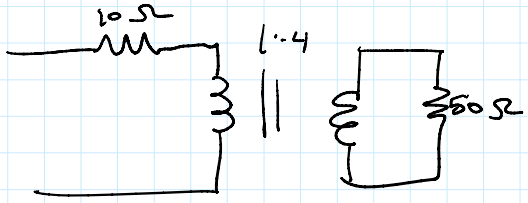
13)



$\frac{11}{3}+j\frac{5}{3}$

$\frac{120}{\frac{14}{3}+j\frac{8}{3}}$

14)

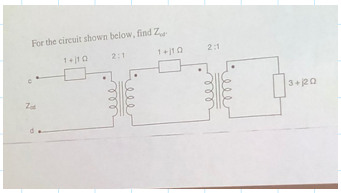


find input imp.

$Z_1 = Z_2\left(\frac{1}{4}\right)^2$

$= 50 \cdot \frac{1}{16} + 10 = 13.125\,\Omega$

15)



$((3+j2)4 + (1+j1)) \cdot 4 + 1+j1$

$53+37j\ \Omega$

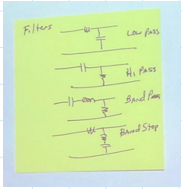
?

16) transformer 2400/240 volts. 480 turns for primary winding

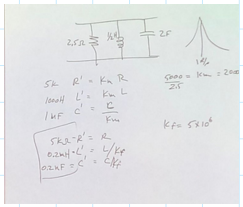
how many on second?

huh?

17)



(8)



/

$K_m R$

$\frac{K_f L}{K_f}$

$\frac{C}{K_m K_f}$