

Questions:

- a. What is instantaneous power?
- b. What is real power?
- c. What is reactive power?
- d. What is total power?
- e. What is rms voltage? rms current?
- f. How do we determine total power produced by a source?
- g. What is the power factor?
- h. What does it mean if the power factor is 'leading'? 'lagging'?

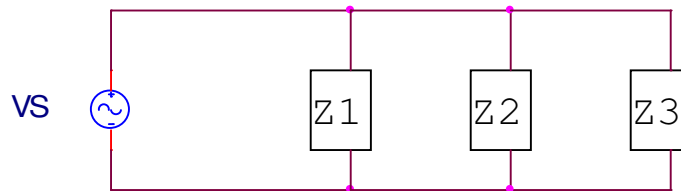
Problem 1)

At 440 V (rms) a two-terminal load draws 3 kVA of apparent power at a lagging power factor of 0.9.  
Find the following:

- (a)  $I_{rms}$
- (b)  $P$
- (c)  $Q$
- (d) the load impedance

Draw the power triangle or the load.

Problem 2)



In the above circuit, the total source power,  $S$ , is 60kVA (magnitude) with a 60 Hz,  $3kV_{RMS}$  source voltage. The power factor for the entire parallel load is 0.9 (90%). The loads are described as:

- Z1: Purely resistive heating element,  $300\ \Omega$  with a current of 10A RMS.
- Z2: Induction motor with small real loss,  $R=20\Omega$ ,  $L=0.79\ H$
- Z3: Unknown load

a. Determine the total real power and total reactive power

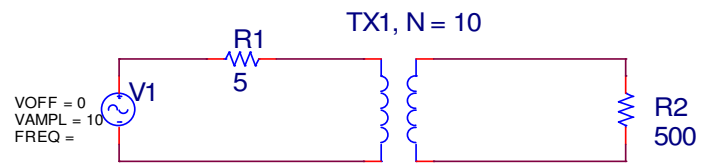
(Answer check:  $S = 54kW - j26.2kVAR$ )

b. Determine the individual real power and reactive power for each load

c. Determine the impedance of the unknown load

	P[W]	Q [VAR]	S	S [VA]	pf
Load 1					
Load 2					
Load 3					
Source					

Problem 3)



Determine  $V_{R2}$ .