1. The parameters of a 5:1 step-down transformer are shown below.
   The transformer is loaded with $Z_L := (2.5 + 0.8 \cdot j) \cdot \Omega$ and the secondary voltage is $V_2 := 36 \cdot V$

   $R_m := 2 \cdot k\Omega$ $R_s := 2 \cdot \Omega$ $X_m := 800 \cdot \Omega$ $X_s := 5 \cdot \Omega$ $N := 5$

   a) Draw the model with the load connected. Label parts, voltages and currents as needed for the rest of the problem.

   b) Find the primary, source voltage. Magnitude only. $\left| V_S \right| = ?$

   c) Find the total complex power supplied the primary, source voltage. $S_S = P_S + j \cdot Q_S = ?$

   d) Find the magnitude of the current flowing from the primary, source voltage. $\left| I_S \right| = ?$

   e) Find the efficiency of the transformer. $\eta = ?$

   f) The transformer would be fully loaded if $V_S := 208 \cdot V$ and $Z_L := 2 \cdot \Omega$ all real
       Find the voltage regulation as defined in your notes. $\% VR = ?$

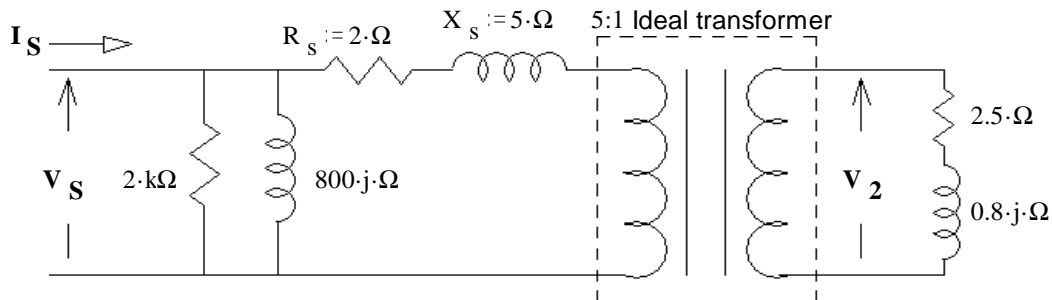2. The parameters of a 4:1 step-down transformer are shown below. The primary voltage is $V_S := 120 \cdot V$

   The transformer is loaded with $Z_L = R_L + jX_L$ and the secondary current is $I_2 := 3.2 \cdot A$
   $R_m := 1.5 \cdot k\Omega$ $R_s := 5 \cdot \Omega$ $X_m := 1 \cdot k\Omega$ $X_s := 7 \cdot \Omega$ $N := 4$
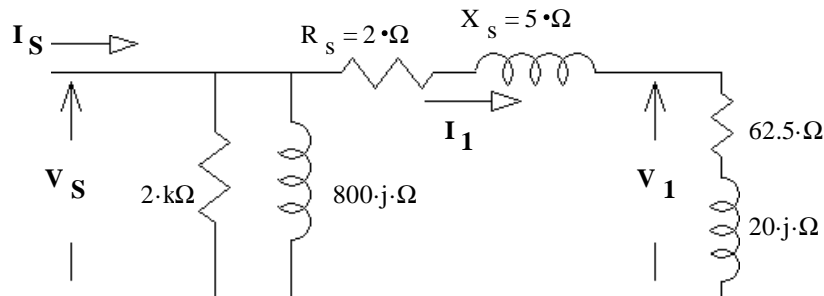   a) The primary, source voltage provides 40 VARs $Q_S := 40 \cdot VAR$ Find X_L
      Hint: draw the model with the load.

   b) Find R_L

   c) Find the efficiency of this transformer. $\eta = ?$

Answers

1. a)

   and/or

   b) 189.7·V   c) 503.3 + 233.1·j VA   d) 2.923·A   e) 93.4·%   f) 4.08·%

2. a) 2.062·Ω   b) 8.723·Ω   c) 87.5·%