ECE 3600 homework # 11 Due: Tue, 10/20/09

1. A 3-phase system operates at $220\ \text{kVA}$ and $11\ \text{kV}$. (Values given in this way are 3-phase power and V_L, also recall that V_L is V_{LL}). Using these quantities to find base values, find the base current and base impedance for the system.

2. 2.19 If $25\ \Omega$ and $125\ \text{A}$ are the base impedance and base current, respectively, for a system, find the base kVA and base voltage.

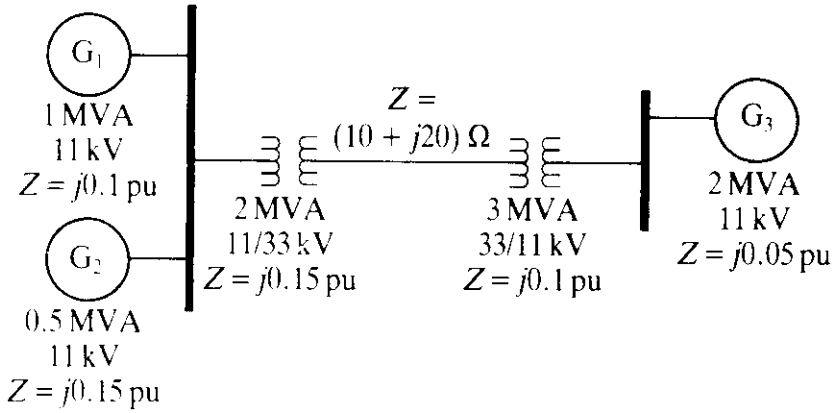
3. 2.20 The percent values of the voltage, current, impedance, and voltamperes for a given power system are 90, 30, 80, and 150 percent, respectively. The base current and base impedance are $60\ \text{A}$ and $40\ \Omega$, respectively. Calculate the actual values of the voltage, current, impedance, and voltamperes.

4. 2.21 A single-phase transmission line supplies a reactive load at a lagging power factor. The load draws $1.2\ \text{pu}$ current at $0.6\ \text{pu}$ voltage while drawing $0.5\ \text{pu}$ (true) power. If the base voltage is $20\ \text{kV}$ and the base current is $160\ \text{A}$, calculate the power factor and the ohmic value of the resistance of the load.

5. 2.25 A 100-kVA, $20/5\text{-kV}$ transformer has an equivalent impedance of 10 percent. Calculate the impedance of the transformer referred to
   a) the 20-kV side
   b) the 5-kV side.

6. 2.23 The one-line diagram for a two-generator system is shown. Redraw the diagram to show all values as per-unit values referred to a 7000-kVA base. See the transformers for the V_{base}s in the 3 regions.

   $S_{base} := 7 \cdot \text{MVA}$



Correct your exam 1 for 5 more exam points

For each problem part you missed, (say 1f) work out the correct solution. Don't change or add to the writing on your exam-- work out the corrections on separate paper. Be sure to clearly label the problems and parts.

Hand in your correct solutions along with your exam Tuesday 10/20 in class for up to 5 more exam points. They will be returned Thursday, 10/22.

Don't Forget: Field Trip, Mon, 10/19/09

Our Field trip is scheduled for Monday 10/19/09 starting at 3:00 at the main Rocky Mountain Power building on North Temple. This is the red building north of the Gadsby power plant.
We will meet at the north-west entrance.
Long pants, long-sleeved shirts + steel-toed boots and hard hats if you have them.

Answers

1. $6.35\cdot\text{kV}$ $11.6\cdot\text{A}$ $550\cdot\Omega$
2. $390.6\cdot\text{kVA}$ $3.125\cdot\text{kV}$
3. $2160\cdot\text{V}$ $18\cdot\text{A}$ $32\cdot\Omega$ $216\cdot\text{kVA}$
4. $69.4\cdot\%$ $43.4\cdot\Omega$
5. $400\cdot\Omega$ $25\cdot\Omega$

6.