Tutorial Sheet I

1. A three phase generator with rating 1000 KVA, 33 kV has its armature resistance and synchronous reactance as 20 ohm/phase & 70 ohm/phase. Calculate p.u. impedance of the generator.
2. A three phase star-delta transformer is constructed using three identical single phase transformer of rating 200 kVA, 63.51kV/11kV transformer. The impedance of primary and secondary are (20+j45) ohm and (0.1+j0.2) ohm respectively. Calculate p.u. impedance of transformer.
3. The reactance (X”) of a generator is 0.25 per unit based on the generator’s name plate rating of 18 kV, 500 MVA. The base for calculations is 20 kV, 100 MVA. Find X” on the new base.
4. **(a)** A generator is rated 500 MVA, 22 kV. Its star connected winding has the reactance of 1.1 p.u. Find the ohmic value of the reactance of the winding.

**(b)** If a generator is working in a circuit for which bases are specified as 1000 MVA, 20 kV. Then find p.u. value of reactance of generator winding on the specific base.

1. A 3-phase transmission line transmits 50 MW at 0.8 power factor lagging at 132 kV. If the impedance of transmission line is 40+j100 ohms, calculate the per unit values of:
2. Complex power, real power and reactive power
3. Voltage
4. Current
5. Impedance, resistance and reactance.

For transmission line assume base MVA = 100 and base kV = 132.