SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

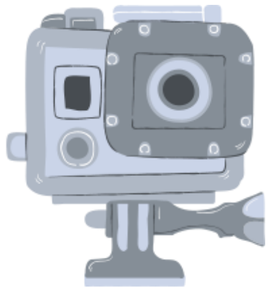
Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

UNIT 1

Single Line Diagram

19EET302 – Power System 1
III year / V Semester

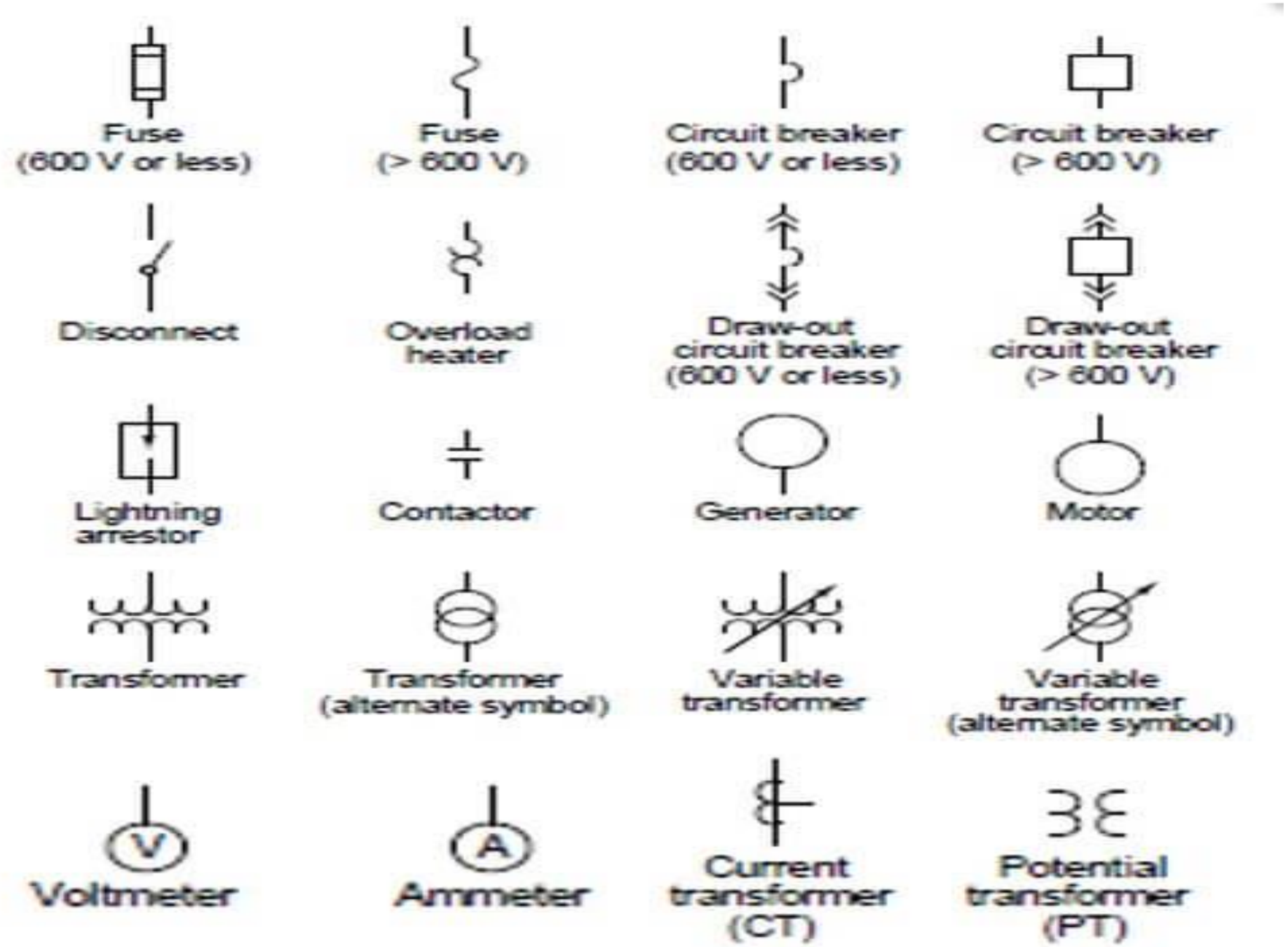


INTRODUCTION

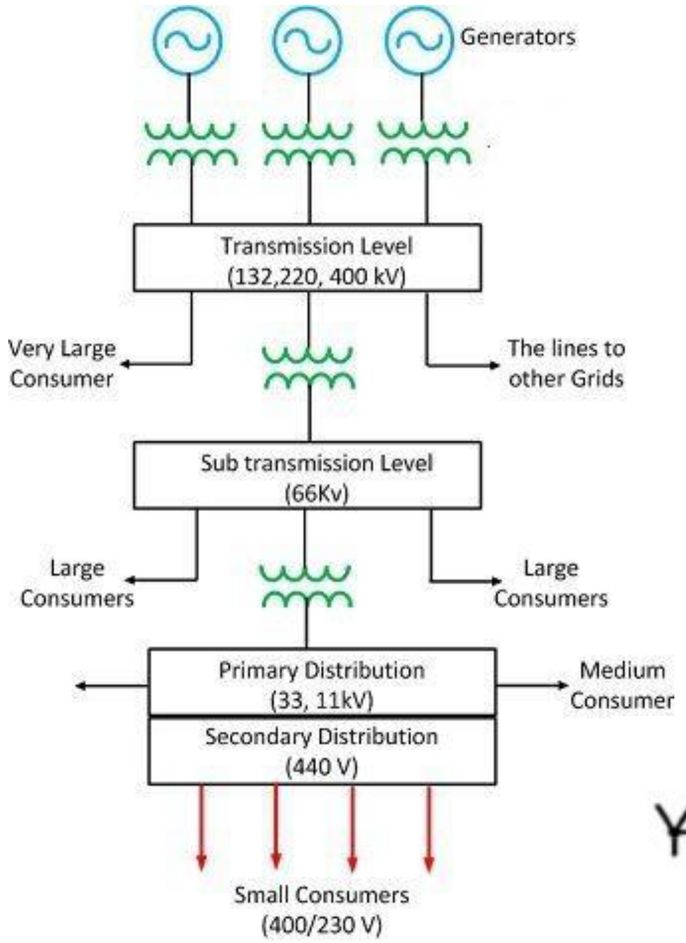
Single Line Diagram

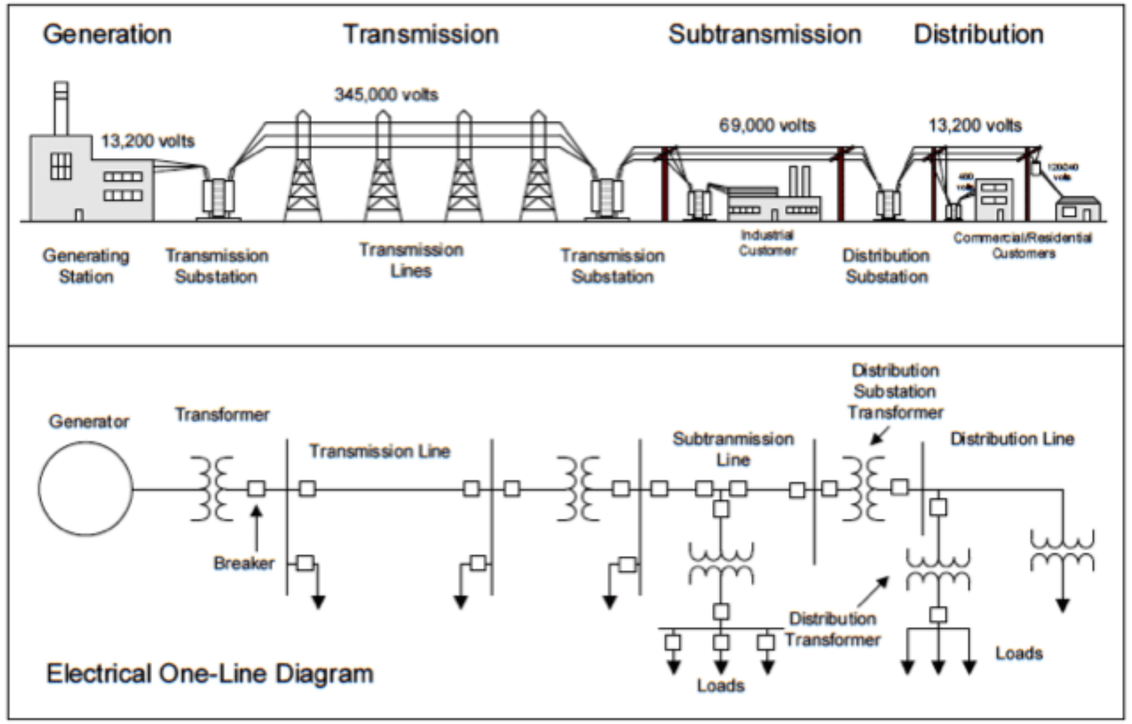
- A 3 ph system is solved always with a 1 ph circuit consisting of one of the three lines and neutral.
- This diagram is further simplified by omitting the completed circuit through neutral and by indicating the components by standard symbols.

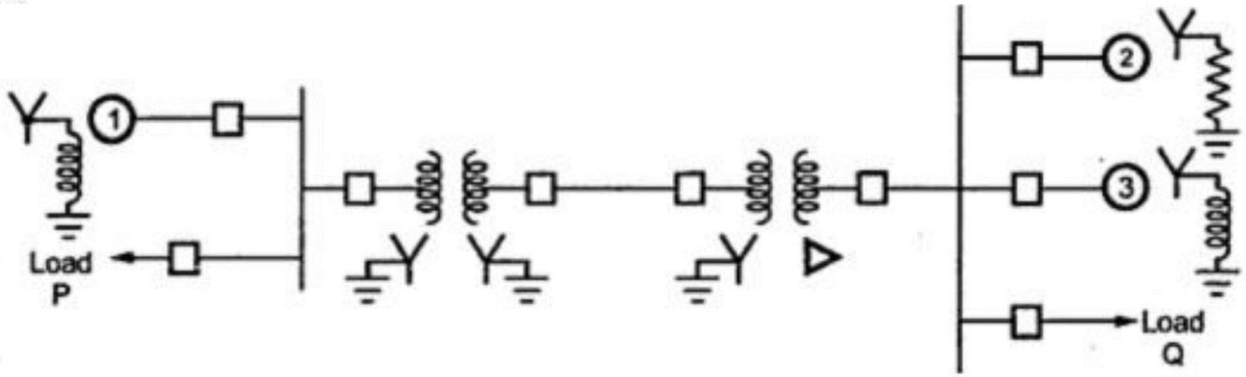
Single Line Diagram



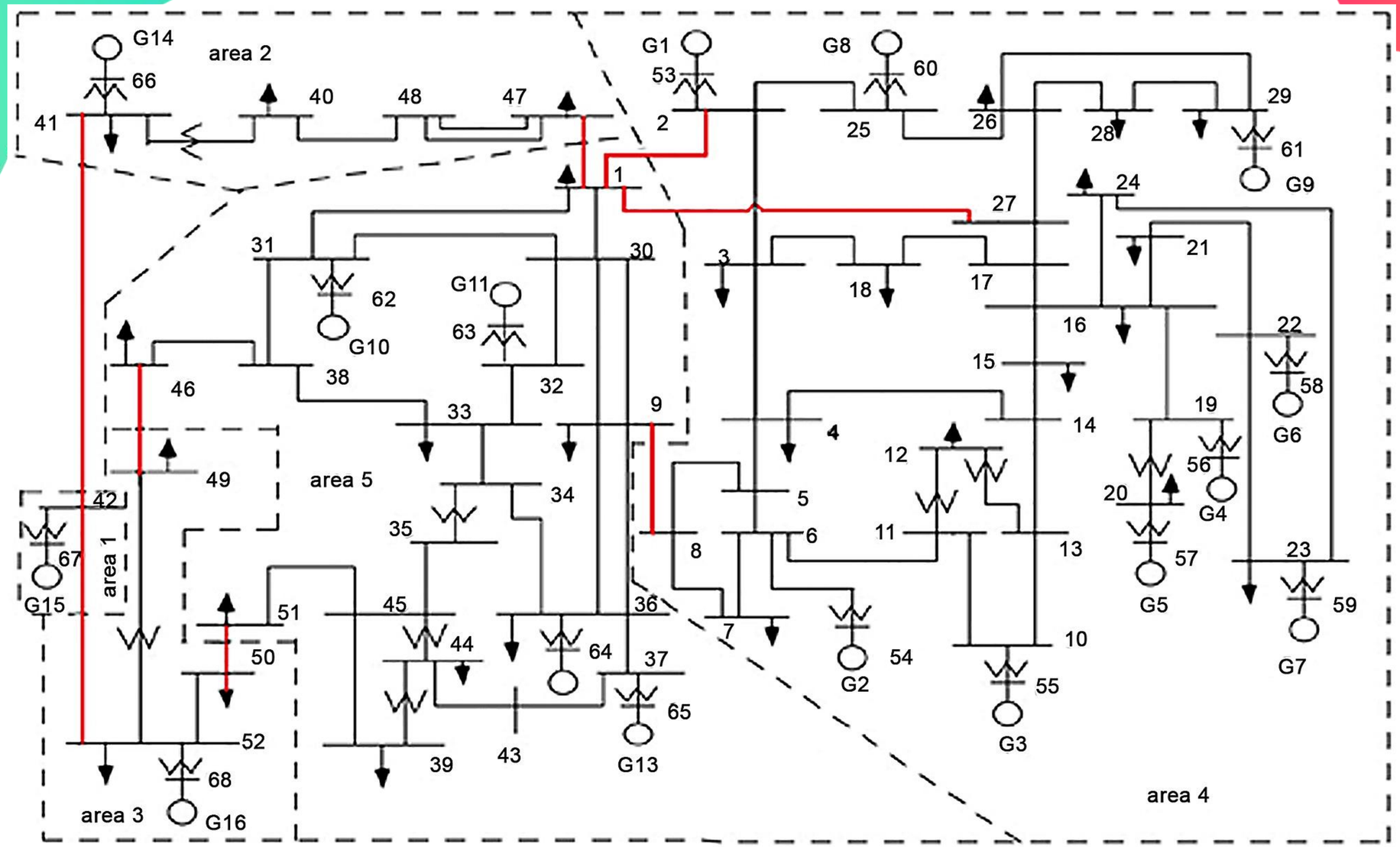
Single Line Diagram







Single Line diagram



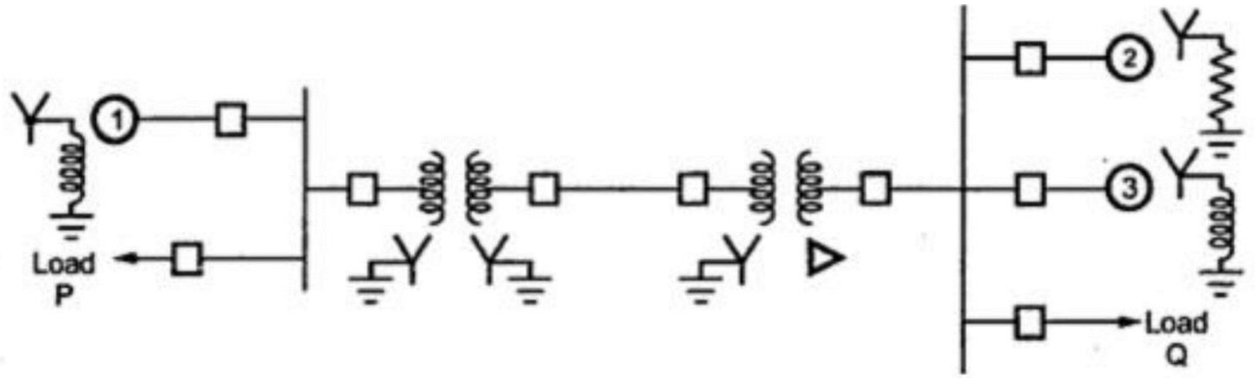
Impedance Diagram

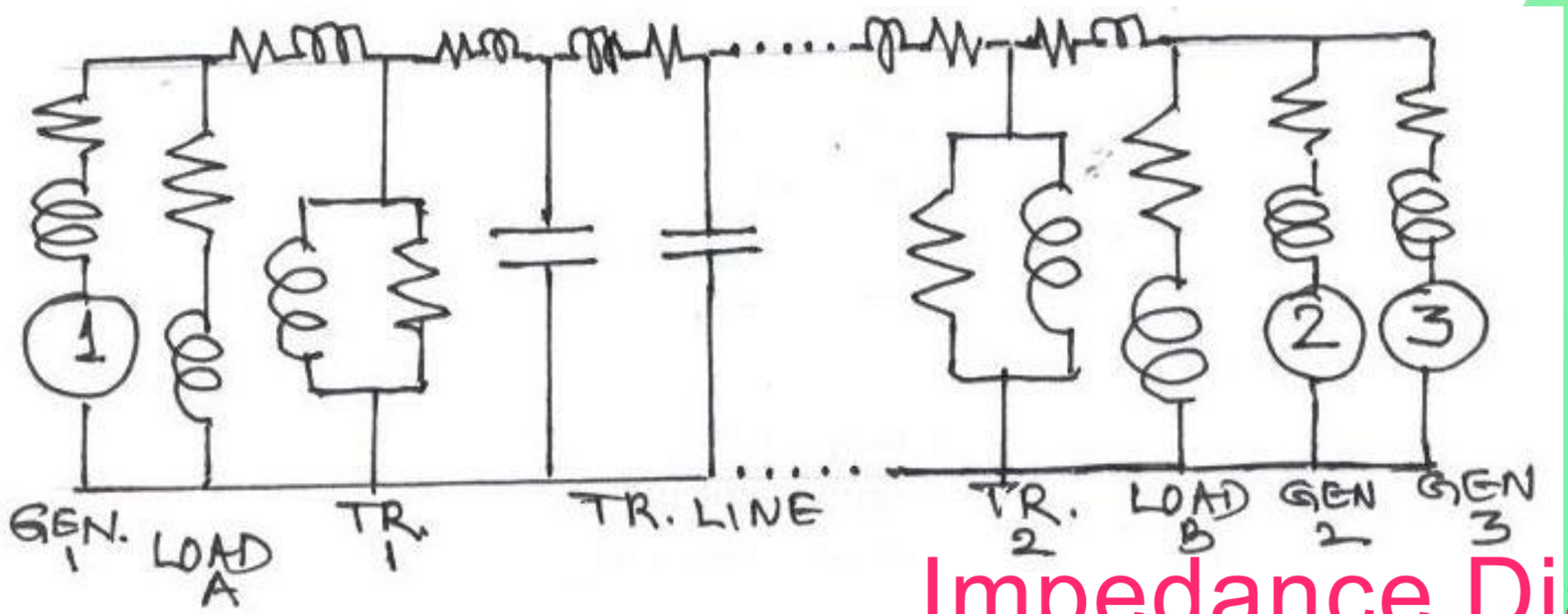
- Impedance diagram is obtained from the single line diagram by replacing all the components of the power system by their 1ph equivalent circuit.

Approximations for Impedance diagram

- The single phase transformer equivalents are shown as ideals with impedance on appropriate side (LV/HV)
- The magnetizing reactance of transformers are negligible
- The generators are represented as constant voltage sources with series resistance or reactance
- The transmission lines are approximated by their equivalent -Models,
- The loads are assumed to be passive and are represented by a series branch of resistance or reactance
- Since the balanced conditions are assumed, the neutral grounding impedance do not appear in the impedance diagram.

Example





Impedance Diagram

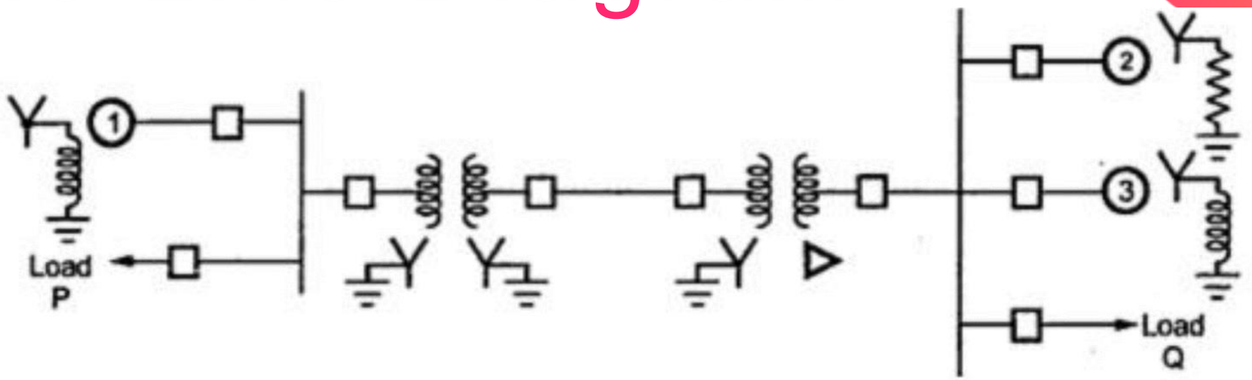
Reactance Diagram

- With some more additional and simplifying assumptions, the impedance diagram can be simplified further to obtain the corresponding reactance diagram.

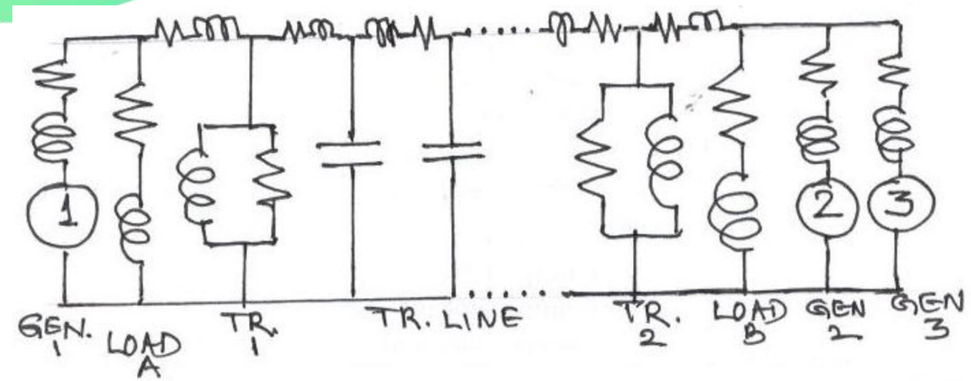
Additional assumptions:

(i). The resistance is often omitted during the fault analysis.
This causes a very negligible error since, resistances are negligible
(ii). Loads are Omitted
(iii). Transmission line capacitances are ineffective
(iv). Magnetizing currents of transformers are neglected.

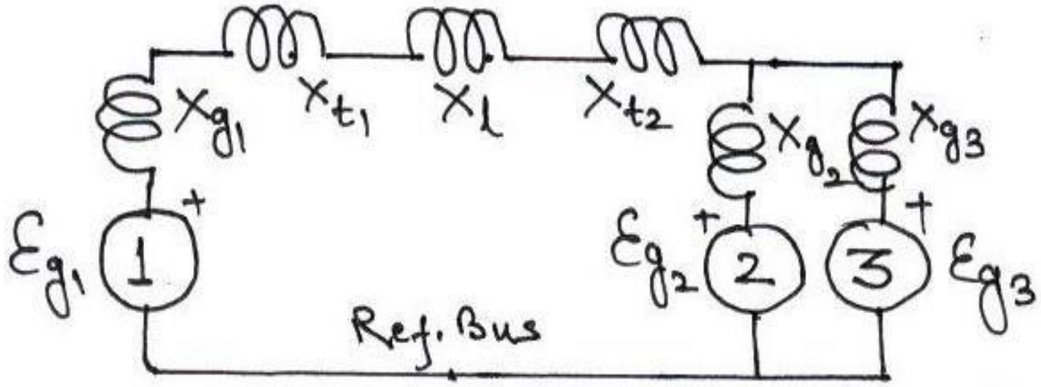
Single Line Diagram



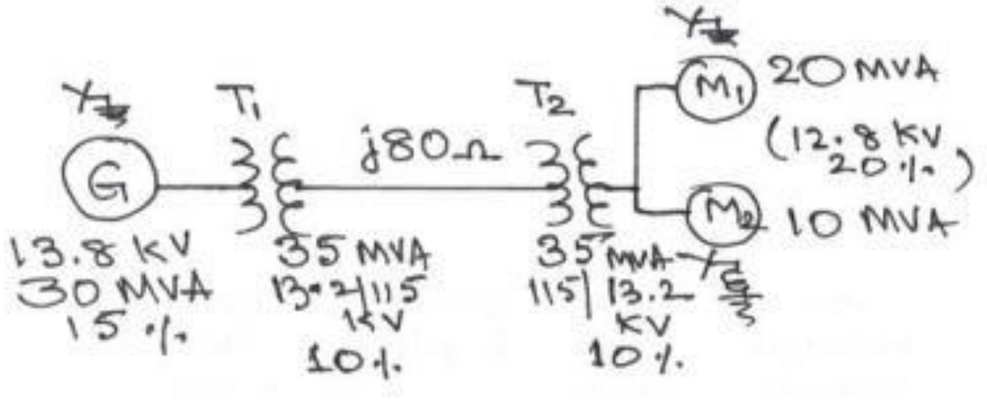
Impedance Diagram



Reactance Diagram



Summary



Activity

KEEP
LEARNING..

Thank u

SEE YOU IN NEXT CLASS