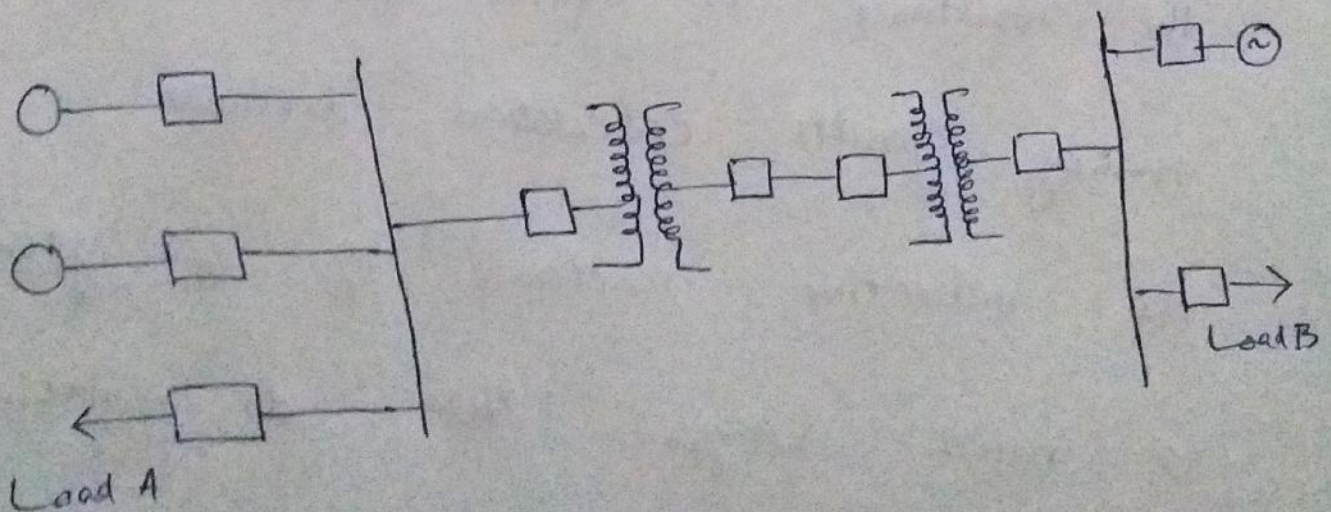


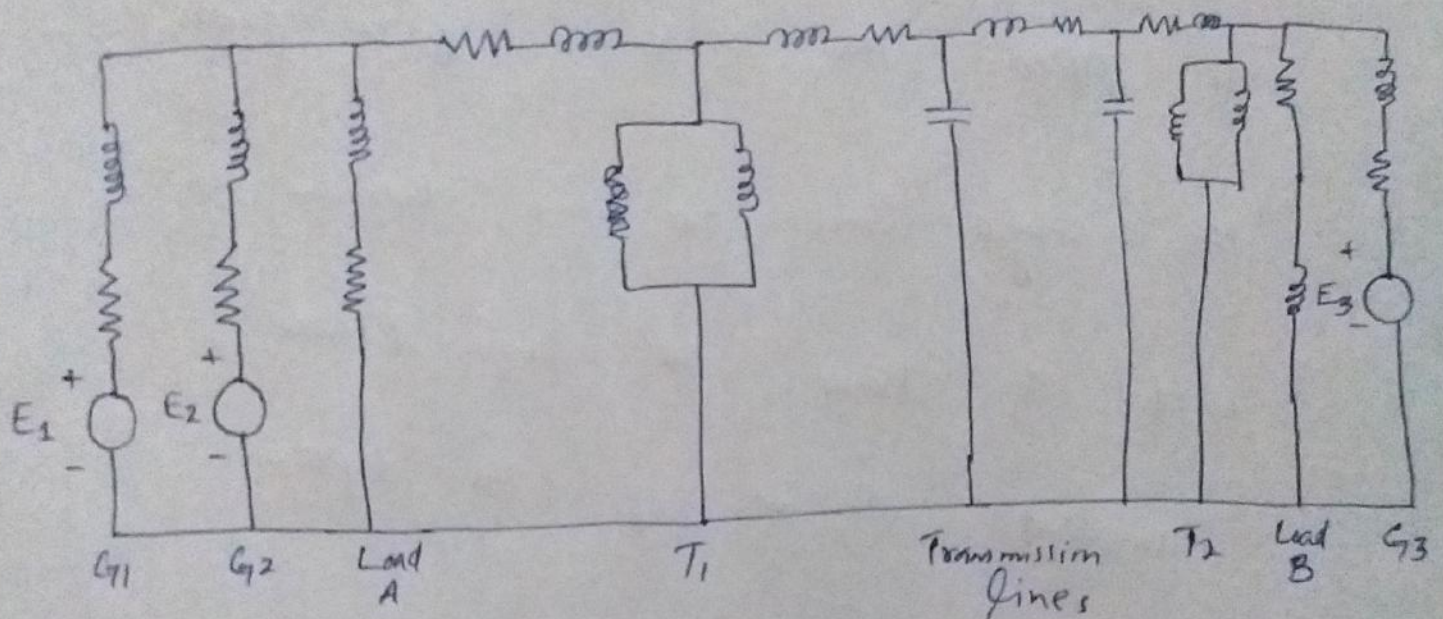
③ Impedance and Reactance Diagram:-

In order to calculate the performance of a system under load conditions or upon the occurrence of a fault, the single line / one line diagram is used to draw the single phase equivalent circuit of the system.

e.g



The impedance diagram of above system can be drawn as :-

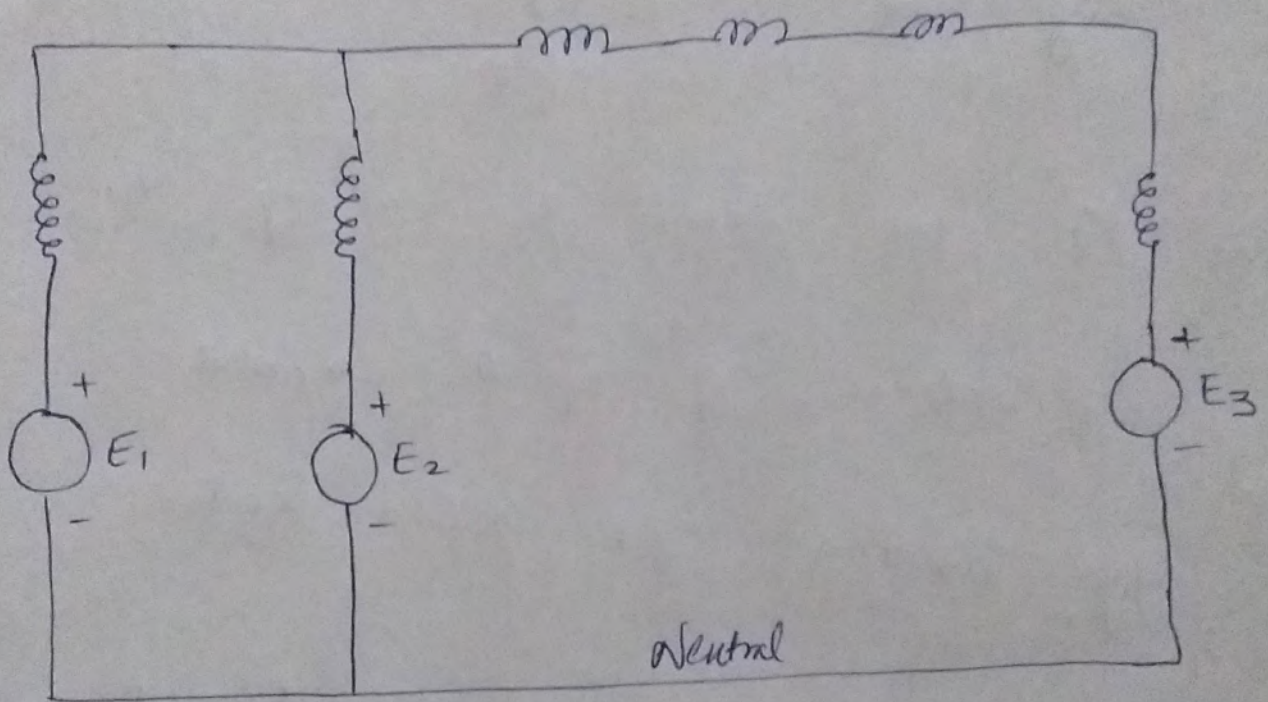


The resistance is often omitted when making fault calculations because the inductive reactance of a system is much larger than its resistance.

⇒ The omission of resistance introduces same error but the results may be satisfactory.

⇒ If we decide to simplify our calculations of fault current by omitting all static loads all resistances and capacitances of transmission lines, The impedance diagram reduces to the reactance diagram

These simplifications apply to fault calculations only



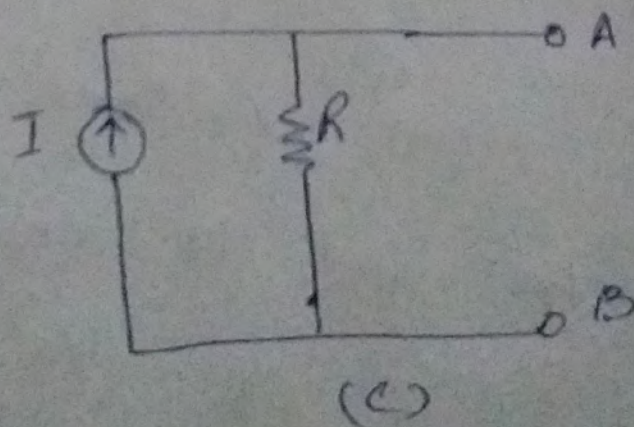
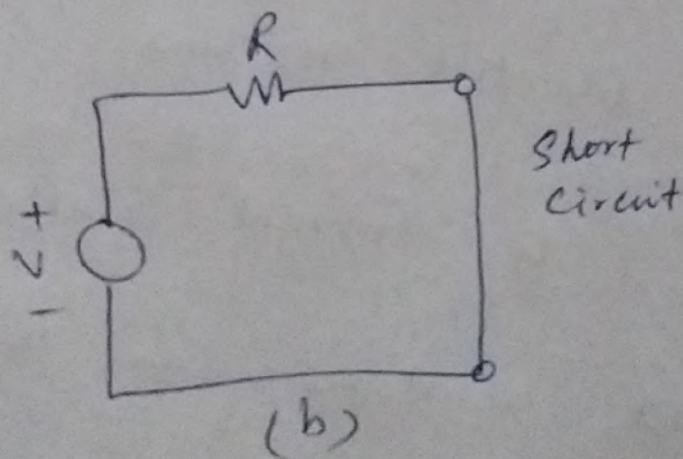
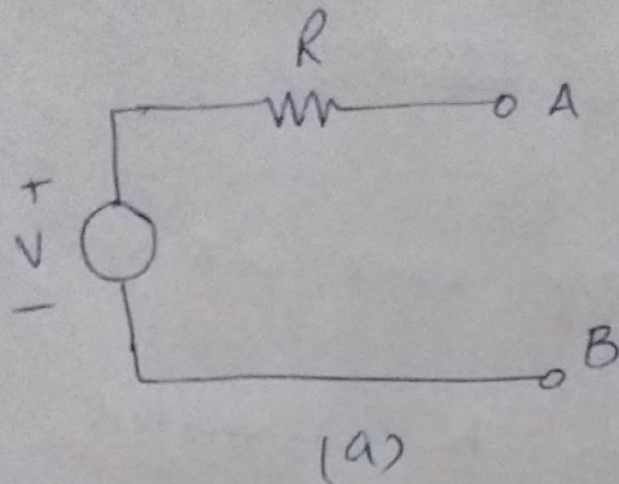
Network Calculations:-Equivalence of Sources:-

A given voltage source with a series resistance can be converted into an equivalent current source with a parallel resistance.

Conversely, a current source with a parallel resistance can be converted into a voltage source with a series resistance.

Suppose, we want to convert the voltage source of the

given below Figures ~~to~~ into an equivalent current source.



We will find the value of current supplied by the source when the terminals A and B are short circuit as shown in

Figure - B

This current is $I = V/R$.

A current source supplying

this current I and having

the same resistance R in parallel

with it represent the equivalent

source as shown in Figure C.

Nodal Method :-

Advantages :-

The Node equation method is based directly on KCL.

It has the advantage that a minimum number of equations need to determine the unknown quantities.

It is particularly suited for networks having many parallel circuits with common ground.