

Generation

Transmission

Distribution

Transformer

Power in = Power out

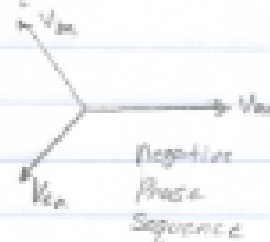
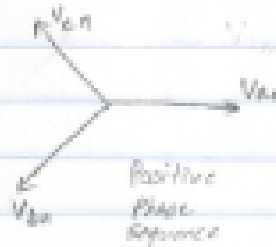
$V I$  } Primary  
 } Secondary  $V I$



### 3 Phase Circuits

A) Balanced 3 phase voltage:

- 1) System of sinusoidal voltage
- 2) Have identical magnitude & frequencies
- 3) Differ in phase angle from each other by  $120^\circ$
- 4) Can have 2 phase sequences



$$V_{a1} + V_{b1} + V_{c1} = 0$$

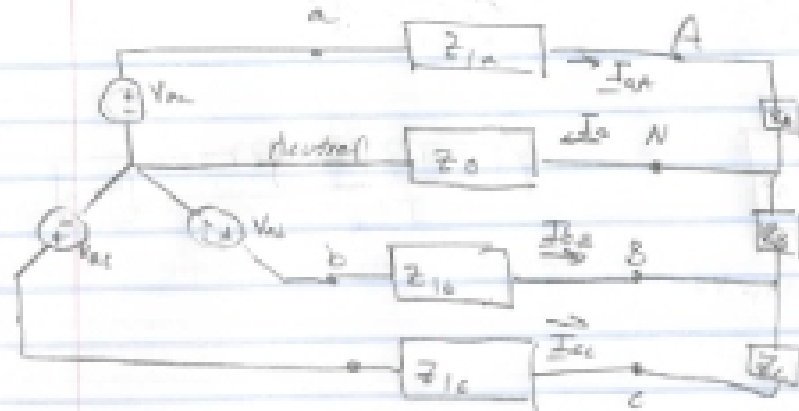
$$V_{a1} = V_p \angle 0^\circ$$

$$V_{b1} = V_p \angle -120^\circ$$

$$V_{c1} = V_p \angle 120^\circ$$

B.) 3 phase voltage source (generator)

- 1) Two types of source interconnection



$$I_0 = I_{cA} + I_{bB} + I_{cC} = 0$$