

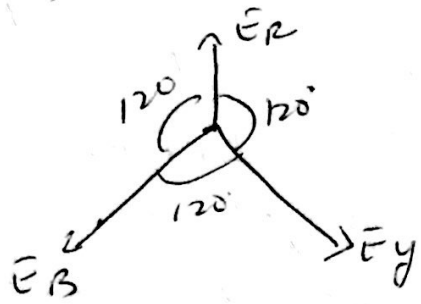
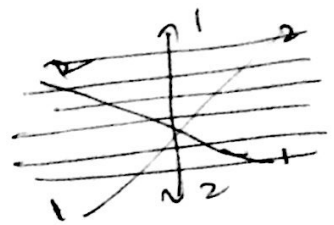
Polyphase system

A single phase system consists of single alternating current and voltage. Single phase system involving single phase current and voltages are quite satisfactory for domestic application. even the meters employed in domestic application are single phase e.g. meter for mixer, water fans, air conditioners. However the single phase system has its own limitation, and therefore has been replaced by polyphase system. For general supply three phase system is universally used.

Polyphase system means system consisting numerous winding.

A poly phase system essentially a combination of several single phase voltage having same magnitude and frequency but displaced from one another by equal angle (electrical) which depend upon the no. of phases. commonly used polyphase system is 3-phase system.

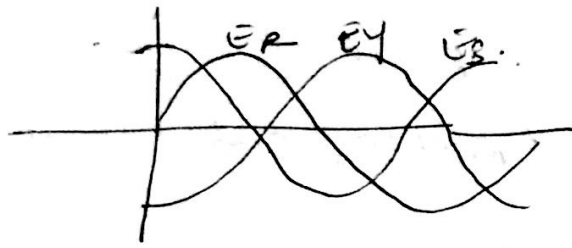
In a three phase system 3 coils which are kept 120° apart are made to rotate in the magnetic field.



$$E_R = E_m \sin \omega t$$

$$E_Y = E_m \sin (\omega t + 120^\circ)$$

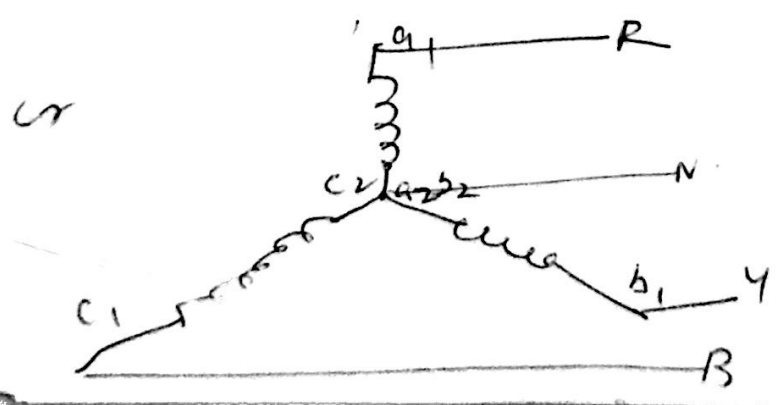
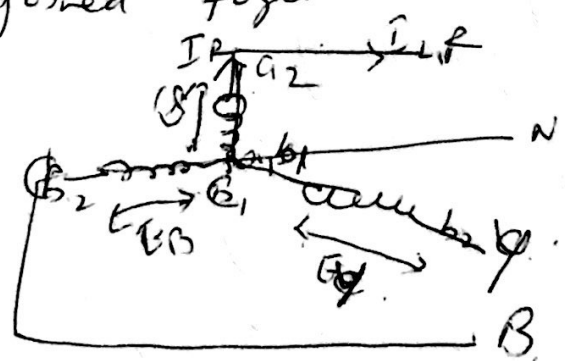
$$E_B = E_m \sin (\omega t - 240^\circ)$$



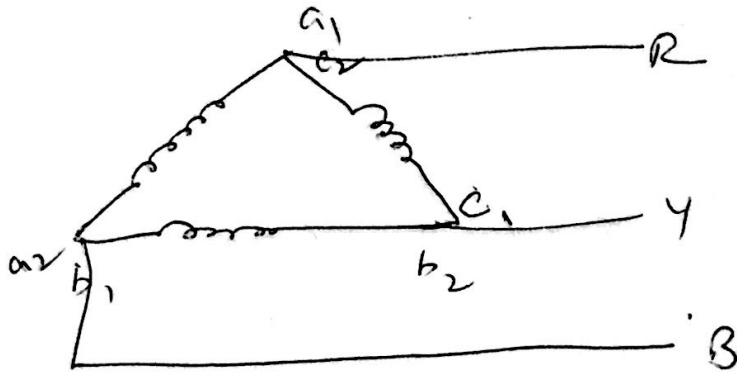
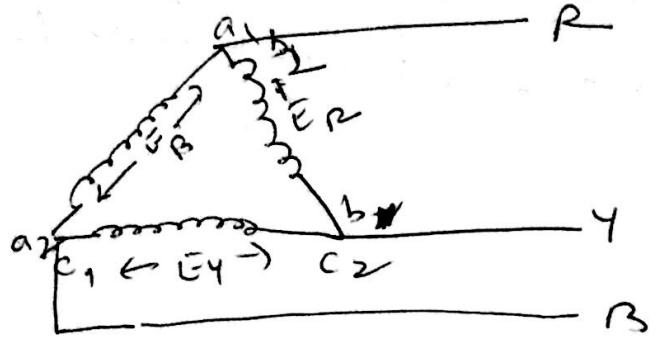
The general method of interconnection of the three phases are

- (1) star or wye connection
- (2) delta or mesh connection

Star connection → Here similar ends i.e. the starting ends of three coil or finishing ends of three coil joined together at point N called neutral.



Delta connection. Here Dissimilar ends of the three ~~the~~ phase windings (coils) are joined together i.e. starting end of one coil is joined to finishing end of the other end.



Phase voltage \rightarrow voltage induced in each winding $\rightarrow E_{ph}$ or V_{ph} (E_R, E_Y, E_B)

Phase current \rightarrow current flowing through any of the phase winding is called phase current.

Line voltage \rightarrow voltage between any two lines of the supply system.

Line current \rightarrow current flowing in each line

In star connection

$$\text{Line current} = \text{phase current}$$

$$\text{Line voltage} = \sqrt{3} \text{ phase voltage}$$

In Δ connection

$$\text{Line voltage} = \text{phase voltage}$$

$$\text{Line current} = \sqrt{3} \text{ phase current}$$