

TRANSFORMERS



WHAT IS A TRANSFORMER?



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A transformer is a static machine used for transforming power from one circuit to another without changing frequency.

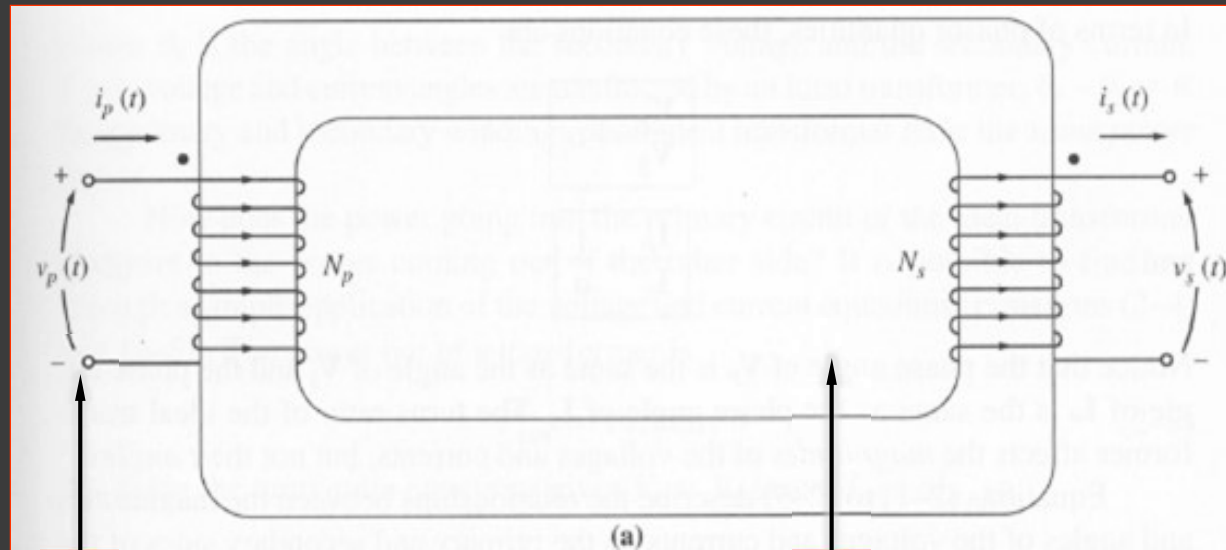
MAJOR COMPONENTS OF TRANSFORMER

- ① Housing
- ① Winding
- ① Core
- ① Insulation Material
- ① Cooling Medium

WINDING

- There are two types of windings in a transformer.
 - a). Primary Winding
 - b). Secondary Winding
- The source side is called Primary
- The load side is called Secondary

WINDING

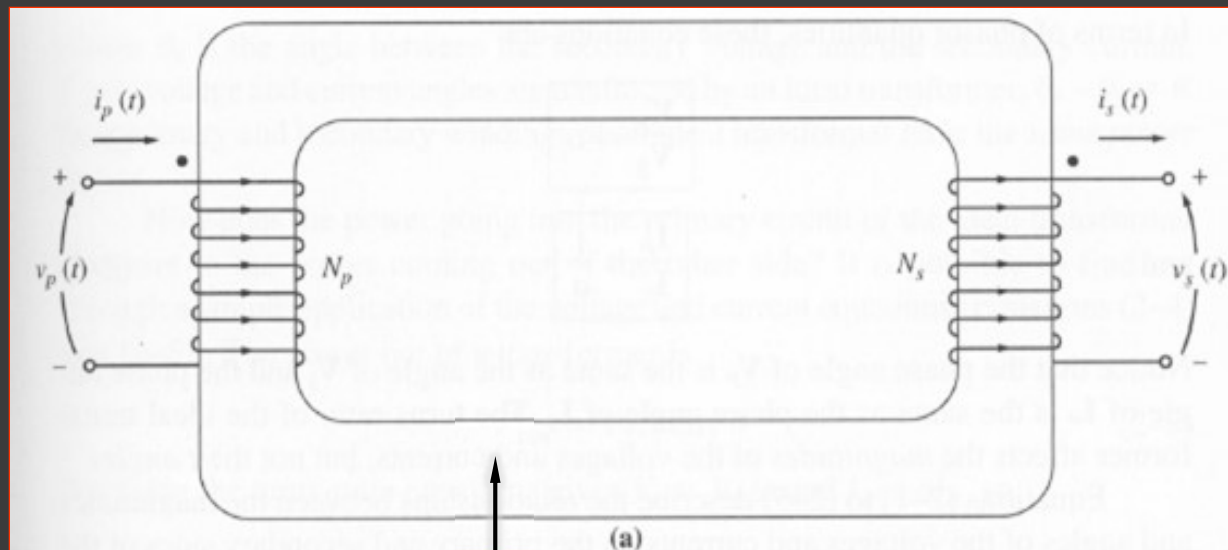


Primary
winding

Secondary
winding

Core

- Core is used to provide a path for magnetic field in the transformer.



Core

Insulation Material

- Insulation Material is used to provide insulation among the live part itself and other parts of the transformer to avoid any short circuit conditions in transformer.

Cooling Medium

- Different types of cooling medium are used in transformers such as mineral oil, Air etc.
- The cooling medium requirement of WAPDA is ONAN(Oil Natural Air Natural).
- Whole transformer active part is dipped in oil which is filled in tank with elliptical tubes.

CONSTRUCTION OF SIMPLE TRANSFORMER

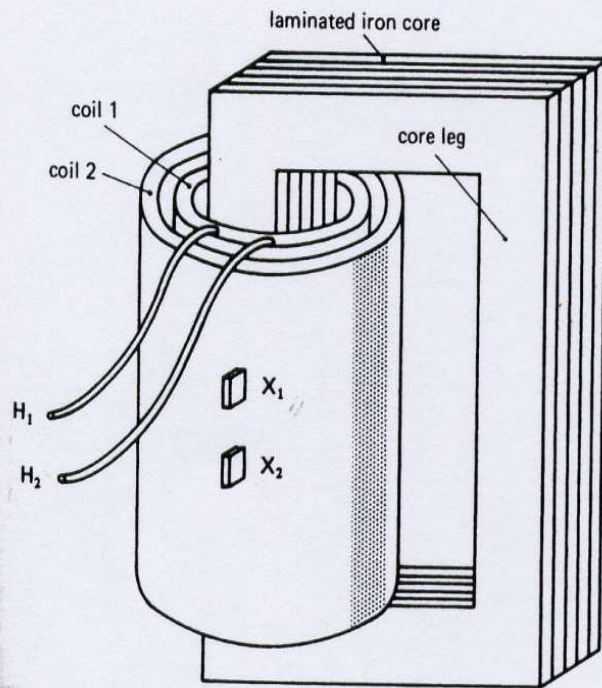
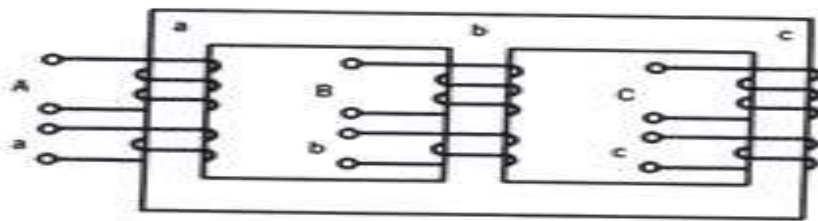


Figure 10.9a
Construction of a simple transformer.

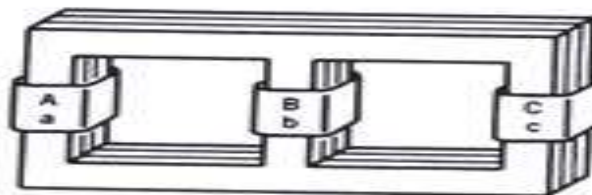


Figure 10.9b
Stacking laminations inside a coil.

3- ϕ Transformer Construction



(c)



(d)

FIGURE 2.21 Development of a three-phase core-type transformer.

TRANSFORMER ACTIVE PART



CLASSIFICATION OF TRANSFORMERS

- ① Transformers can be classified as
 - a). Based on type of construction
 - i). Core Type
 - ii). Shell Type
 - b). Based on Voltage Transformation
 - i). Step Up
 - ii). Step Down

CLASSIFICATION OF TRANSFORMERS

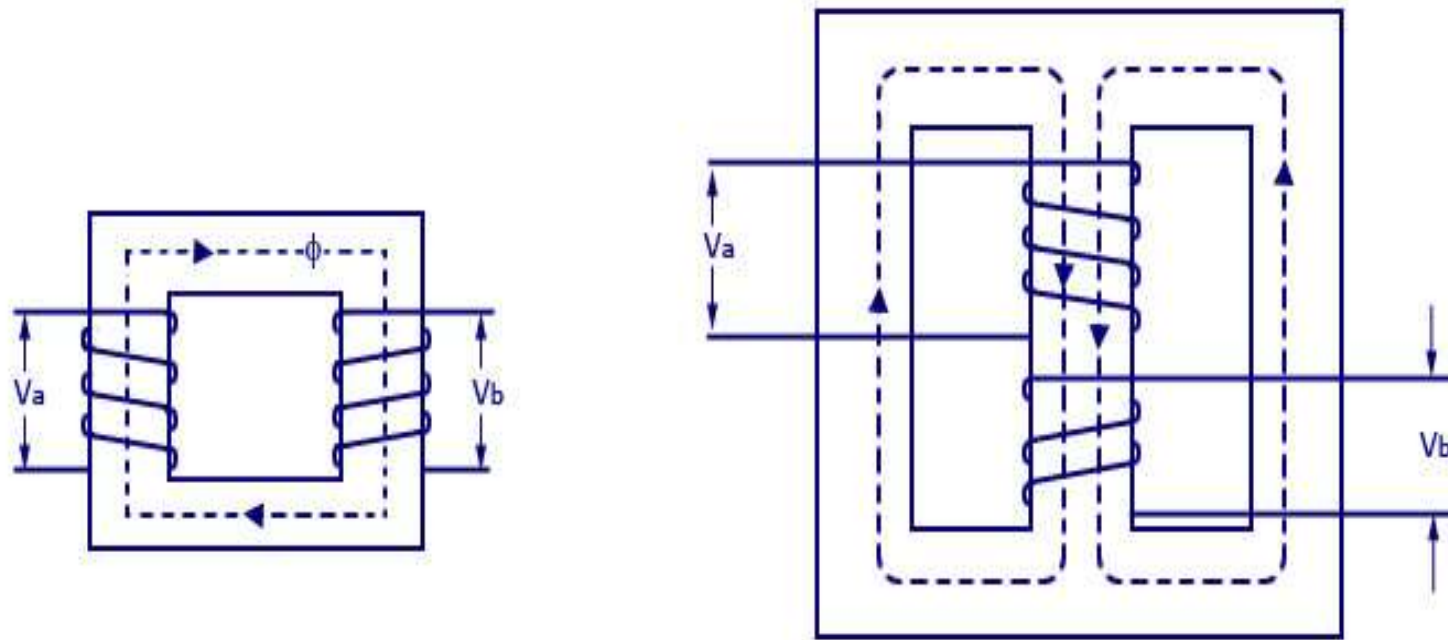
- Transformers are further classified as

- i). Distribution Transformers

- ii). Power Transformers

CORE & SHELL TYPE TRANSFORMERS

Core Type and Shell Type Transformer Winding



STEP UP & STEP DOWN TRANSFORMERS

- ⦿ A transformer which steps up the voltage is called step up transformer. In this transformer source voltage is less than the output voltage.
- ⦿ A transformer which steps down the voltage is called step down transformer. In this transformer source voltage is greater than output voltage

Power & Distribution Transformers

- ⦿ The transformers used in sub-stations; grid stations and for transmission of electricity are called power transformers. Their rating is expressed in MVA. They may be step up or step down transformer.
- ⦿ The transformer which is used for distribution of electricity known as Distribution Transformers. Their Rating is express ass KVA. They are always step down Transformers