ROYALCLASS
Page No. 1
Date: / /20

EXP-4 Date:

AIM : To perform polarity test of a single phase transformer.

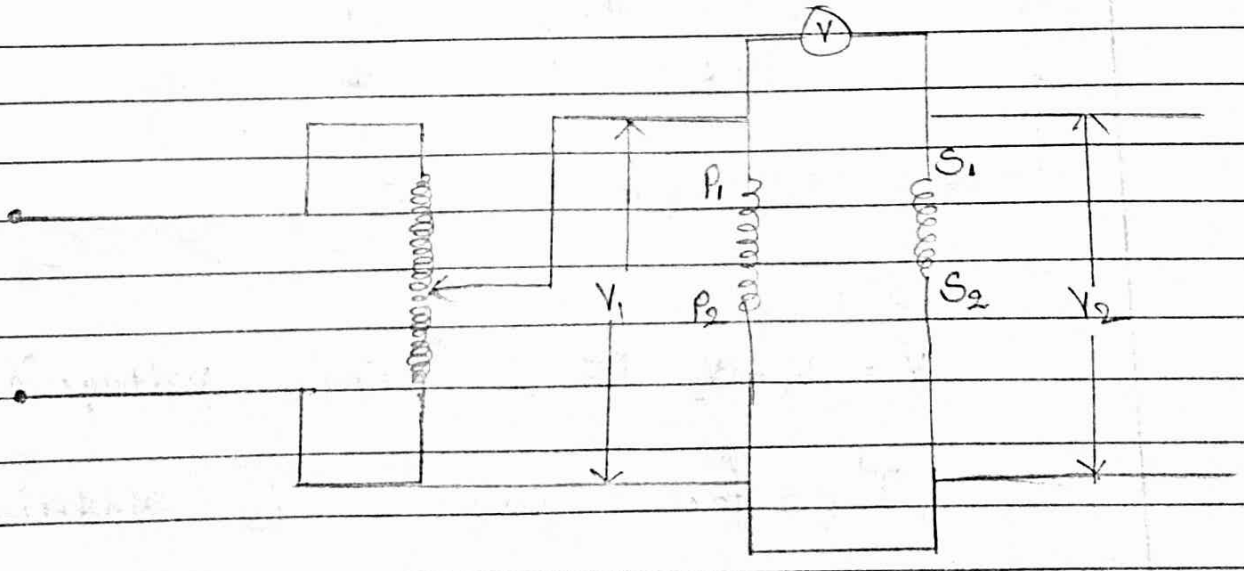
Apparatus & Specifications :

1> 1-Φ Transformer : 230V/230V, 1kA, 50Hz

2> 1-Φ Variac : 0-300 V, 15-A

3> Voltmeter : 0-300 V

Circuit Diagram :



230 ∫ 930 V

1-Φ x'mer

1 KVA

Date : / /20

Theory :

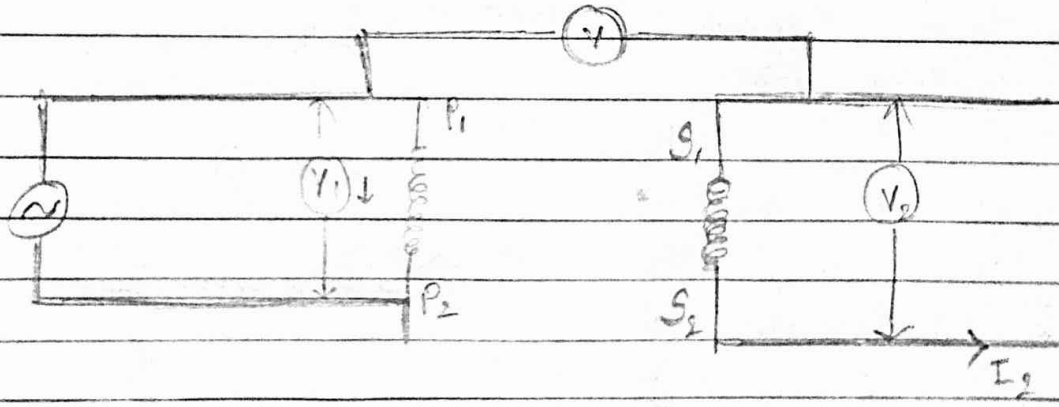
- There are two types of polarity of transform

1> Additive polarity

2> Subtractive polarity

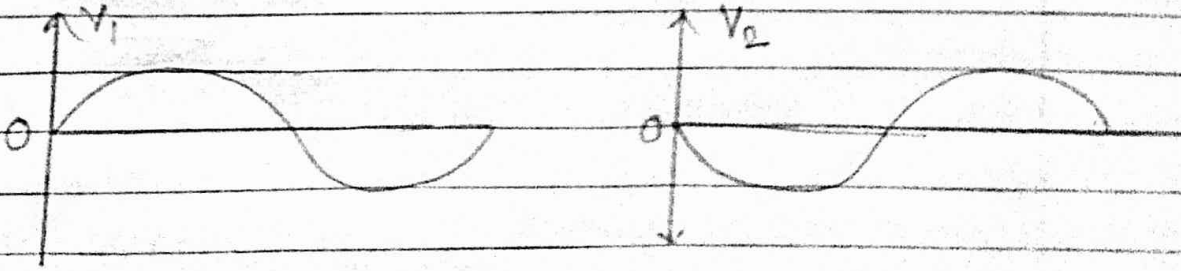
- Check the polarity for the "parallel operation of transformer"

i> Additive polarity



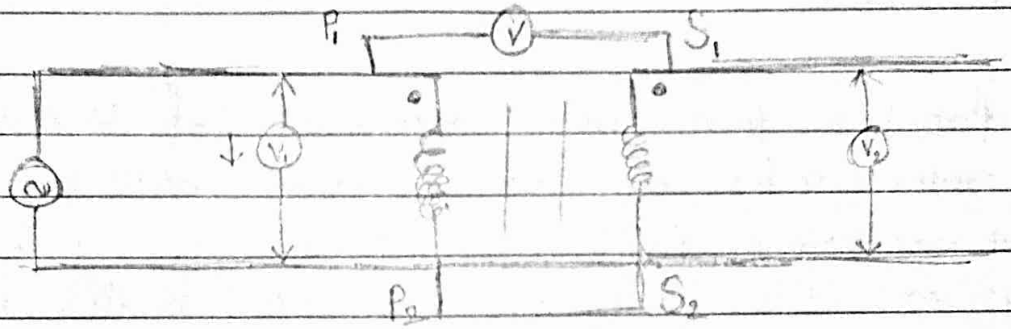
$V = V_1 + V_2 \approx 2$ (supply Voltage)

Therefore polarity is Additive



- Voltage are out of phase
- Hence, with additive polarity, transformers can't be ~~com~~ connected in parallel.

ii> Subtractive polarity

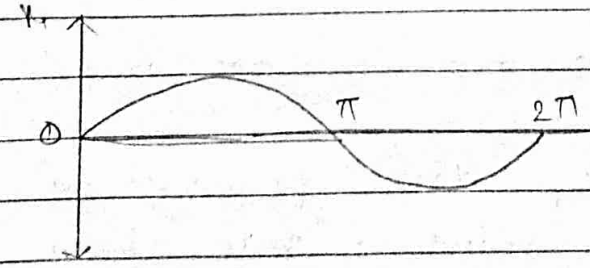


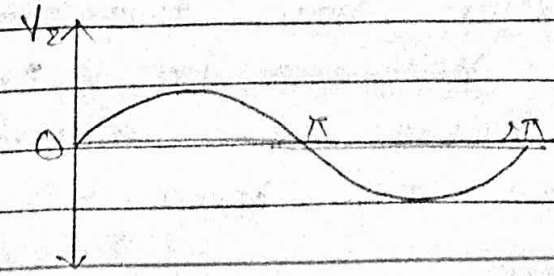
~~$V = V_1 + V_2$~~

$$V = V_1 - V_2 \approx 0$$

~~Therefor~~

Therefore, polarity is subtractive





Date : / /20

- Voltage are in phase
- Hence with subtractive polarity, transformers can be connected in parallel

Procedure :

→ Firstly join one terminal of variable autotransformer with one terminal of transformer (P_1) and similarly join the other terminal of varice with the other terminal of the transformer (P_2)

→ Now short the two terminal of transformer P_2 & S_2

→ Then join one terminal of Voltmeter with p terminal of transformer and the other terminal of Voltmeter with S_1 terminal of transformer

→ Now turn on the power supply for Varice

→ Now turn up the power of varice to a certain value & note down that value in V_1 and then note the readings obtainted in Voltmeter in V. Repeat this process for some more different values & note down the readings obtained.

→ Now if the values of V obtained from ~~subtractive~~ subtraction of V_1 & V_2, is zero then the polarity is subtractive. If the value of V obtained from ~~addition~~ addition of V_1 & V_2 is twice the value of V_1, then the polarity is additive.

↳ observation tables -

Sr.no	Primary V_1 (V)	Secondary V_2 (V)	voltmeter V(V)	Remarks
1	20	20	0	Subtractive Polarity
	30	30	0	Subtractive Polarity
	50	50	100	Additive polarity

Conclusions :

→ In Additive polarity, transformer cannot be connected in parallel & in subtractive polarity transformer can be connected in parallel connection.