THAPAR POLYTECHNIC COLLEGE

BRANCH- ELECTRICAL

Assignment -2

Subject- EMII Semester- 4th

Q1. Explain the method of measurement of power in

1. Single phase system
2. Three phase system

Q2. What is clamp on meter? Why it is used?

Q3. Explain the working of meggar? How it is used for measuring earth resistance?

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BRANCH- ELECTRICAL

Assignment -3

Subject- EMII Semester- 4th

Q1. Explain working of LCR meter? Where it is used?

Q2. Explain costruction and working of

1) Moving iron synchroscope

2) Phase sequence indicator

Q3. Explain the working of maximum demand indicator with diagram?

EMII - TOPICS ASSIGNED FOR SEMINAR

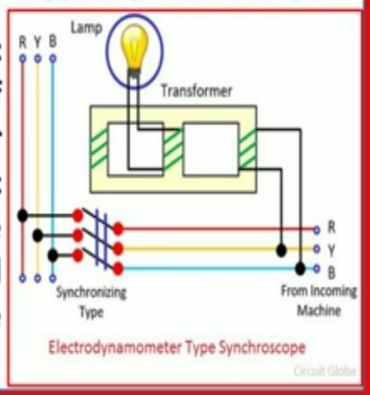
S. No.	Seminar Topic	Roll No.
1.	1. Difference in integrating and recording instrument 2. Why PMMC Instruments used on D.C supply only 3. Explain errors in shunt and multipliers 4. Difference in voltmeter and ammeter	81-86
2.	1. What are the essentials of indicating instruments 2. Type of moving iron instruments 3. Difference in moving coil and moving iron instruments	87-92
3.	1. Power measurement by wattmeter 2. Errors in wattmeter 3. Single phase energy meter 4. Three phase energy meter and errors compensation	93-100
4.	1. Measurement of low resistance by Kelvin double bridge 2. Difference in wheatstone and Kelvin bridge 3. Measurement of unknown inductance 4. Measurement of unknown capacitance	101-109
5.	1. CRO application and construction 2. Use of CRO in measurement of voltage and frequency 3. Phase sequence indicator	110-118
6.	1. Syncroscope and its applications 2. Power factor meter for single phase power 3. LCR meter and its use in laboratory	119-127
7.	1. Difference in digital and analog multimeter 2. Maximum demand indicator and its use 3.Frequency meter and its types	128-134
8.	1. Transducers classification 2. LVDT working and use 3. temperature measurement device	136-143
9.	1. Measurement of pressure and strain 2.Power measurement in three phase balanced system 3. Two wattmeter method of power measurement	145-150
10.	1. Current transformer construction and errors 2.Potential transformer construction and errors 3. Tong tester	151-155
11.	1. Use of Meggar for insulation testing 2. Earth tester for measurement of earth resistance	156-160

Types of Synchroscope:-

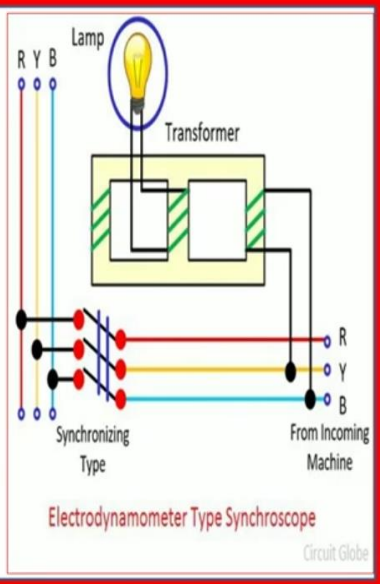
- Electrodynamometer type synchroscope
- Moving Iron synchroscope

Electrodynamometer type synchroscope

The static and dynamic are the two main parts of the electrodynamometer synchroscope. The static part of the synchroscope consists the three-limbed transformer and the lamp.

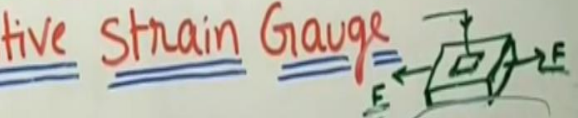


The winding of the outer limb of the transformer induces two flux. And the flux of the central limb is the resultant of the outer two limb flux. The resultant flux induces the EMF in the central winding of the transformer.



Semi-Conductor Strain Gauge

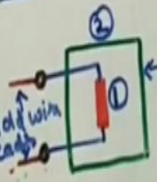
[or] Piezo Resistive Strain Gauge



Basic Principle: change in Dimension → Resistance → Strain → Applied Force

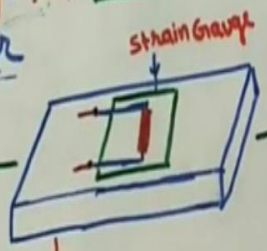
10Ω – 10N

Description: 3



Material: [Wheat stone Bridge] on different leads

① For Semi-conductor
(i) n-type
(ii) P-type



· For Piezo Resistive | structure under study

conductivity High
conductors
semiconductor → Medium
Insulators → No electric

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pes:

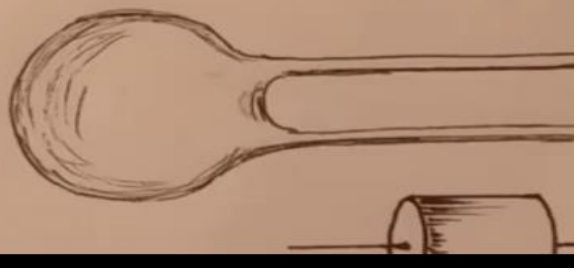
Bead Thermistor

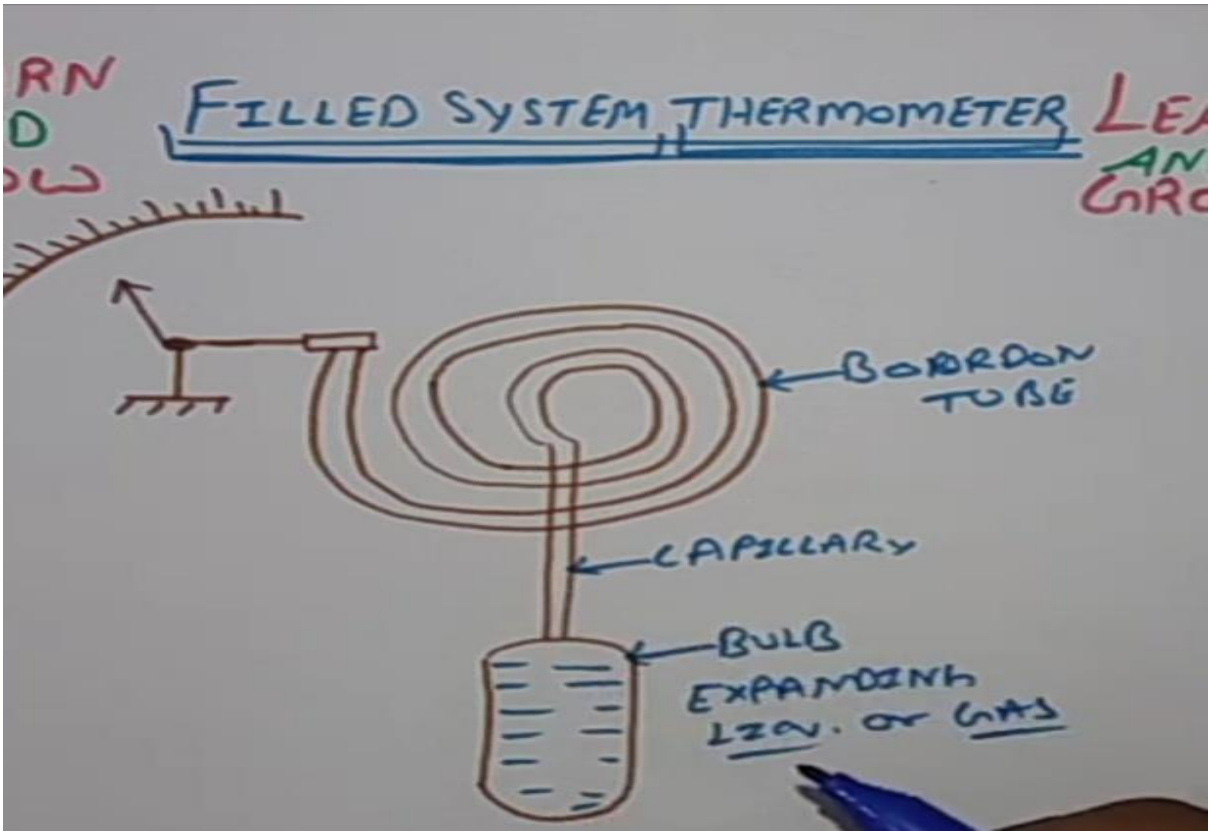
Smallest thermistor
0.15 mm to 1.25

Glass coated bead

Probe Thermistor

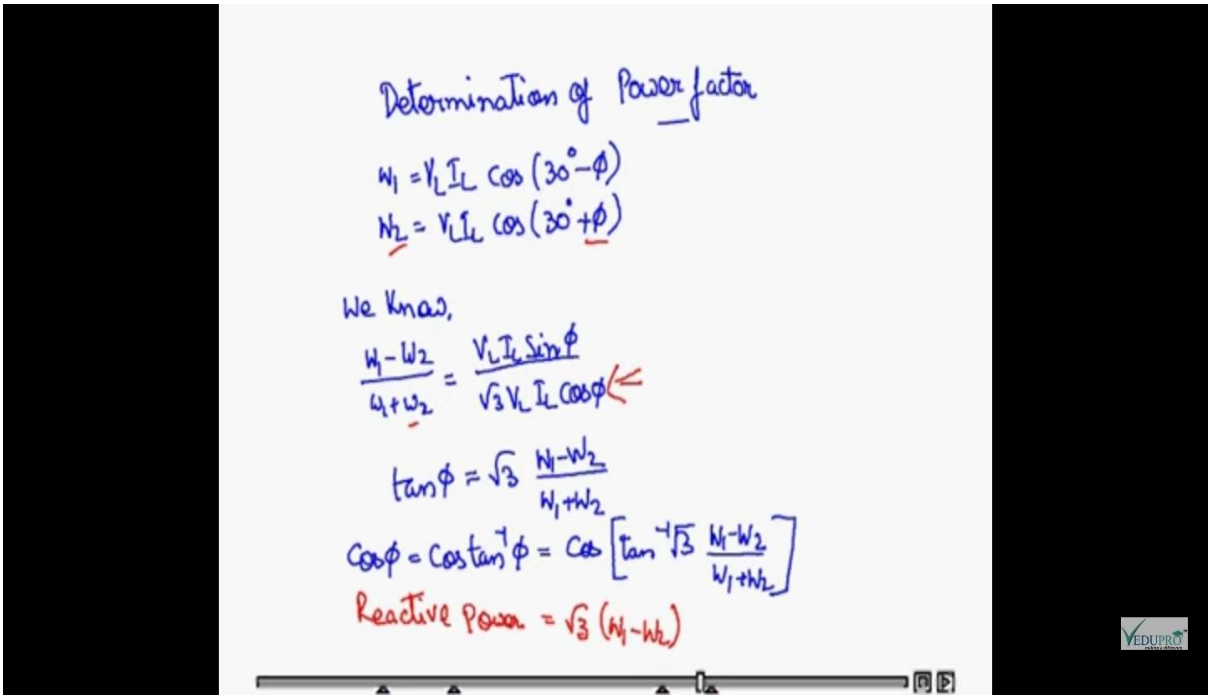
Generally used to measure temperature of liquids.

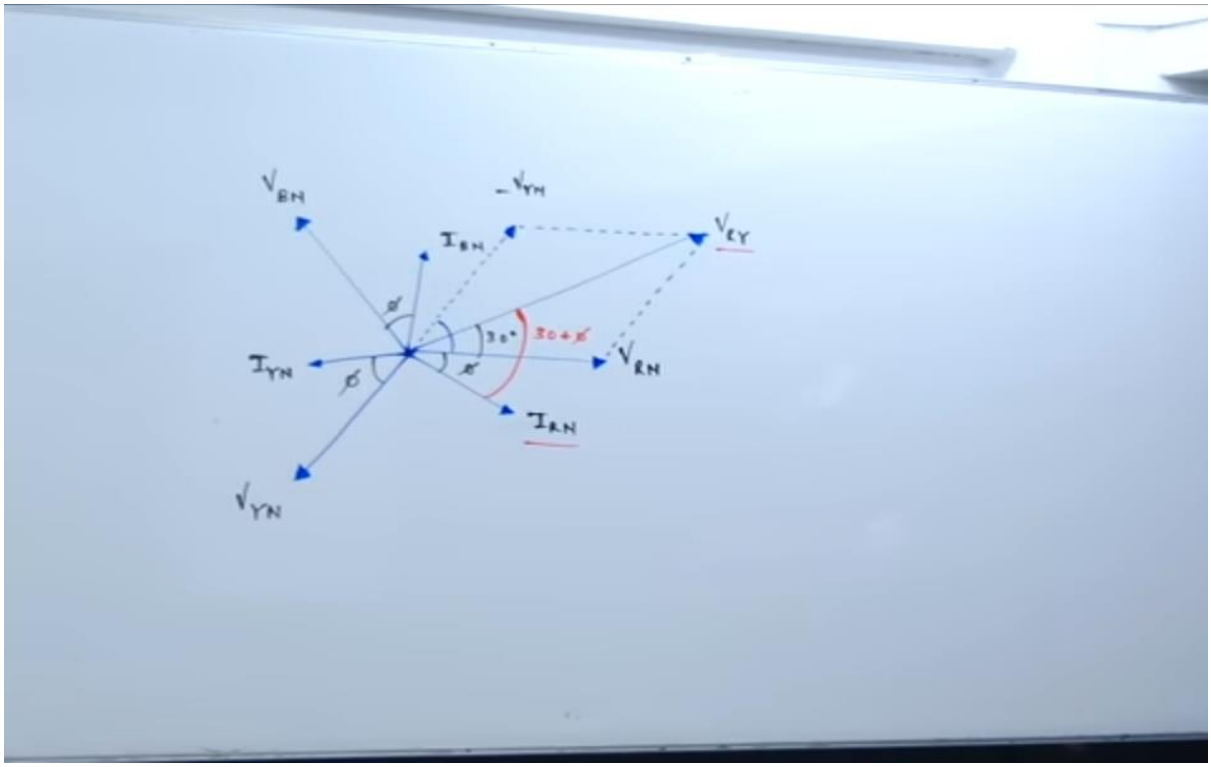


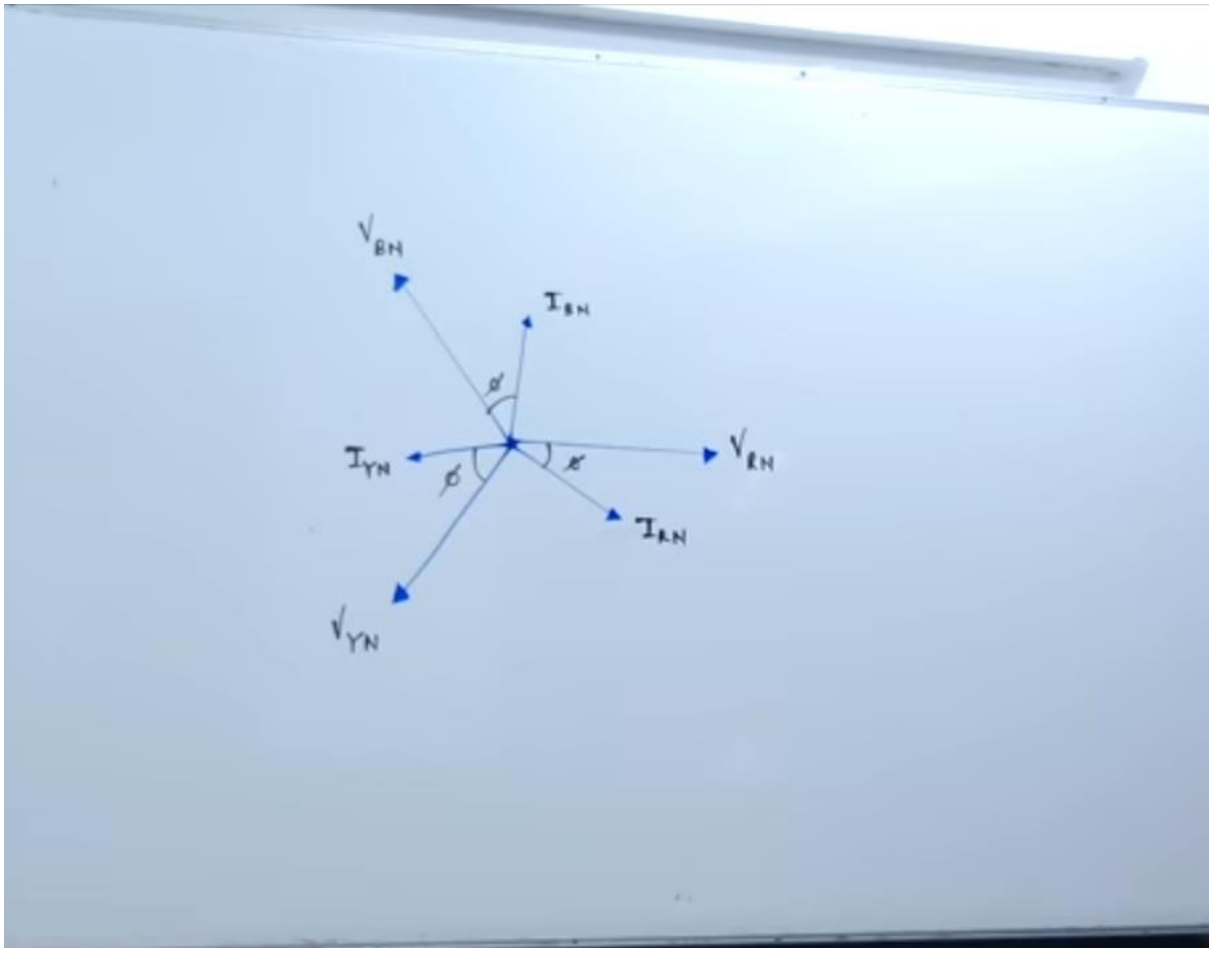

FILLED SYSTEM THERMOMETER
BOURDON TUBE
CAPILLARY
BULB
EXPANDING LIQ. OR GAS

LCR METER

POWER MEASUREMENT BY TWO WATTMETER METHOD



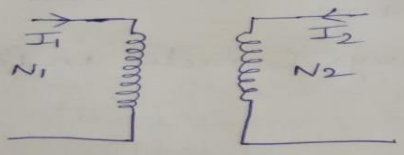

V_{BN}
$-V_{YN}$
V_{BY}
I_{BN}
ϕ
30°
30+ϕ
I_{YN}
ϕ
ϕ
V_{RN}
I_{RN}
V_{YN}


V_{BN}
I_{BN}
ϕ
I_{YN}
ϕ
ϕ
V_{RN}
I_{RN}
V_{YN}

C.T AND P.T

CT & PT are used for decreasing the voltage & current level before applying the supply to the measuring instrument

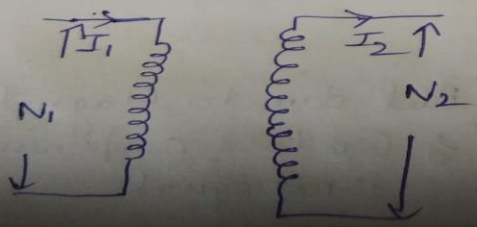
PT - It is a step down transformer



$$K = \frac{N_1}{N_2} = \frac{I_2}{I_1} = \frac{V_1}{V_2}$$

$N_2 < N_1$

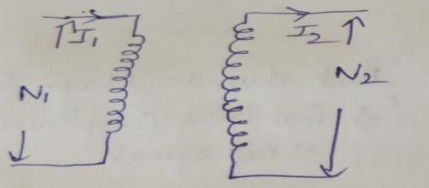
CT is basically a step up transformer



$N_2 > N_1$ So that $V_2 >$
But $I_2 < I_1$

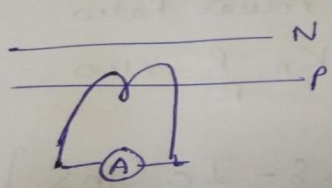
$N_2 < N_1$

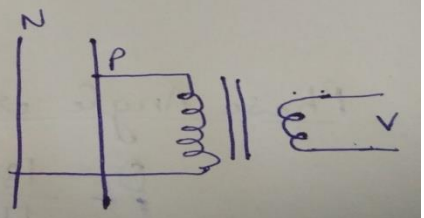
CT is basically a step up transformer



$N_2 > N_1$ So that $V_2 > V_1$
But $I_2 < I_1$

CT is always applied in series





CT & PT

CT	PT
1) Used for step down the Current	Used for step down the Voltage
2) Always connected in series	Always Connected in Parallel

CT error in CT

Ratio error

$$\frac{N_1}{N_2} = \frac{I_2}{I_1}$$

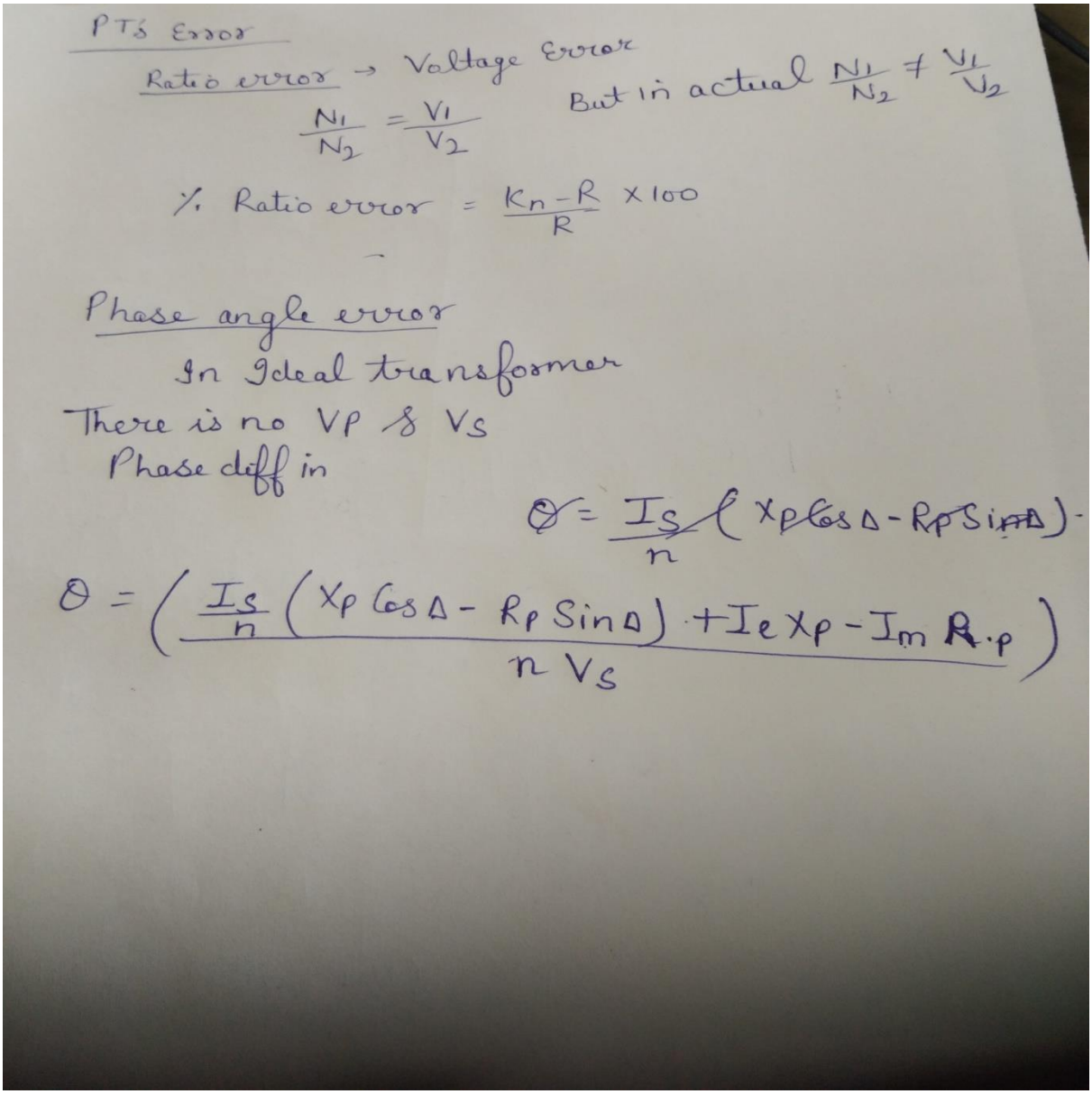
But due to Magnetizing & Core loss component it is not equal

$$\text{Nominal Ratio} - \text{Actual Ratio}$$

$$\text{Actual Ratio}$$

$$= \frac{K_n - R}{R} \times 100$$

Phase Angle error



YOUTUBE LINKS

https://youtu.be/P4acOyf_nhQ

https://youtu.be/Y7cVvGOpHzc

https://youtu.be/pbp1uoTJkF8

https://youtu.be/wkGadXZlnyA

https://youtu.be/JggL3cDzIFI