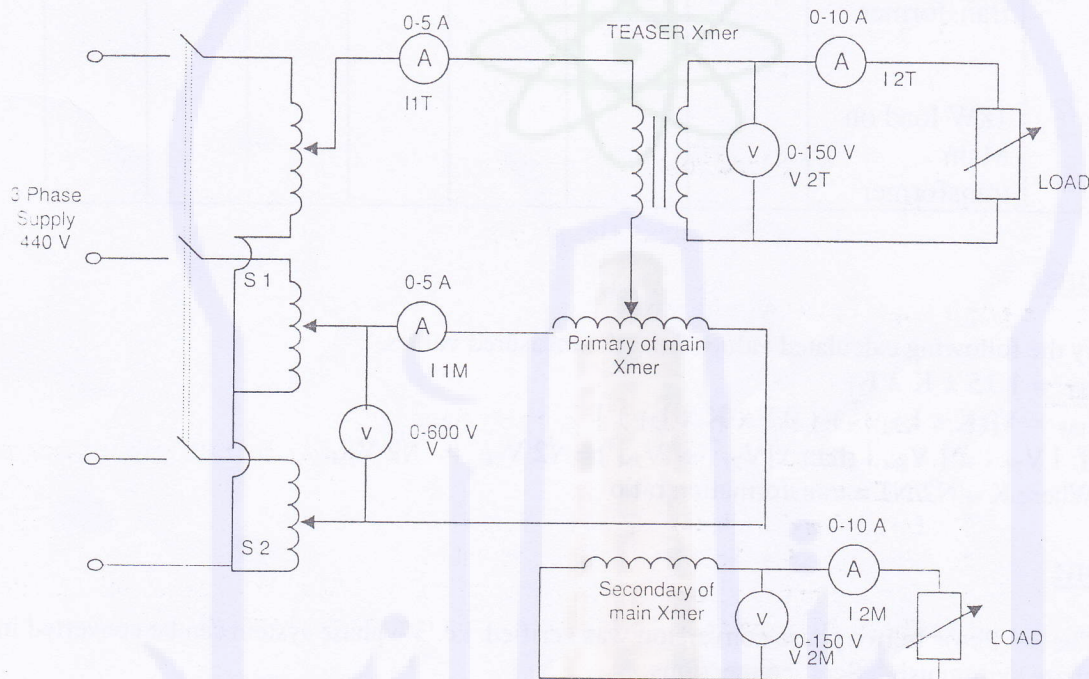# SCOTT. CONNECTIONS OF TRANSFORMER

Apparatus: Ammeters   (0-5 A, AC) 3 Nos ; (0-10 A, AC) 2 Nos.
Voltmeters   (0-600 V; AC) 1 Nos, (0-150 V; Ac) 2 Nos.
Transformer 1-phase, 1 kVA, with 86.6% tap on 415V side
Transformer 1-phase, 1 kVA, with 50% tap on 415V side
Dimmer stat   (0-440 V, 3 phase) 1 Nos.
Connecting wires, etc.

Circuit Diagram:

Theory: It should cover the following.
1. Explanation and mathematical proof of how a balanced two-phase supply can be obtained by using Scott connection.
2. Phasor diagram illustrating the phase quadrature between the secondary voltages of the two transformers.

Procedure:
1. Connect the circuit as shown.
2. Use 86.6% tapping for teaser transformer and 50% tapping for main transformer.
3. Keep both loads zero
4. Switch on the 3-ph. supply and take the readings.
5. Vary the loads as per given in observation table and take the readings.

Observation Table:

[A] FOR BALANCED LOAD

S. No.	Load condition	Teaser transformer			Main transformer			
		I_{1T}	I_{2T}	V_{1T}	I_{1M}	I_{2M}	V_{1M}	V_{2M}
1.	No load							
2.	1kW load on both transformers							

[B] FOR UNBALANCED LOAD

S. No.	Load condition	Teaser transformer			Main transformer			
		I_{1T}	I_{2T}	V_{1T}	I_{1M}	I_{2M}	V_{1M}	V_{2M}
1.	1kW load on Teaser transformer							
2.	1kW load on Main transformer							

Calculations:

Verify the following calculated values from the measured values.

1. $I_{1T} = 1.15 \times K \times I_{2T}$
2. $I_{1M} = \sqrt{(K \times I_{2M})^2 + (0.5 \times K \times I_{2T})^2}$
3. If $|V_{2T}| = |V_{2M}|$ than $\sqrt{V_{2T}^2 + V_{2M}^2} = \sqrt{2}\, V_{2T} = \sqrt{2}\, V_{2M}$

   Where $K = N2/N1 = $ transformation ratio

Conclusion:

The 3 – Phase to two phase conversion was verified. i.e. 3 – phase system can be converted in to two phase system using Scott-connections.

Viva Questions:

1) Is it possible to obtain a 3- phase a.c. supply from 2 – phase a.c. supply by using Scott-connection ?
2) Where dose the Scott-connection find its use?
3) If the two transformers used in Scott. Connection are identical, then how many primary turns of the teaser transformer are actually used?
4) What is the ratio of number of turns on the primaries of teaser transformer in case of Scott-connection?
5) Are the two transformers connected for Scott-connection coupled magnetically?
6) Do you know any other method of conversion of 3-phese a.c. supply from 2-phese a.c. supply?