SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME: 23EET204/ ELECTRICAL MACHINES II

II YEAR / IV SEMESTER

Unit 1 – SYNCHRONOUS GENERATOR

Topic 8: Synchronizing and parallel operation

Synchronizing and parallel operation

Synchronizing and Parallel operation
Necessary Condition for Synchronization

The process of switching of an alternator to another alternator or with a common Bus bar without any interruption is called Synchronization

CONDITIONS FOR PARALLEL OPERATION

1. The terminal voltage of the incoming machine must be **same** as that of bus bar Voltage.

2. The frequency of the generated voltage of the incoming machine must be **same** as that of bus bar frequency.

3. The phase Sequence voltage of the incoming machine must be **same** as that of bus bar.(R Y B).

Advantages of Parallel operation

Advantages of Parallel operation

Continuity of supply is possible when Breakdown or Shut down for maintenance of alternator in generating station

Repair and Maintenance of individual machine can be carried out one after the other without effecting the normal routine work

Depending upon the load requirement any number of alternator can be operated and the remaining can be put off

It is economical and improves the efficiency of the generating station

New alternator can be connected in parallel, when the demand increases. This reduces the capital cost of the system.

Synchronizing and parallel operation

Methods of Synchronization of alternator

Three Methods

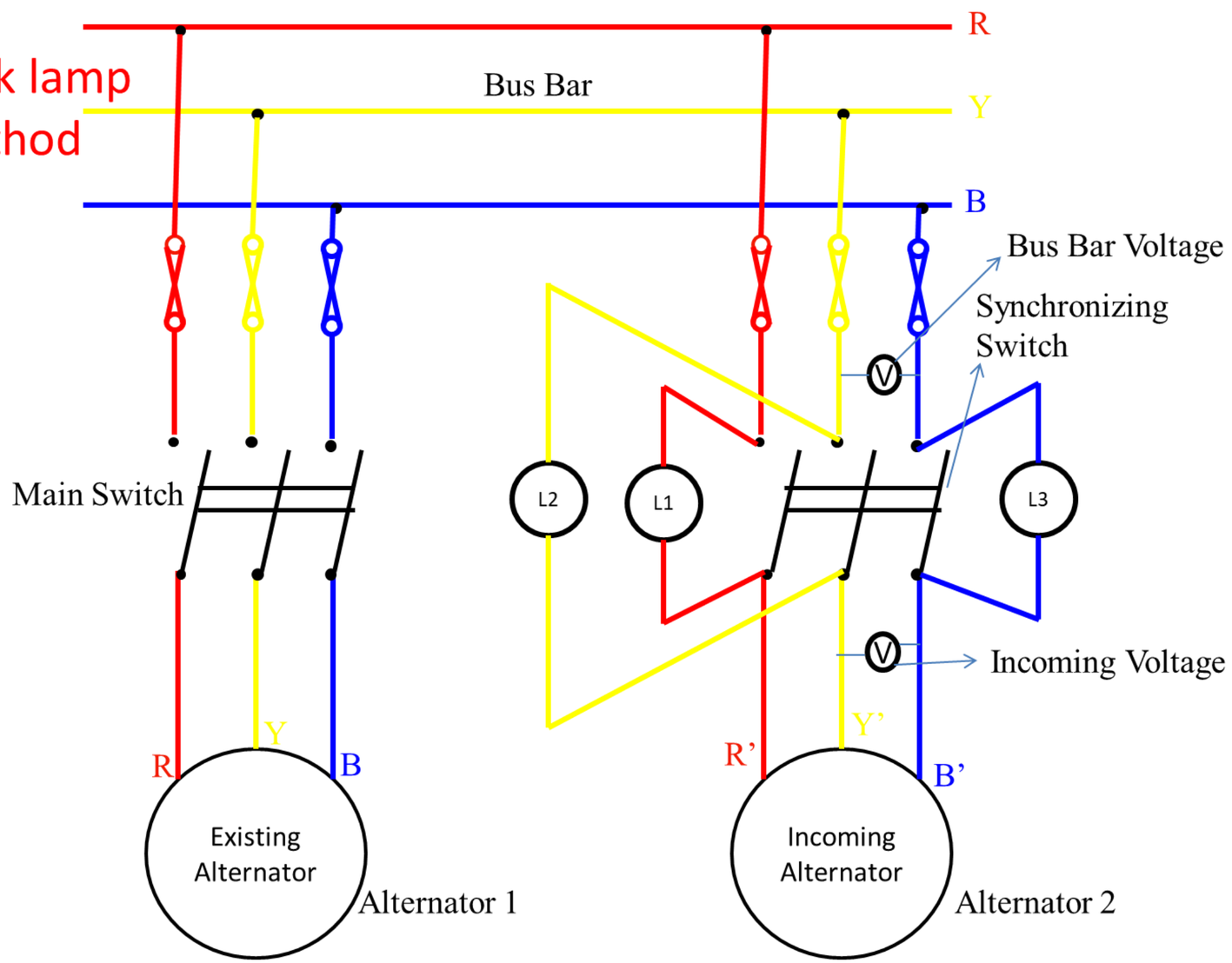
1. Dark lamp method.
2. Bright Lamp Method
3. Synchroscope Method

Conditions Should Satisfy

1. Voltage
2. Frequency
3. Phase Sequence

Dark lamp method

Dark lamp method



Dark lamp method

Alternator 1 is **already** (Exciting) connected with the Bus Bar and **Supplying power to load**

Alternator 2 is **Incoming** Alternator

Voltage of **Incoming** Alternator **SHOULD be same** to that of **Exciting** Alternator

V1 = V2 Voltage SAME

Phase Sequence

3 Lamps Glowing Uniformly together and becoming dark together Phase Sequence **is correct**

LAMP Flickering together in uniform

Frequency

Difference in frequency Lamp will be glow DARK and BRIGHT alternatively

Speed of alternator 2 should be adjusted

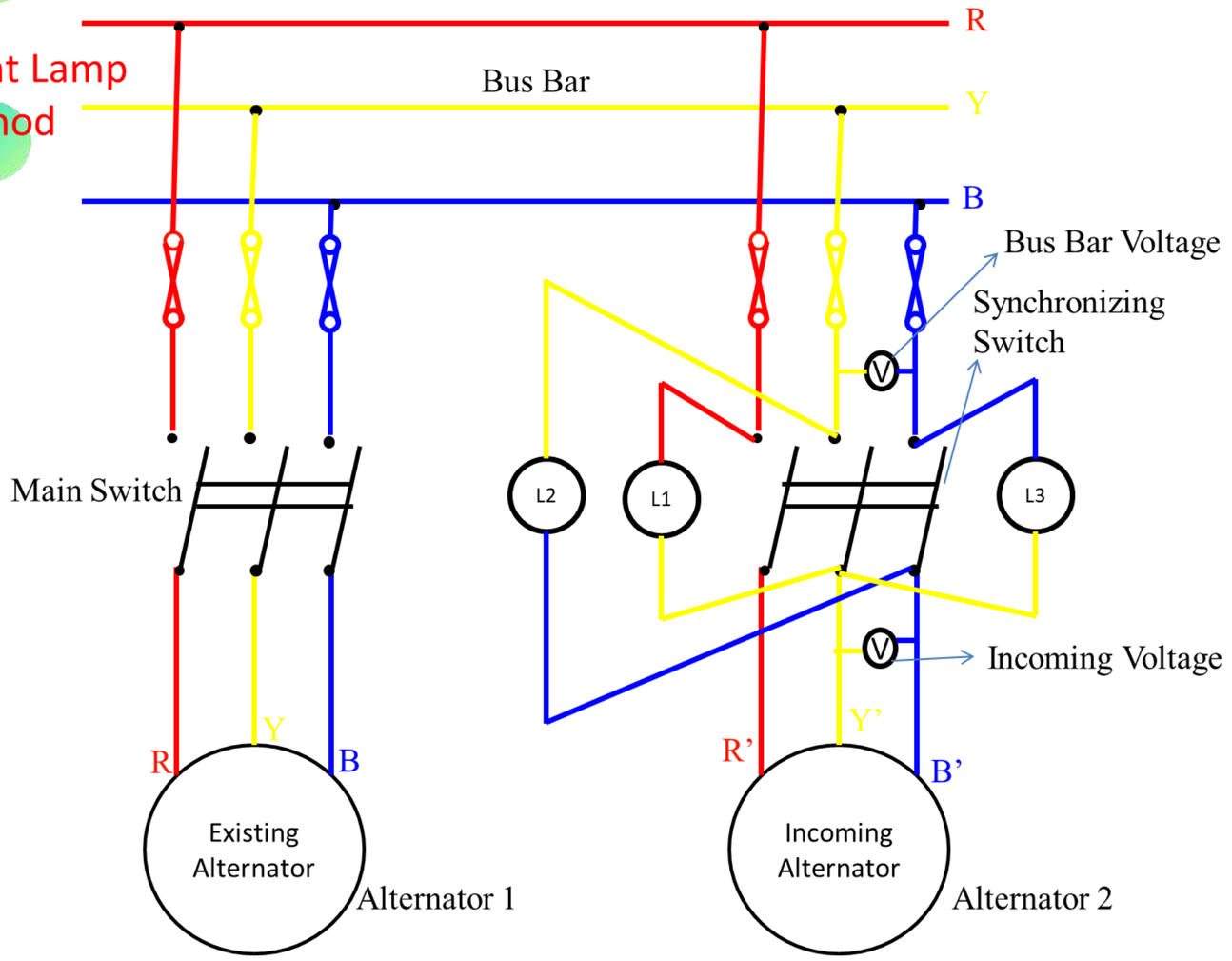
Demerits

It is not possible to judge whether the incoming alternator is fast or slow.

The lamp can be dark even through a small value of voltage may present across the Terminals.

Bright lamp method

Bright Lamp Method



Lamps are cross connected

Lamps will GLOW the BRIGHTEST when two voltage are in PHASE (V^2)

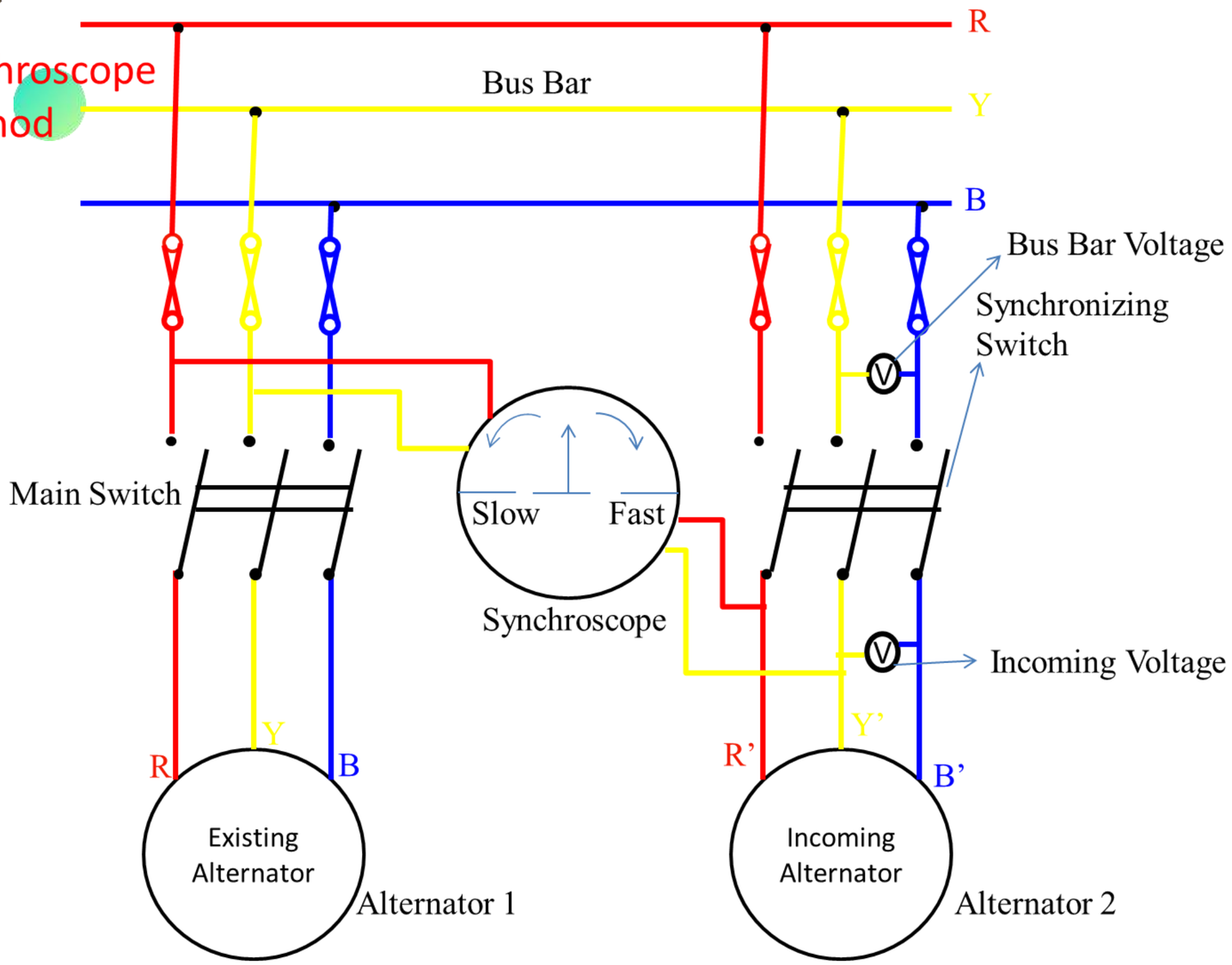
V1 = V2 Voltage SAME

Phase sequence same LAMPS will start Flickering in uniform

Switch is closed at the middle of the Brightest period of the lamp

Synchroscope Method

Synchroscope Method



LAMP Flickering together in uniform

Synchroscope consists of STATOR and ROTOR

The ROTOR is connected to the INCOMING alternator

The STATOR is connected to the EXISTING alternator

The pointer is attached to the rotor. The pointer will indicate the correct time of closing the switch. (12'O Position)

Frequency Different the pointer will rotate

Anti clock wise ---- Frequency of INCOMING alternator is LOW
Clock wise ---- Frequency of INCOMING alternator is Higher

KEEP
LEARNING..

Thank u

SEE YOU IN NEXT CLASS