	K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE-637 215 (An Autonomous Institution, Affiliated to Anna University, Chennai)		EEE
Flipped Class			
Programme & Branch	B.E-Electrical and Electronics Engineering	Semester	IV
Course Code & Name	50 EE 402 – Electrical Machines II		
Maximum Marks	20	Date	11.05.2022

Module : **Alternators**
Topic : **Parallel operations of Alternators**
Video Link: https://youtu.be/izKH-SrS5uU

Q.No		Blooms Level	COs	Marks
1.	What are the needs of parallel operation of alternators and what are the conditions for parallel operations?	An	01	4
2.	List out the advantages of synchronising lamps used for synchronising?	An	01	2
3.	Why the alternators are rated in KVA not in KW?	Kn	01	2
4.	What do you mean by infinite bus bar?	Kn	01	2
5.	How the power system stability have maintained by parallel operations of Alternators?	Kn	01	05
6.	What Do you understand synchronizing torque in local circuit? How the synchronizing have maintained in local circuit?	An	01	05

Outcome based Education

Blooms Level	Marks
Knowledge(Kn)	09
Analyze(An)	11

Q. No.	COs	Marks
1-6	CO 1 : Describe the principle of operation, types and performance of Synchronous generator	20

Course Coordinator — Dr P Aravindan
Module Coordinator — Dr R Balamurugan
Programme Coordinator — DR T.Venkatesan
Approved By — HOD / EEE

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Impact Analysis on Flipped Class activity

1. From the above flipped class activity, the students can understood the operation of the alternator in the parallel operation environment.
2. Students can make the parallel operation of the given alternator with infinite busbar. Also how the synchronization can maintained in the loaded environments.

Course Instructor

Dr.P.Aravindan

Name: M S Sudhaharan
Reg No: 737720124114
Subject: Electrical machines-II
Date: 19.5.2021

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Flipped class

1) necessity of parallel operation

* If the load on a single phase transformer at a power station becomes more than a rating of alternator, it becomes necessary to add another alternator in parallel to meet the increasing load. For this reasons,

A number of alternators connected in parallel to a common system of bus bars.

Conditions of parallel operation of Alternator

* The terminal of the voltage of the incoming alternator must be same as that of existing alternator.
* The frequency of incoming alternator is must be same as that of existing alternator.
* The phase sequence of incoming alternator must be same as that of Existing alternator (or) busbar voltage.

2) List the advantages of synchronising lamps used in synchronising.

Dark lamp method:

* The proper phase sequence can be easily Eliminated
* This method of synchronization is less Expensive

Bright lamp method:

* Continuity of service
* High Efficiency
* Expanded capacity

Dark-Bright lamp method:

* This method is cheaper.
* The correct phase sequence is easily determined.

2

3) The alternators are rated in KVA not in KW:

* If we connect inductive (or) capacitive load (when the power Factor is not at least unity).
* The o/p would differ as there are losses due to load power Factor.

2

For this reason,

KVA → apparent power which does not take into account the power Factor instead of KW - Real power

4) Infinite busbar:

Infinite busbar is one which keeps constant voltage & frequency Even though the load varies.

2

power system stability is maintained by parallel operation:

There are stability in power system,

* Steady state stability
* Dynamic stability
* Trainsed stability

* power system stability involves the study of dynamic of power system under disturbances.
* power system stability implies that its ability to return to normal or stable operation after having been subjected to some from to disturbances.
* From the classical point of view power system instability can be seen as loss of synchronism (some synchronous machine going out of step) when the system is subjected to a particular distrubance.

6.) Synchronising Torque (Tsy)

* The synchronising torque is developed due to the synchronising current Isy.

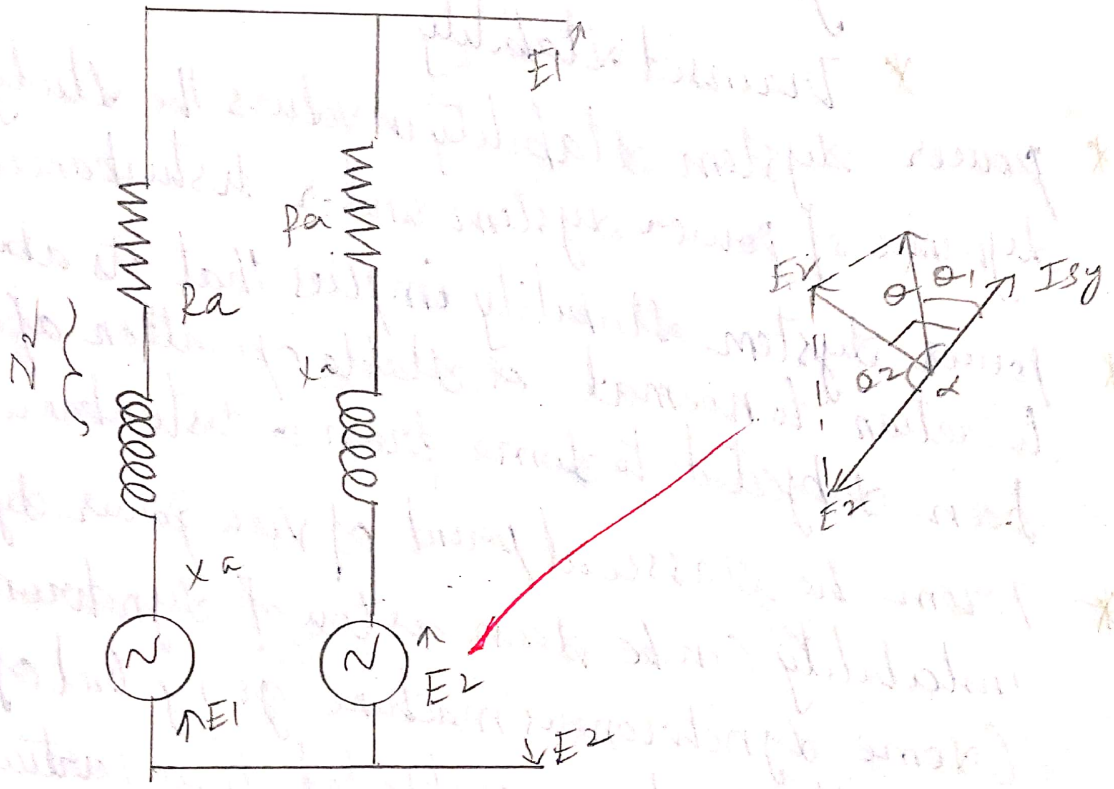
$$\text{Synchronising Torque } (T_{sy}) = \frac{P_{sy}}{\frac{2\pi N_s}{60}}$$

$N_s \rightarrow$ synchronous speed of alternator

$P_{sy} \rightarrow$ synchronizing power.

Synchronising torque have maintained in local circuit.

* This synchronising torque bring the stable operation conditions of two alternators in parallel.



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