



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (PO), Coimbatore – 641 107

AN AUTONOMOUS INSTITUTION

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



UNIT-II SYNCHRONOUS MOTOR

1. What does hunting of synchronous motor mean?

When the load applied to the synchronous motor is suddenly increased or decreased, the rotor oscillates about its synchronous position with respect to the stator field. This action is called hunting.

2. Mention the methods of starting of 3-phase synchronous motor.

- A D.C motor coupled to the synchronous motor shaft.
- A small induction motor coupled to its shaft. (pony method)
- Using damper windings – started as a squirrel cage induction motor.

3. What could be the reasons if a 3-phase synchronous motor fails to start?

It is usually due to the following reasons

- a. Voltage may be too low.
- b. Too much starting load.
- c. Open circuit in one phase or short circuit.
- d. Field excitation may be excessive

4. What is synchronous condenser?

An over-excited synchronous motor under no load, used for the improvement of power factor is called as synchronous condenser because, like a capacitor it takes a leading current.

5. Write the applications of synchronous motor.

- a. Used for power factor improvement in sub-stations and in industries.
- b. Used in industries for power applications.
- c. Used for constant speed drives such as motor-generator set, pumps and compressors.

6. What is an inverted 'V' curve?

For a constant load, if the power factor is plotted against various values of field exciting current, the curve formed is inverted V Shape and called as inverted 'V' curve.

7. A synchronous motor starts as usual but fails to develop its full torque. What could it be due to?

- a. Exciter voltage may be too low.
- b. Field spool may be reversed.
- c. There may be either open-circuit or short-circuit in the field.

8. Define SCR?

Short circuit ratio (SCR) is defined as the ratio of field current required to produce rated voltage on open-circuit to field current required to produce rated armature current with the terminals shorted, while the machine runs at synchronous speed.



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9. Why is open circuit characteristics called magnetic characteristic?

The OCC is called magnetic characteristic because it gives the variation of space component of flux in air gap and mmf / pole of magnetic circuit.

10. What are the losses determined from SCC?

- i. Copper loss
- ii. Mechanical loss

11. What are stray load losses?

Stray load loss is the sum of load core loss and loss due to the additional conductor resistance offered to the ac.

12. What is synchronizing?

The operation of connecting an alternator in parallel with another alternator or with common bus bars is known as synchronizing.

13. What is a synchroscope?

Synchroscope is an instrument, which shows the phase relationship of emf of the incoming alternator. It also indicates whether the incoming alternator is running slow or fast.

14. What is direct axis?

The mmf wave is highest when it is aligned with the field pole axis called the direct axis or d axis.

15. What is quadrature axis?

The permeance offered to a mmf wave is lower when it is oriented 90° to the field pole axis called the quadrature axis or q axis.

16. What are the two curves required for POTIER method?

- i. No load curve.
- ii. Full load zero power factor curve called wattless load characteristic.

17. What are the three methods of determining voltage regulation?

- i. Synchronous impedance method or EMF method.
- ii. The ampere-turn or MMF method.
- iii. Zero power factor or potier method.

18. When does a synchronous motor get over excited?

If the field excitation of the motor is increased, the field flux will become strong and E_b will increase. As a result E_b will exceed V and the motor will be called an over excited motor.

19. Define pullout torque?

The pullout torque is the torque, beyond which the synchronous link between field poles and resultant flux wave is severed and the machine falls out-of-slip.



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20. What is the main advantage of POTIER method?

The voltage regulation calculated by potier's method is quite accurate.

21. What is meant by the subtransient period?

The initial period of decay of the short circuit current is called the subtransient, in which the current decay is governed mainly by the damper winding constant.

22. What is fractional pitch winding?

When a winding is made with coil span less than full pitch, the winding is called as fractional pitch winding.