NAME: **ILEGOGIE DANIEL**

MATRIC NO.: **17/ENG04/032**

DEPT.: **ELECTRICAL AND ELECTRONICS ENG**

1. The power factor of a synchronous motor is changed with a change in

the excitation. When the excitation of the motor is increased, the

power factor changes from lagging to unity and then to a leading

power factor. This property of the motor is utilized to improve the

power factor of the leads, having a low lagging power factor. Normally,

when the motor is utilized in this way to improve the factor, the

synchronous motor is run without any mechanical load. The excitation

is adjusted in such a manner that it works at a leading power factor.

The synchronous motor is then referred to a synchronous condenser.

2. That means that the three phase current entering the stator winding

has an angle difference with the voltage. The purpose of using

synchronous motors is to use it in leading power factor, by controlling

the field current in the rotor.

3. An over-excited synchronous motor has a leading power factor. This

makes it useful for power factor correction of industrial loads. Both

transformers and induction motors draw lagging (magnetizing)

currents from the line. ... This improves the plant power factor and

reduces the reactive current required from the grid.

4. A synchronous motor has better power factor as compared to that of

an equivalent induction motor. This is mainly because

* synchronous motor has no slip.
* stator supply is not required to produce magnetic field.
* mechanical load on the rotor remains constant.
* synchronous motor has large air-gap.

5. Synchronous motors are used for the power factor correction Now,

since the set up of the magnetic flux (which can be considered as the

reactive power component) inside the motor is done by the dc

excitation provided on the rotor terminals, the power factor can also

be controlled by controlling this dc excitation.

6. A synchronous motor running on no-load with leading power factor-

will act as synchronous condenser. The same motor when

operated with lagging power factor on no-load will draw a reactive

current from the system depending upon the system voltage.

7. Like an induction machine, an under excited synchronous machine too

will consume reactive power; a properly excited synchronous

machine neither consumes nor produces reactive power; An over

excited synchronous machine can produce reactive power.

8. Efficiency is higher than that  of an induction motor of the same

output and voltage rating because there are neither losses related to

slip nor the additional losses due to magnetizing current.

With synchronous motors, there is no difference of speed between air

gap rotating magnetic field and rotor.

9. Power factor of induction motor depends on load and speed, Power

factor of a synchronous might be fixed, usually such motors are huge

and therefore their reactive power causes huge losses

10. The real power is nothing to do with it. The real power will be

proportional to the mechanical load. If the motor is uncoupled it will

be (close to) zero, regardless of the reactive situation. If the load is

consuming power, the motor will take it from the supply to pass on. If

the load is supplying power the converse will apply.

11. Large synchronous motors have adjustable power factor, they can

even have leading power factor. They are often set this way

compensate for all the other induction motors. This can effect the

efficiency of the motor depending on load. With the system tuned to

near unity the entire distribution system benefits. It is a good way to

go. There is not just one type of synchronous motor but they most

often do better than standard induction motors.

12. Synchronous motor always rotates with synchronous speed,

irrespective of the loading conditions. So, the effective output is not

reduced, compared to induction motor. So, more efficiency is

observed in this case. Also, the operating power factor is constant in

synchronous motors. It is also a doubly excited machine, unlike

induction motor.

13. Synchronous machine have separate DC excitation which reduces

machine's excitation dependency on main supply, hence better PF.

where as IM have no such provisions, hence low PF .

14. Power factor is a number which tells us about the efficiency of an AC

machine like induction motor. As we know, in an inductive load

current it lags the voltage by a certain angle. The higher the lag, the

lesser the power factor. **Cosine of the angle between Voltage and**

**Current is called power factor.**

15. An over-excited synchronous motor has a leading power factor. This

makes it useful for power factor correction of industrial loads. Both

transformers and induction motors draw lagging (magnetising)

currents from the line. ... This improves the plant power factor and

reduces the reactive current required from the grid..