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Top 250+ Electrical Machines Interview Questions - Best Electrical Machines Interview Questions and Answers

13-16 minutes

1. Question 1. What Is The General System Requirements Of Alternator?

Answer :

For the generation of emf, there should be two basic systems.

- magnetic field system to produce the magnetic field
- Armature system which houses the conductors on which the EMF is to be induced.

2. Question 2. Will The Alternators Have Rotating Armature System Or Stationary Armature System?

Answer :

Generally in alternators, the armature is stationary and the field rotates. Small low-voltage alternators often have a rotating armature and a stationary field winding. But in large alternators rotating armature field type is used.

3. Question 3. What Are The Advantages Of Stationary Armature And Rotating Field System?

Answer :

- The stationary armature coils can be insulated easily.
- Higher peripheral speed can be achieved in the rotor.
- Cooling of the winding is more efficient.
- Only two slip rings are required to give DC supply to the field system
- Output current can be easily supplied to the load circuit. Slip-rings and brushes are not necessary.

4. Question 4. What Is Meant By Stator? What Is Meant By Rotor?

Answer :

In any electrical machine (AC/DC motor or generator) the stationary member is called as stator. Similarly in all machines the rotating member is known as rotor.

5. Question 5. What Are The Advantages Of Three Phase Motor Over Single Phase Motor?

Answer :

Three phase motors are having

- Higher starting torques
 - Improved speed regulation
 - Less vibration
 - Quieter operation
- compared to the single phase motors.

6. Question 6. What Is Basic Principle Of Operation Of Alternators/dc Generators?

Answer :

They are working on the fundamental principle based on Faraday's Laws of Electromagnetic Induction.

This law states that, When a current carrying conductor moves in magnetic field, it induces an EMF.

7. Question 7. How To Minimize The Eddy Current Losses?

Answer :

When the core is laminated and insulated from each other with paper or varnish the eddy current loss is minimized.

8. Question 8. What Is Meant By Turbo Alternators?

Answer :

Turbo alternators are high speed alternators. Because of high speed of rotation, the rotor diameter is reduced and the axial length is increased. Two or four poles are generally used and steam turbines are used as prime movers.

9. Question 9. What Are The Various Types Of Rotors Used In The Alternators?

Answer :

- Salient pole rotor
- Non- salient pole rotor and Cylindrical rotor

10. Question 10. Define Pole Pitch?

Answer :

The distance between the centres of two adjacent poles is called pole pitch. One pole pitch is equals to 180 electrical degrees. It is also defined as the number of slots per pole.

11. Question 11. Define Coil Span?

Answer :

The distance between the two coil sides of a coil is called as coil span. It may be expressed in electrical degrees or in number of slots.

12. Question 12. What Is Meant By Full Pitched Winding?

Answer :

If the coil span is equal to pole pitch, the winding is called as full pitched winding.

13. Question 13. What Is Meant By Short Pitched Winding?

Answer :

If the coil span is less than the pole pitch, the winding is called as short-pitched winding. It is also known as short-chorded winding.

14. Question 14. What Are The Advantages And Disadvantages Of Short-pitched Winding?

Answer :

The advantages are:

1. They save copper for end connections
2. They improve the waveform of the generated EMF.
3. The generated EMF can be made to approximate to a sine wave more easily and the distorting harmonics can be reduced.

The disadvantages are:

1. The total voltage around the coils is somewhat reduced. Because the voltage induced in the two coil sides are slightly out of phase.

15. Question 15. Why Is The Efficiency Of A Three-phase Induction Motor Is Less Than That Of A Three-phase Transformer?

Answer :

Three phase Induction motor is nothing but a rotating transformer.

1. Due to rotating nature, there are friction and windage losses associated with it.
2. On the other hand, the three-phase transformer is a static device, thus there are no rotational losses.
3. Thus the efficiency of three-phase induction motor is less than that of a three-phase transformer.

16. Question 16. Why The Air Gap Between The Pole Pieces And The Armature Is Kept Very Small?

Answer :

1. The air gap between the pole pieces and the armature is kept very small to keep the field strength at its highest value.
2. This is due to the reason the flux lines can pass through iron very easily than the air gap.
3. The small air gap generates high voltage.
4. Larger the air gap means stronger must be the magnetising force to produce the required voltage hence the air gap is kept very small.

17. Question 17. Why Does Curving The Pole Faces In A Dc Machines Contributes To A Smoother Dc Output Voltage From It?

Answer :

For having smoother output voltage from DC machines its commutation must be as ideal as possible.

In order to have good commutation the flux density in the air gap must decrease gradually from maximum value under the centre of

the pole to zero on.

18. Question 18. The Series Field Winding Has Low Resistance While The Shunt Field Winding Has High Resistance. Why?

Answer :

The series field winding is always connected in series with the armature and thus has to carry the armature current which directly gets decided by the load.

Thus the current passing through series field winding is of high level.

The voltage drop across series field winding gets added to the voltage drop across armature winding while deciding the back emf. This voltage drop must be very small.

Hence as the current through series field winding is high, in order to keep voltage drop across it to a small value, its resistance is very low.

On the other hand, the shunt field winding is directly connected across the rated supply voltage hence to limit current through it, resistance is very high.

19. Question 19. What Are The Conditions To Be Satisfied For Parallel Operation Of Dc Generators?

Answer :

- The polarities of the generators must be same or the connections must be interchanged till they become same.
- The voltages of both the generators must be equal.
- The change of voltage with change of load should be of same character.

- The prime movers driving the generators should have stable and similar rotational speed characteristics.
- The positive and negative terminals of generators must be connected properly to the positive and negative of busbar.

20. **Question 20. What Are The Major Parts Of The Dc Generators?**

Answer :

- Yoke Poles
- Field winding
- Armature
- Armature winding
- Commutator brushes

21. **Question 21. What Is A Commutator?**

Answer :

The commutator is a device which converts alternating induced emf in a generator to DC emf. In case of motor it produces unidirectional torque.

22. **Question 22. What Is Meant By Reactance Voltage?**

Answer :

- An armature coil has certain self inductance.
- When coil undergoes commutation, there is change in current (di) in that coil and the commutation takes certain time(dt).
- Thus there is self-induced emf in a coil undergoing commutation given by $L(di/dt)$.
- This EMF induced in the coil undergoing commutation is called

reactance voltage.

23. Question 23. What Is Electric Motors?

Answer :

An electric motor is an electrochemical device that converts electrical energy into mechanical energy. Most electric motors operate through the interaction of magnetic field and current carrying conductors to generate force.

24. Question 24. On What Principle Electric Motor Works?

Answer :

The Motor Principle: when a current-carrying conductor is located in an external magnetic field perpendicular to the conductor, the conductor experiences a force perpendicular to itself and to the external magnetic field. The physical principle behind production of mechanical force by the interactions of an electric current and a magnetic field.

The right-hand rule for force on a conductor can be used to determine the direction of the force experienced on the conductor.

25. Question 25. How Many Types Of Electric Motors Are There?

Answer :

Mainly there are two types of electric motors:

- AC motors
- DC motors

26. Question 26. What Is Ac Motor?

Answer :

An AC motor is an electric motor driven by an alternating current

(AC). It commonly consists of two basic parts, an outside stationary stator having coils supplied with alternating current to produce a rotating magnetic field, and an inside rotor attached to the output shaft that is given a torque by the rotating field.

27. Question 27. What Is Dc Motors?

Answer :

A DC motor is a mechanically commutated electric motor powered from direct current (DC). The stator is stationary in space by definition and therefore so is its current. The current in the rotor is switched by the commutator to also be stationary in space. This is how the relative angle between the stator and rotor magnetic flux is maintained near 90 degrees, which generates the maximum torque.

28. Question 28. What Are The Applications Of Electric Motor?

Answer :

Electric motors applications are: industrial fans, blowers and pumps, machine tools, household appliances, power tools, and disk drives, record players.

29. Question 29. What Is Universal Motor?

Answer :

A series-wound motor is known as a universal motor when it has been designed to operate on either AC or DC power. It operates well on AC because the current in both the field and the armature (and hence the resultant magnetic fields) will alternate in synchronism and hence, the resulting mechanical force will occur in a constant direction of rotation.

30. Question 30. What Are The Advantages And Disadvantages Of Ac, Dc Motors?

Answer :

Advantages of AC Motors:

- Low cost,
- long life,
- high efficiency,
- large ratings available (to 1 MW or more),
- large number of standardized types.

Disadvantages of AC Motors:

- Starting inrush current can be high,
- speed control requires variable frequency source.

Advantages of DC Motors:

- Precision positioning,
- High holding torque,
- Long lifespan,
- Low maintenance,
- High efficiency

Disadvantages of DC Motors:

- Some can be costly,
- Require a controller,
- Higher initial cost,
- Requires a controller.