

NOORUL ISLAM COLLEGE OF ENGINEERING, KUMARACOIL
TWO MARK QUESTIONS AND ANSWERS
SUB: BASIC ELECTRICAL ENGINEERING
SEM: II

UNIT-V

1. Define electric current.

Electric current is defined as rate of flow of electric charge $i=dq/dt$ amperes where q is the charge in coulombs. The unit of current is the amperes which is the current that flows when 1 coulomb of charge is transferred in one second.

2. State ohms law.

When the temperature remain constant current flowing through a circuit is directly proportional to potential difference across the conductor.

$$V \propto I$$

$V=IR$, Where R the constant of proportionality, becomes the resistance when V is in Volts and I in amperes.

3. State Kirchoff's laws.

Kirchoff's current law(I law): The sum of the currents flowing towards a junction is equal to the sum of the currents flowing away from it.

Kirchoff's Voltage law(II law): In a closed circuit the sum of the potential drops is equal to the sum of the potential rises.

4. Write down the equation for frequency of emf induced in an Alternator.

Frequency of emf induced in an Alternator, f , expressed in cycles per second or Hz, is given by the following equation

$$F = (PN)/120 \text{ Hz,}$$

Where P - Number of poles
 N -Speed in rpm

5. How are alternators classified?

According to type of field system

- Stationary field system type
- Rotating field system type

According to shape of field system

- Salient pole type
- Smooth cylindrical type

6. Name the types of Alternator based on their rotor construction.

Alternators can be classified into the following two types according to its rotor construction

- Smooth cylindrical type alternator

Salient pole alternator

7. Why is the stator core of Alternator laminated?

The stator core of Alternator is laminated to reduce eddy current loss.

8. State the principle of 3 phase IM?

While starting, rotor conductors are stationary and they cut the revolving magnetic field and so an emf is induced in them by electromagnetic induction. This induced emf produces a current if the circuit is closed. This current opposes the cause by Lenz's law and hence the rotor starts revolving in the same direction as that of the magnetic field.

9. Induction motor can run at synchronous speed ? True or false? Explain .

No, if the speed of induction motor is N_s then the relative speed between the rotating flux and the rotor will be zero and so no torque is produced.

10. Define power factor.

The power factor is the cosine of the phase angle between voltage and current.
 $\cos\theta = R / Z$; $\cos\theta = \text{Real Power} / \text{Apparent power}$.

11. Define Form factor and Crest factor.

Form factor = $\frac{\text{RMS value}}{\text{Average Value}}$
 Crest(peak) factor = $\frac{\text{Maximum Value}}{\text{RMS value}}$

12. Define average value.

The average value of an alternating current is that value of steady direct current which transfers the same charge as the alternating current flowing for the same time.

13. Define RMS value.

The effective value of an alternating current is that value of steady ,direct current which produces the same heat as that produced by the alternating current when passed which produces the same heat as that produced by the alternating current when passed through the same resistance for the same interval of time.

14. What is the basic principle of a dc generator?

Basic principle of a dc generator is Faraday's law of electromagnetic induction. That is whenever a conductor is moved in amagnetic field dynamically induced emf is produced in that conductor.

15. What is the purpose of interpoles in modern d.c machine?

In modern d.c machines commutating poles or interpoles are provided to improve commutation.

16. What is the use of commutator and brush in a d.c machine?

The commutator converts the alternating emf into unidirectional or direct emf. The brushes are mainly used to collect current from the commutator.

17. What is the basic principle of operation of d.c motor?

The basic principle of operation of d.c motor is that a current carrying conductor placed in a magnetic field, experiences a force tending to move it.

18. Write down the voltage equation of a d.c motor?

voltage equation of a d.c motor is given by

$$V = E_b + I_a R_a$$

Where V- applied voltage

E_b - back emf

I_a - armature current

R_a - armature resistance

19. What is meant by transformer?

The transformer is a static piece of apparatus by means of which electrical energy is transformed from one circuit to another with desired change in voltage and current, without any change in the frequency. It works on the principle of mutual induction.

20. What are the different types of single phase motor?

i) Single phase induction motor

ii) Single phase synchronous motor.

iii) Single phase series motor

21. Give the difference between squirrel cage motor and slip ring motor.

Squirrel cage motor	Slip ring motor
Simple construction	Construction is complicated
Moderate torque	High starting torque.
Slip rings and brushes are not present.	Slip rings and brushes are present.
Speed control by rotor resistance is not possible.	Speed control by rotor resistance is possible.
External resistance cannot be added.	External resistance can be added.

22. What is a prime mover?

The basic source of mechanical power, which drives the armature of the generator, is called prime mover.

23. How is the direction of induced emf determined?

Direction of induced emf is determined by using

- (i) Right Hand Gripping Rule.
- (ii) Right Hand Cork Screw Rule.

24. State Lenz's law?

Any induced emf will circulate a current in such a direction as to oppose the cause producing it.

$$e = -N \frac{d\phi}{dt}$$

25. How are hysteresis and eddy current losses minimized?

Hysteresis loss can be minimized by selecting materials for core such as silicon steel & steel alloys with low hysteresis co-efficient and electrical resistivity.

Eddy current losses are minimized by laminating the core.

26. How will you find the direction of emf using Fleming's right hand rule?

The thumb, the forefinger and the middle finger of the right hand are held so that these fingers are mutually perpendicular then
Forefinger –field
Thumb-motion
Middle finger-I, current.

27. How do you find the direction of force produced using Fleming's left hand rule?

The thumb, the forefinger and the middle finger of the left hand are held so that these fingers are mutually perpendicular then
Forefinger –field
Thumb-motion (due to force)
Middle finger-I, current

28. Why are carbon brushes preferred for dc machines?

The high contact resistance carbon brushes help the current the coil undergoing commutation to attain its full value in the reverse direction at the end of commutation. The carbon brushes also lubricate and give less wear and tear on commutator surface.

29. State faraday's law

- a) Whenever the magnetic flux linking a circuit changes an emf is always induced in it,
- b) The magnitude of such an emf is proportional to the rate of change of flux linkages.

