

Elements of Electrical Engineering

Viva Questions and Answers

1. State Faraday's law of Electromagnetic Induction

First Law: - -----Whenever change in the magnetic flux linked with a coil or conductor, an EMF is induced in it.

Second Law: -----The Magnitude of induced EMF is directly proportional to (equal to) the rate of change of flux linkages. $e = N \frac{d\phi}{dt}$

2. Define following terms

i) Time Period: ----- The time (in sec) required by an alternating quantity to complete its one cycle is known as time period.

(ii) Frequency: It is the number of cycles completed by an alternating quantity in one second.

(iii) Form factor: The form factor of an alternating quantity is defined as the ratio of the RMS value to the average value.

(iv) Peak factor: The peak factor of an alternating quantity is defined as the ratio of its maximum value to the rms value

v) Leading phase angle: When two ac quantities of same frequency do not attain their respective zero or peak values simultaneously, then the quantities are said to be out-of-phase quantities. The quantity which attains the respective zero or peak value first, is called 'Leading Quantity'

vi) Lagging phase angle: The quantity which attains the respective zero or peak value later, is called 'Lagging Quantity'.

(vii) Reluctance (s)

Reluctance is the property of the substance which opposes the creation of flux in it. OR It is defined as the opposition to the creation of flux in the material.

Unit of Reluctance (s) :- Its unit is : AT/Wb

Transformation Ratio (k):- -----It is the ratio of secondary number of turns to primary number of turns.

3. Four main parts of d.c. motor.

- 1) Yoke
- 2) Pole Cores & Pole shoe
- 3) Armature core
- 4) Armature winding
- 5) Commutator
- 6) Brush
- 7) Cooling Fan
- 8) End covers
- 9) Field winding

4. State any two methods of reducing earth resistance.

Earth resistance can be minimised using any of the following measures

1. By increasing the length of the earth electrode
2. By increasing no of earthing rods

Explain the importance of earthing.

1. To provide an alternative path for the leakage current to flow towards earth.
2. To save human life from danger of electrical shock due to leakage current.
3. To protect high rise buildings structure against lightning stroke.

Types of Earthing

1. Pipe type earthing
2. Plate earthing
3. Rod earthing or Driven Rod earthing
4. Strip earthing or Wire earthing

4. Explain the working of the fuse.

Working of fuse Fuse is an overcurrent/short circuit protection. The working principle of the fuse is based upon the “heating effect of the electric current”. It is fabricated in a form of strip or thread of metallic wire. The connection of the Fuse in an electrical circuit is always in series with a device that is to be protected. Due to the heavy flow of current in the electrical circuit, the fuse gets melted and it opens the circuit. The extreme flow of current may direct to the collapse of the wire and disconnection of the circuit that is protected

Types of Fuses

1. Rewirable Fuses
2. HRC Fuse
3. Cartridge type Fuses
4. D-type Cartridge Fuse
5. Link Type Fuse

6. Stepper Motor

Working Principle of stepper Motor- A stepper motor rotates through a fixed angular step in response to each input current pulse received by its controller.

Types of Stepper Motor :-

- 1) Variable Reluctance Motor
- 2) Permanent Magnet Motor

Advantages

7. Advantages of AC over DC :

- 1) We can easily step up or step down the voltage easily with the help of a transformer
- 3) Generation is easy.
- 4) Design of the AC machine is easy.

8. Autotransformer:-

1. Saving of copper takes place/Copper required is less.
2. Autotransformer is smaller in size.
3. Cost is less as compared to conventional transformers.
4. Copper losses are less.

9. Advantages of 3-phase supply over 1-phase supply:

- 1. Constant power output:** The power delivered by a three phase supply is constant and that of a single phase supply is oscillating.
- 2. Higher power:** For the same copper size output of 3 phase supply is always higher than single phase supply.
- 3. Smaller conductor cross section:** For given power, the cross section area of copper is smaller as compared to single phase.
- 4. Magnetic field:** Three phase supply has rotating magnetic field and single phase supply has pulsating magnetic field.

Applications

10. Universal Motor

- 1) Mixer
- 2) Food processor
- 3) Heavy duty machine tools
- 4) Grinder

11. stepper motor

1. Suitable for use with computer controlled system
2. Widely used in numerical control of machine tools.
3. Tape drives
4. Floppy disc drives

12. Lenz law

1. Eddy current balances
2. Metal detectors
3. Eddy current dynamometers
4. Braking systems on train
5. AC generators

13. capacitor start capacitor run induction motor:

- 1) Fans, Blowers
- 2) Grinder
- 3) Washing machine
- 4) Refrigerator, Air conditioner

14. ELCB

1. It is used for safety of the operator
2. It is used to detect presence of leakage current in a device

15. MCCB :

1. It is used as a protective device in low voltage distribution
2. It is used to protect the secondary side of power distribution transformer
3. It is used for short circuit protection of motors

16. MCB :

1. It is used as an alternative to fuse in domestic and commercial applications
2. It is used in industrial control panels as overload protection and disconnection of supply
3. It is used in industrial heating systems.

17. Fuse:

1. Protection against overload and short circuit.
2. Electrical Appliances, like ACs (Air Conditioners), TV, Washing Machines, Music Systems, and
3. Many more.
4. Electrical Cabling in Home

18. Autotransformer-

1. It is used as a starter for an induction motor.
2. It is used in electrical testing laboratories.
3. It is used to control the voltage level.
4. It is used in locomotives for control equipment.

19. Long shunt D.C. compound motor :

1. Rolling mills
2. Cutting and shearing tools.
3. Presses
4. Punches
5. Conveyors

20. DC shunt motor

1. Line shafts
2. Lathes
3. Vacuum cleaners
4. Pressure blowers

21. DC Series Motor

1. Electric traction
2. Cranes
3. Passenger elevators
4. Continuous conveyors

22. Two winding transformer

1. Mains transformer
2. power supply
3. welding
4. isolation transformer

For More Viva Questions and Answers
Visit Msbte News

