

Basic Electrical Engineering

Unit-I-

Objective Questions

Which of the following elements of electrical engineering cannot be analysed using Ohm's law?

- a) Capacitors
- b) Inductors
- c) **Transistors**
- d) Resistance

Which of the following is a correct representation of peak value in an AC Circuit?

- a) RMS value/Peak factor
- b) RMS value*Form factor
- c) RMS value/Form factor
- d) **RMS value*Peak factor**

How many cycles will an AC signal make in 2 seconds if its frequency is 100 Hz?

- a) 50
- b) 100
- c) 150
- d) **200**

Which of the following according to KVL must be zero?

- a) Algebraic sum of currents in closed-loop
- b) Algebraic sum of power in closed-loop
- c) Algebraic sum of losses in closed-loop
- d) **Algebraic sum of voltages in closed-loop**

Kirchhoff's Law is applicable to

- a) Passive network only
- b) A.C. Network only
- c) D.C. network only
- d) **Both A.C and D.C circuits**

How many coulombs of charge flow through a circuit carrying a current of 10 A in 1 minute

- a) 10
- b) 60
- c) **600**
- d) 1200

7. A capacitor carries a charge of 0.1 C at 5 V. Its capacitance is

- a) **0.02 F**
- b) 0.5 F
- c) 0.05 F
- d) 0.2 F

8. The voltage induced in an inductor is represented as

- a) Product of its inductance and current through it
- b) Ratio of its inductance to current through it
- c) Ratio of current through it to its inductance
- d) **Product of its inductance and rate of change of current through it**

9. Inductor does not allow the sudden change of

- a) **current**
- b) Voltage
- c) Power
- d) None of the above

10. Capacitor does not allow the sudden change of

- a) Current
- b) **Voltage**
- c) Power
- d) None of the above

11. Nodal analysis can be applied for

- a) Planar networks
- b) Non planar networks
- c) **Both planar and non-planar networks**
- d) Neither planar nor non-planar networks

12. Mesh analysis is applicable for

- a) **Planar networks**
- b) non planar networks
- c) both planar and non planar networks
- d) neither planar and non planar networks

13. Which quantity should be measured by the voltmeter?

- a) Current
- b) **Voltage**
- c) Power
- d) Speed

14. Which quantity consists of a unit 1 KWh

- a) **Energy**
- b) Time
- c) Power
- d) Charge

15. KCL works on the principle of which of the following

- a) **law of conservation of charge**
- b) Law of conservation of energy
- c) Both
- d) None of the above

16. KVL works on the principle of

- a) Law of conservation of charge
- b) **Law of conservation of energy**
- c) Both
- d) None of the above

17. Rms value is defined based on which of the following

- a) **Heating effect**
- b) Charge transfer
- c) Current
- d) Voltage

18. Which of the following defined the average value

- a) Voltage
- b) Heating effect
- c) Current
- d) **Charge transfer**

19. For symmetrical waveform average value of one full cycle is

- a) 1
- b) 1.11

c) 2.22

d) **0**

20. Form factor is equal to Peak factor in case of

a) **Square wave**

b) Triangle wave

c) Saw tooth wave

d) All of the above

21. If a pure inductor is connected across the ac source, the average power taken by the inductor is

a) A few watt

b) 100 watt

c) **Zero watt**

d) Maximum power

22. Average power taken by the pure capacitor is

a) **Zero**

b) Minimum

c) Maximum

d) Any of the above

23. In a series R, L circuit, voltage across resistor and inductor are 3 V and 4 V respectively, then what is the applied voltage

a) 7V

b) **5V**

c) 4V

d) 3V

24. The alternative names for active power is/are

a) Real power

b) Average power

c) True power

d) **All of the above**

25. In series R, L circuit power factor can be defined as

a) R/Z

b) P/S

c) V_r/V

d) **All of the above**

26. In ac RC series circuit total voltage is 10V and voltage across resistor is 6V, then what is voltage across capacitor

- a) 4V
- b) **8V**
- c) 16V
- d) 10V

27. In series RLC circuit, voltage across resistor, inductor and capacitor are 5V, 2V and 2V respectively. Find total voltage

- a) 9V
- b) 4V
- c) 2V
- d) **5V**

28. In RLC series circuit, if the voltage across the capacitor is greater than the voltage across inductor, then power factor of the network is

- a) Lagging
- b) **Leading**
- c) Unity
- d) Zero

29. Which of the following can vary with AC, but never with DC?

- a) Power
- b) Voltage
- c) **Frequency**
- d) Amplitude

30. An inductor works by

- a) Charging a piece of wire
- b) **Storing Energy as a magnetic field**
- c) Choking off DC
- d. Introducing Resistance into the field

31. In ac circuit the ratio of kW/KVA is

- a) **Power factor**
- b) Form factor
- c) Load factor
- d) Diversity factor

32. The period of a wave is

- a) The same as frequency
- b) **Time required to complete one cycle**
- c) Expressed in amperes

d) None of the above

33. For a Sine wave with peak value I_{max} the R.M.S value is

a) $0.5I_{max}$

b) **0.707**

c) 0.9

d) $1.414I_{max}$

34. All the rules and laws of DC Circuit also apply to Ac circuit containing

a) Capacitance only

b) Inductance only

c) **Resistance only**

d) All Above

35. In the case of an unsymmetrical alternating current, the average value must always be taken over

a) unsymmetrical part of the waveform

b) The quarter Cycle

c) The half Cycle

d) **The whole Cycle**

36. A phasor is

a) **A line which represents the magnitude and phase of an alternating quantity**

b) A line representing the magnitude and direction of an alternating quantity

c) A colored tag or band for the distinction between the different phases of a 3-phase supply

d) An instrument used for measuring phases of an unbalanced 3-Phase load

37. The power factor of a DC circuit is always

a) less than unity

b) **unity**

c) Greater than unity

d) Zero

38. The form factor is the ratio of

a) Peak value to r.m.s. value

b) r.m.s. value to average value

c) Average value to r.m.s. value

d) None of the above

39. In an Ac circuit, a low value of KVAR compared with KW indicates

- a) Low efficiency
- b) **High power factor**
- c) Unity power factor
- d) Maximum load current



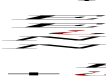

40. Which of the following circuit components opposes the change in the circuit voltage

- a) Inductance
- b) **Capacitance**
- c) Conductance
- d) Resistance

~ISE(I)

Sl.No.	MCQ	CO
1.	Faraday's First Law states: (a) The changing magnetic field linked with a conductor induces an electromotive force in the conductor. (b) The induced emf is inversely proportional to the rate of change of magnetic flux linkage. (c) The induced emf is directly proportional to the magnetic flux linkage. (d) The induced emf is inversely proportional to the magnetic flux linkage	3
2.	Faraday's Second Law states: (a) The magnitude of induced emf in a closed circuit is directly proportional to the rate of change of magnetic flux linked with the circuit. (b) The direction of the induced emf is such that it aids the change that produced it. (c) The magnitude of the induced emf is independent of the change that produced it. (d) The direction of the induced emf is always clockwise.	3
3.	Self-induced emf is produced when: (a) The current in a coil changes. (b) The current in a nearby coil changes. (c) A magnet moves near a coil. (d) A coil moves in a magnetic field.	3
4.	Mutually induced emf is produced when: (a) The current in a coil changes. (b) The current in a nearby coil changes. (c) A magnet moves near a coil. (d) A coil moves in a magnetic field.	3
5.	The following are the parts of a DC generator are: (a) Stator, rotor, commutator, brushes (b) Stator, rotor, slip rings, brushes (c) Stator, rotor, commutator, slip rings (d) Stator, rotor, slip rings, commutator	3
6.	The following are the parts of a DC motor are: (a) Stator, rotor, commutator, brushes (b) Stator, rotor, slip rings, brushes (c) Stator, rotor, commutator, slip rings (d) Stator, rotor, slip rings, commutator	3
7.	The principle of operation of a DC generator is based on: (a) Faraday's Law of Electromagnetic Induction (b) Lenz's Law (c) Ohm's Law (d) Kirchhoff's Law	3
8.	The principle of operation of a DC motor is based on: (a) Faraday's Law of Electromagnetic Induction (b) Lenz's Law (c) Ohm's Law (d) Kirchhoff's Law	3
9.	The back emf in a DC motor is:	3

	<p>(a) Directly proportional to the speed of the motor. (b) Inversely proportional to the speed of the motor. (c) Independent of the speed of the motor (d) Equal to the supply voltage</p>	
10.	<p>The back emf in a DC motor: (a) Helps in controlling the speed of the motor (b) Opposes the supply voltage (c) Limits the armature current (d) All of the above</p>	3
11.	<p>Which of the following is NOT a type of DC motor? (a) Shunt motor (b) Series motor (c) Compound motor (d) Synchronous motor</p>	3
12.	<p>A DC series motor has: (a) High starting torque (b) Low starting torque (c) Constant speed (d) Low speed regulation</p>	3
13.	<p>A DC shunt motor has: (a) High starting torque (b) Low starting torque (c) Approximately constant speed (d) Poor speed regulation</p>	3
14.	<p>A DC compound motor combines the characteristics of: (a) Shunt and series motors (b) Shunt and synchronous motors (c) Series and synchronous motors (d) None of the above</p>	3
15.	<p>Transformers are used to: (a) Change the voltage level of AC power (b) Change the frequency of AC power (c) Convert AC power to DC power (d) Convert DC power to AC power</p>	4
16.	<p>The main advantage of using transformers in power transmission is: (a) Reduced power losses (b) Increased power transmission efficiency (c) Ability to transmit power over long distances (d) All of the above</p>	4
17.	<p>The principle of operation of a transformer is based on: (a) Kirchoff's Law (b) Lenz's Law (c) Mutual induction (d) Self-induction</p>	4
18.	<p>Which of the following is NOT a type of transformer? (a) Step-up transformer (b) Step-down transformer (c) Autotransformer</p>	4

	(d) DC transformer	
19.	<p>The EMF equation of a transformer is:</p> <p>(a) </p> <p>(b) </p> <p>(c) </p> <p>(d) </p>	4
20.	<p>The main losses in a transformer are:</p> <p>(a) Copper losses and iron losses</p> <p>(b) Copper losses and hysteresis losses</p> <p>(c) Iron losses and eddy current losses</p> <p>(d) Hysteresis losses and eddy current losses</p>	4
21.	<p>The efficiency of a transformer is:</p> <p>(a) $\frac{\text{Output Power}}{\text{Input Power}}$</p> <p>(b) $\frac{\text{Input Power}}{\text{Output Power}}$</p> <p>(c) $\frac{\text{Output Power} + \text{Losses}}{\text{Input Power}}$</p> <p>(d) $\frac{\text{Input Power} - \text{Losses}}{\text{Output Power}}$</p>	4
22.	<p>A transformer has 500 turns in the primary winding and 100 turns in the secondary winding. If the primary voltage is 220V, the secondary voltage will be:</p> <p>(a) 44V</p> <p>(b) 1100V</p> <p>(c) 110V</p> <p>(d) 22V</p>	4
23.	<p>A transformer has an output power of 1000W and losses of 50W. Its efficiency is:</p> <p>(a) 95%</p> <p>(b) 90%</p> <p>(c) 85%</p> <p>(d) 80%</p>	4
24.	<p>A single phase autotransformer has:</p> <p>(a) One winding</p> <p>(b) Two windings</p> <p>(c) Three windings</p> <p>(d) Four windings</p>	4
25.	<p>Autotransformers are used for:</p> <p>(a) Starting induction motors</p> <p>(b) Voltage regulation</p> <p>(c) Variable voltage supply</p> <p>(d) All of the above</p>	4
26.	<p>A rotating magnetic field is produced in a three-phase induction motor by:</p> <p>(a) Three-phase AC supply</p> <p>(b) Single-phase AC supply</p> <p>(c) DC supply</p>	3

	(d) None of the above	
27.	<p>The main parts of a three-phase induction motor are:</p> <p>(a) Stator, rotor, commutator, brushes</p> <p>(b) Stator, rotor, slip rings, brushes</p> <p>(c) Stator, rotor</p> <p>(d) Stator, rotor, field winding, armature winding</p>	3
28.	<p>The rotor of a three-phase induction motor:</p> <p>(a) Rotates at synchronous speed</p> <p>(b) Rotates at a speed slightly less than synchronous speed</p> <p>(c) Rotates at a speed slightly more than synchronous speed</p> <p>(d) Does not rotate</p>	3
29.	<p>Slip in an induction motor is:</p> <p>(a) The difference between synchronous speed and rotor speed</p> <p>(b) The ratio of synchronous speed to rotor speed</p> <p>(c) The ratio of rotor speed to synchronous speed</p> <p>(d) The sum of synchronous speed and rotor speed</p>	3
30.	<p>Slip is necessary in an induction motor for:</p> <p>(a) Producing torque</p> <p>(b) Reducing losses</p> <p>(c) Increasing efficiency</p> <p>(d) Starting the motor</p>	3
31.	<p>A starter is used in an induction motor to:</p> <p>(a) Limit the starting current</p> <p>(b) Increase the starting torque</p> <p>(c) Improve the power factor</p> <p>(d) Reduce the speed</p>	3
32.	<p>Which of the following is NOT a type of starter for an induction motor?</p> <p>(a) Direct-on-line starter</p> <p>(b) Star-delta starter</p> <p>(c) Autotransformer starter</p> <p>(d) DC series starter</p>	3
33.	<p>A single-phase induction motor:</p> <p>(a) Is self-starting</p> <p>(b) Is not self-starting</p> <p>(c) Has high starting torque</p> <p>(d) Has high efficiency</p>	3
34.	<p>Which of the following is used to make a single-phase induction motor self-starting?</p> <p>(a) Capacitor</p> <p>(b) Centrifugal switch</p> <p>(c) Starting winding</p> <p>(d) All of the above</p>	3
35.	<p>The most common type of single-phase induction motor is:</p> <p>(a) Capacitor-start motor</p> <p>(b) Capacitor-run motor</p> <p>(c) Shaded-pole motor</p> <p>(d) Split-phase motor</p>	3

36.	A shaded-pole motor has: (a) High starting torque (b) Low starting torque (c) High efficiency (d) Low noise	3
37.	A split-phase motor has: (a) One winding (b) Two windings (c) Three windings (d) Four windings	3
38.	A capacitor-start motor has: (a) High starting torque (b) Low starting torque (c) High running torque (d) Low running torque	3
39.	A capacitor-run motor has: (a) High power factor (b) Low power factor (c) High starting torque (d) Low starting torque	3
40.	The direction of rotation of a single-phase induction motor can be reversed by: (a) Reversing the supply connections (b) Reversing the connections of the main winding (c) Reversing the connections of the starting winding (d) None of the above	3

BASIC ELECTRICAL ENGINEERING

OBJECTIVE TYPE QUESTIONS

UNIT III

1. What does SMPS stand for?

- A) Switched Mode Power System
- B) Switched Mode Power Supply
- C) Smart Mode Power Solution
- D) Simple Mode Power Source

Answer: B) Switched Mode Power Supply

2. Electric Vehicles can help reduce pollution & improve air quality
(True / False)

Ans: True

3. EV uses Internal Combustion Engine for propulsion (True / False)

Ans: False

4. What is the primary function of an SMPS?

- A) To convert AC to DC power
- B) To convert DC to AC power
- C) To regulate power supply
- D) To generate power

Answer: A) To convert AC to DC power

5. What is the advantage of SMPS over linear power supplies?

- A) Higher efficiency
- B) Lower cost
- C) Simpler design
- D) Larger size

Answer: A) Higher efficiency

6. What is the typical application of SMPS?

- A) Household appliances
- B) Industrial power systems
- C) Electronic devices (e.g., computers, smartphones)
- D) Automotive systems

Answer: C) Electronic devices (ex. computers, smartphones)

7. If petrol/diesel driven vehicles are compared with EVs, then EVs are:

- a) Costlier
- b) Cheaper

Answer: b) Cheaper (in the long run, considering lower operating & maintenance costs)

8. What does PMSM stand for?

- A) Permanent Magnet Synchronous Motor
- B) Permanent Magnet Stepper Motor
- C) Pulse Width Modulation Switching Motor
- D) Power Management Switching Module

Answer: A) Permanent Magnet Synchronous Motor

9. What is a significant cost factor that makes EVs more economical in the long run?

- a) Higher battery replacement costs
- b) Lower operating costs (fuel and maintenance)
- c) Higher insurance costs
- d) Lower resale value

Answer: b) Lower operating costs (fuel and maintenance)

10. What is the primary characteristic of a PMSM?

- A) Uses electromagnetic induction
- B) Has a permanent magnet rotor
- C) Requires a commutator
- D) Uses a brushed motor design

Answer: B) Has a permanent magnet rotor

11. What is the advantage of PMSM over induction motors?

- A) Higher efficiency
- B) Lower cost
- C) Simpler design
- D) Larger size

Answer: A) Higher efficiency

12. What is the typical application of PMSM?

- A) Household appliances
- B) Industrial power systems
- C) Electric vehicles and robotics
- D) Aerospace and defense

Answer: C) Electric vehicles and robotics

13. What is the key benefit of PMSM in electric vehicles?

- A) Higher torque density
- B) Lower noise emission
- C) Improved fuel efficiency
- D) Reduced maintenance

Answer: A) Higher torque density

14. What does MCB stand for?

- A) Miniature Circuit Breaker
- B) Main Control Board
- C) Motor Control Box
- D) Maximum Current Breaker

Answer: A) Miniature Circuit Breaker

15. What is the primary function of an MCB?

- A) To supply power to a circuit
- B) To control the speed of a motor
- C) To protect a circuit from overcurrent
- D) To regulate voltage levels

Answer: C) To protect a circuit from overcurrent

16. What type of device is an MCB?

- A) Electromechanical device
- B) Electronic device
- C) Thermal device
- D) Hydraulic device

Answer: A) Electromechanical device

17. Where is an MCB typically used?

- A) In industrial power systems
- B) In residential electrical panels
- C) In commercial buildings
- D) In all of the above

Answer: D) In all of the above

18. What is the benefit of using an MCB?

- A) Higher current rating
- B) Lower cost
- C) Improved safety
- D) Increased complexity

Answer: C) Improved safety

19. What is necessary to provide a path to the leakage current to ground and protect personnel from the danger of shock or death?

- A) Fuse
- B) Circuit Breaker
- C) Earthing
- D) Insulator

Answer: C) Earthing

20. Which of the following is a benefit of a proper earthing system?

- A) Reduced risk of fire
- B) Improved system efficiency
- C) Protection of personnel from electric shock
- D) Increased system capacity

Answer: C) Protection of personnel from electric shock

21. What happens when a leakage current flows to ground through an earthing system?

- A) The circuit breaker trips

- B) The fuse blows
- C) The voltage is reduced
- D) The current is safely dissipated

Answer: D) The current is safely dissipated

22. Two main parts of a PMSM are:-

- A) Field, Armature
- B) Stator, Armature
- C) Stator, Rotor
- D) Field, Rotor

Answer: C) Stator, Rotor

23. Two types of BLDC motors are :-

- A) Slip ring BLDC Motor, Squirrel cage BLDC Motor
- B) Series BLDC Motor, Shunt BLDC Motor
- C) Unipolar BLDC Motor, Bipolar BLDC Motor
- D) Short shunt BLDC Motor, Long shunt BLDC Motor

Answer: C) Unipolar BLDC Motor, Bipolar BLDC Motor

24. Boost converter is a _____ converter

- A) Step down - Step up
- B) Step down
- C) Step Up - Step down
- D) Step up

Answer: D) Step up

25. Boost converter uses _____

- A) An inductor & a diode only
- B) A capacitor & a diode only
- C) An inductor, a capacitor & a diode
- D) An inductor & a capacitor only

Answer: C)

26. In a boost converter, output voltage is _____

- A) Input Voltage / (1-D)
- B) $D \times$ Input Voltage
- C) (1-D) / Input Voltage
- D) (1-D) \times Input Voltage

Answer: A) Input Voltage / (1-D)

27. Buck converter is also called as _____

- A) Step up converter
- B) Step down converter
- C) Step Up - Step down converter
- D) Step down - step up converter

Answer: B) Step down converter

28. Output voltage of a step down converter is ____

- A) Input Voltage / D
 - B) $(1-D) \times \text{Input Voltage}$
 - C) $D \times \text{Input Voltage}$
 - D) Input Voltage / $(1-D)$
- Answer: C) $D \times \text{Input Voltage}$

29. Operating a device from two different locations using two-way control is also called_____

- A) Step Wiring
- B) Conduit Wiring
- C) Staircase Wiring
- D) Cleat Wiring

Answer: C) Staircase Wiring

30. Two-way control of lamp uses _____ two-way switches.

- A) Zero
- B) One
- C) Two
- D) Three

Answer: C) Two

31. The number of switches required to control a lamp from three different points are ____

- A) 2
- B) 3
- C) 4
- D) 5

Answer: B) 3

32. _____ is a safety device used in any electrical installation which forms the weakest link between the supply & the load

- A) Circuit Breaker
- B) Fuse
- C) Conductor
- D) Semi-conductor

Answer: B) Fuse

33. Fuse can be made of _____

- A) Lead
- B) Tin
- C) Zinc
- D) All the above

Answer: D) All the above

34. _____ type of earthing is used in electric substations.

- A) Pipe
- B) Pin
- C) Plate

D) None of the above

Answer: C) Plate

35. In plate earthing, earth plate is made up of _____ of size _____cm

A) Copper, 60 x 60 x 0.318cm

B) Aluminium, 60 x 60 x 6.35cm

C) Steel, 60 x 60 x 0.318cm

D) Silver, 60 x 60 x 6.35cm

Answer: A) Copper, 60 x 60 x 0.318cm

36. _____ pipe is used in Pipe earthing.

A) Steel

B) Galvanized Iron

C) Copper

D) Silver

Answer: B) Galvanized Iron

37. In case of pipe earthing, the range of earth resistance would be _____

A) 40-50 ohms

B) 20-40 ohms

C) 02-05 ohms

D) 10-20 ohms

Answer: C) 02-05 ohms

