Electrician 3rd Semester - Module 1 : DC Generator

Questions: Level 1

1. What is the name of the part marked 'X' in DC generator?
   - A Armature core
   - B Armature core
   - C Commutator raiser
   - D Commutator segment

2. What is the name of D.C generator?
   - A Differential long shunt compound
   - B Differential short shunt compound
   - C Cumulative long shunt compound
   - D Cumulative short shunt compound

3. Which rule is used to find the direction of induced emf in D.C generator?
   - A Cork screw rule
   - B Right hand palm rule
   - C Fleming’s left hand rule
   - D Fleming’s right hand rule

4. Which formula is used to calculate the generated emf in D.C generator?
   - A Generated emf = \( \frac{\phi ZN}{60} \) Volt
   - B Generated emf = \( \frac{\phi ZN \times A}{60 \times P} \) Volt
   - C Generated emf = \( \frac{\phi ZN \times P}{60 \times A} \) Volt
   - D Generated emf = \( \frac{ZN \times P}{60 \times X \phi \times A} \) Volt

5. What is the formula to calculate back emf of a D.C motor?
   - A \( E_b = \frac{V}{I_a R_a} \) Volts
   - B \( E_b = V \times I_a R_a \) Volts
   - C \( E_b = V - I_a R_a \) Volts
   - D \( E_b = V + I_a R_a \) Volts

6. What is the name of the part marked 'X' in DC generator?
   - A Pole tip
   - B Pole coil
   - C Pole core
   - D Pole shoe

7. What is the name of the D.C generator?
   - A Shunt generator
   - B Series generator
   - C Compound generator
   - D Separately excited generator

8. Which energy is converted into electrical energy by generator?
   - A Heat
   - B Kinetic
   - C Chemical
   - D Mechanical

9. What is the name of D.C generator?
   - A Short shunt compound generator
   - B Long shunt compound generator
   - C Differential compound generator
   - D Cumulative compound generator
10. What is the principle of D.C generator?
   A. Cork screw rule
   B. Fleming’s left hand rule
   C. Fleming’s right hand rule
   D. Faradays laws of electromagnetic induction

11. What is the formula for dynamically induced emf?
   A. BLV volts
   B. BL sinθ volts
   C. BLV sinθ volts
   D. BLV cosθ volts

12. Which rule is used to find direction of magnetic field?
   A. Cork screw rule
   B. Right hand palm rule
   C. Fleming’s left hand rule
   D. Fleming’s right hand rule

13. What is the name of the part of DC generator?
   A. Stator
   B. Pole core
   C. Pole shoes
   D. Yoke (or) frame

14. How many parallel paths in duplex lap winding of a 4 pole DC generator?
   A. 4
   B. 6
   C. 8
   D. 12

15. Name the part of DC generator?
   A. Side end plates
   B. Pole shoe lamination
   C. Commutator segment
   D. Armature core lamination
### Questions: Level 2

1. How interpoles are connected in a DC generator?
   - **A** In series with armature
   - **B** In parallel with armature
   - **C** In series with shunt field
   - **D** In parallel with shunt field

2. What is the necessity of residual magnetism in a self excited DC generator?
   - **A** Build up the voltage
   - **B** Reduce the field current
   - **C** Reduce armature current
   - **D** Maintain constant output voltage

3. Which are the two points that the brush contact resistance measured in D.C machines?
   - **A** Resistance between the opposite brushes
   - **B** Resistance between brush and commutator raiser
   - **C** Resistance between brush and commutator
   - **D** Resistance between brush and armature conductors

4. Which voltage drop is indicated in the portion marked as ‘X’?
   - **A** Full load voltage drop
   - **B** Armature voltage drop
   - **C** Armature reaction drop
   - **D** Shunt field voltage drop

5. What is the name of the compound generator, if the shunt field is connected in parallel with armature?
   - **A** Long shunt compound
   - **B** Cumulative compound
   - **C** Differential compound
   - **D** Short shunt compound

6. Why the armature core of a DC generator is laminated?
   - **A** Reduce the copper loss
   - **B** Reduce the friction loss
   - **C** Reduce the hysteresis loss
   - **D** Reduce the eddy current loss

7. Why armature resistance of a D.C generator is very low?
   - **A** Reduce armature current
   - **B** Reduce armature voltage drop
   - **C** Run armature with less weight
   - **D** Reduce the temperature of armature

8. Why the D.C generator should run in clockwise direction only?
   - **A** Protect brushes from damage
   - **B** Protect the residual magnetism
   - **C** Avoid short circuit in armature
   - **D** Avoid over loading of generator

9. Why compensating winding is provided in large DC generators?
   - **A** Connect more loads
   - **B** Reduce commutation effect
   - **C** Neutralize armature reaction effect
   - **D** Increase the efficiency of generator

10. What is the reason for DC generator fails to build up voltage?
    - **A** Loose brush contract
    - **B** Armature resistance is more
    - **C** Field resistance is above critical resistance
    - **D** Prime mover is running at above rated speed

11. What is the name of generator, if its field is connected in parallel with armature?
    - **A** Shunt generator
    - **B** Series generator
    - **C** Compound generator
    - **D** Self excited generator

12. What is the purpose of pole shoe in DC generator?
    - **A** Reduce the air gap
    - **B** Increase the field strength
    - **C** Minimize the magnetic losses
    - **D** Spread out flux uniformly in the air gap

13. What is the function of split rings in DC generator?
    - **A** Maintain constant voltage
    - **B** Collects the current unidirectionally
    - **C** Reduces the voltage drop at brushes
    - **D** Increases the terminal voltage than rated
<table>
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| 14 | Which material is used to make brush in generator? | A Steel and graphite  
B Carbon and graphite  
C Cast iron and graphite  
D Aluminium and graphite |
| 15 | Why DC generators are loosing their residual magnetism? | A Heavy short circuit in load  
B Running without load continuous  
C Continuous running without break  
D Change of direction of rotation very often |
| 16 | How does the magnetic circuit complete through the yoke and poles in a generator? | A Field coils  
B Armature core  
C Laminated pole core  
D Winding conductors in armature |
| 17 | Why the terminal voltage decreases if load increases in DC shunt generator? | A Because of armature reaction effect  
B Due to increased in armature resistance  
C Because of brush voltage drop decreases  
D Due to increased in shunt field inductance |
| 18 | Which type of DC generator is used for long distance distribution lines? | A Shunt generator  
B Series generator  
C Differential compound generator  
D Cumulative compound generator |
| 19 | Which method is used to improve the insulation resistance in DC generator? | A Replacing the brushes frequently  
B Heating the machine by running periodically  
C Cleaning the commutator segments regularly  
D Blowing hot air in to the machine during maintenance |
| 20 | Which type of D.C Generator works in absence of residual magnetism? | A Shunt generator  
B Series generator  
C Compound generator  
D Separately excited generator |
| 21 | Which type of D.C generator is used for arc welding? | A Shunt generator  
B Series generator  
C Differential compound generator  
D Cumulative compound generator |
| 22 | What is the property of wave winding in D.C generator? | A Low current low voltage  
B High current low voltage  
C Low current high voltage  
D High Current high voltage |
| 23 | What is the purpose of resistance wire used in the commutator connection in D.C generator? | ![Diagram of wave winding](image)  
A Maintain constant voltage  
B Nullifying statically induced emf  
C Increasing statically induced emf  
D Smooth reversal of current direction |
| 24 | Why solid pole shoes are used in D.C generator? | A To reduce the copper loss  
B To increase the residual magnetism  
C To decrease the residual magnetism  
D To reduce the reluctance of magnetic path |
| 25 | Which metal is used to make large capacity DC generator yoke? | A Cast iron  
B Soft iron  
C Aluminium  
D Rolled Steel |
| 26 | What is the function of split rings in a D.C generator? | A Supplies output continuously  
B Makes output in the uni direction  
C Makes output in the opposite direction  
D Collects the output from alternate conductors |
| 27 | Which type of voltage is induced dynamically in a D.C generator? | A Pulsating voltage  
B Oscillating voltage  
C Alternating voltage  
D Direct current voltage |
28. What is the purpose of slot marked as ‘X’?
   A. To fix the key way
   B. To make air circulation
   C. For lubrication purpose
   D. For easy removal from shaft

29. What is the purpose of field coils in D.C generator?
   A. To increase the flux in air gap
   B. To decrease the magnetizing current
   C. To magnetize the poles to produce coil flux
   D. To increase the reluctance of magnetic path

30. Which metal is used to make pole core of large DC generator machines?
   A. Soft iron
   B. Cast iron
   C. Cast steel
   D. Stainless steel

31. Why the pole core stampings are laminated in DC generator?
   A. Reduce the friction loss
   B. Reduce the windage loss
   C. Reduce the hysteresis loss
   D. Reduce the eddy current loss

32. Which type of DC generator is used for electroplating process?
   A. Shunt generator
   B. Series generator
   C. Differential compound generator
   D. Cumulative compound generator

33. What is the purpose of compensating winding in DC generator?
   A. Minimizes rough commutation
   B. Maintain constant output voltage
   C. Neutralizes the demagnetizing effect
   D. Decreases the excitation current of field coils
Questions: Level 3

1. What is the effect if the shunt field resistance is above critical resistance value in a D.C generator?
   A. Output voltage is pulsating
   B. Output voltage is above normal
   C. Generator fails to build up voltage
   D. Generator builds up voltage normally

2. What is the effect of armature reaction in DC generator?
   A. Output voltage increases
   B. Output voltage decreases
   C. Output voltage is pulsating
   D. Output voltage will become zero

3. Calculate the emf generated in a 4 pole DC generator with simplex wave wound armature has 1020 conductors and driven at a speed of 1500 rpm, the flux/pole is 0.007 webers?
   A. 178 V
   B. 243 V
   C. 357 V
   D. 428 V

4. How the effect of armature reaction can be neutralized in large DC generators?
   A. Using compensating winding
   B. Providing additional inter poles
   C. Increasing brush contact resistance
   D. Adding resistance wires with winding

5. What is the effect in D.C generator, if it is kept ideal for long time?
   A. Field coil resistance increases
   B. Armature resistance increases
   C. Increase the armature reaction
   D. Looses its residual magnetism

6. Calculate the induced emf of 4 pole dynamo having 1000 rpm lap wound and total number of conductors is 600, the flux/pole is 0.064 wb?
   A. 160V
   B. 320V
   C. 480V
   D. 640V

7. What is the effect on induced emf if the main field flux get distorted in DC generator?
   A. Induced EMF increases
   B. Induced EMF decreases
   C. No change in induced EMF
   D. Induced EMF becomes zero

8. What is the cause for heavy sparking in brushes of DC generator?
   A. Shunt circuit in field winding
   B. Short circuit in armature winding
   C. MNA and GNA position changed
   D. Too much spring tension as brush
### Module 1: DC Generator - Key paper

#### Questions: Level 1

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Electrician - 3rd Semester - Module 2 : DC Motor

Questions: Level 1

1. Which instrument is used to measure armature winding resistance?
   A. Megger
   B. Multimeter
   C. Series type Ohm meter
   D. Kelvin bridge

2. Which instrument is used to test armature winding for short and open circuit?
   A. Tong Tester
   B. Internal Growler
   C. External Growler
   D. Digital multimeter

3. What is the name of the speed control method of DC motor?
   A. Field diverter method
   B. Field tapping method
   C. Voltage control method
   D. Armature diverter method

4. Which winding wire is used for DC field coil?
   A. Super enameled copper wire
   B. Single silk covered copper wire
   C. Double silk covered copper wire
   D. PVC covered copper winding wire

5. Which formula is used to calculate the speed of DC motor?
   A. \[ N = \frac{E_b}{\phi} \]
   B. \[ N = \frac{\phi}{E_b} \]
   C. \[ N = \frac{E_b \cdot \phi}{120} \]
   D. \[ N = \frac{E_b \cdot \phi}{60} \]

6. How many parallel paths in duplex lap winding in the armature of 4 pole D.C Motor?
   A. 2
   B. 4
   C. 6
   D. 8

7. Which rule determines the direction of rotation of armature in D.C motor?
   A. Right hand grip rule
   B. Right hand palm rule
   C. Fleming’s left hand rule
   D. Fleming’s right hand rule

8. What is the name of D.C motor?
   A. D.C shunt motor
   B. D.C series motor
   C. D.C differential compound motor
   D. D.C cumulative compound motor

9. Which rule determines the direction of current in D.C motor?
   A. Right hand grip rule
   B. Right hand palm rule
   C. Fleming’s left hand rule
   D. Fleming’s right hand rule

10. What is the formula to calculate the current taken by D.C shunt motor armature?
    A. \[ I_a = \frac{V}{R_a} \]
    B. \[ I_a = \frac{E_b}{R_a} \]
    C. \[ I_a = \frac{V - E_b}{R_a} \]
    D. \[ I_a = \frac{V + E_b}{R_a} \]

11. Which rule is applied to identify the direction of flux in DC motor?
    A. Cork’s screw rule
    B. Right hand grip rule
    C. Fleming’s left hand rule
    D. Fleming’s right hand rule
12 Name the type of DC motor.

A Shunt motor
B Series motor
C Long shunt compound motor
D Short shunt compound motor

13 What is the formula to calculate back EMF in a DC motor?

A \[ E_b = \frac{Z \cdot N \cdot P}{\phi \cdot 60 \text{ A}} \]
B \[ E_b = \frac{N \cdot P}{Z \cdot \phi \cdot 60 \text{ A}} \]
C \[ E_b = \frac{\phi \cdot Z \cdot N \cdot P}{60 \text{ A}} \]
D \[ E_b = \frac{60 \text{ A} \cdot \phi}{Z \cdot N \cdot P} \]

14 What is the name of the equipment?

A Megger
B Earth resistance tester
C Internal growler
D External growler

15 What is the name of winding, if coil pitch is less than pole pitch?

A Full pitch winding
B Half pitch winding
C Long chorded winding
D Short chorded winding
Questions: Level 2

1. What is the purpose of series resistor connected with holding coil in a D.C four point starter?
   A. Limit the current in holding coil
   B. Increase the current in holding coil
   C. Increase the voltage in holding coil
   D. Decrease the voltage in holding coil

2. Which speed control method of D.C series motor is used for electric train?
   A. Field diverter method
   B. Field tapping method
   C. Armature diverter method
   D. Supply voltage control method

3. Why shunt field coil is connected in series with holding coil in D.C three point starter?
   A. Increase the holding coil current
   B. Decrease the holding coil current
   C. Protect the shunt field from over current
   D. Protect the motor in case of open in shunt field

4. Why the direction of rotation is changed only by changing the armature current direction in a D.C compound motor?
   A. Maintain rated speed
   B. Maintain motor characteristics
   C. Avoid armature reaction effect
   D. Prevent motor from over loading

5. Which speed control methods offers below the rated speed in DC series motor?
   A. Field control method
   B. Voltage control method
   C. Armature control method
   D. Armature diverter method

6. Why starters are required to start D.C motors in industries?
   A. Regulate the field voltage
   B. Reduce the armature current
   C. Control the armature reaction
   D. Smooth operation of motors

7. Which insulating material belongs to class ‘B’ insulation?
   A. Cotton
   B. Bamboo
   C. Fibre glass
   D. Leatheroid paper

8. What is the temperature value of class ‘F’ insulation?
   A. 90°C
   B. 105°C
   C. 120°C
   D. 155°C

9. Which type of D.C motor is used for constant speed drives?
   A. DC series motor
   B. DC shunt motor
   C. Differential long shunt compound motor
   D. Differential short shunt compound motor

10. Which type of DC motor is used in elevators?
    A. DC series motor
    B. DC shunt motor
    C. DC differential compound motor
    D. DC cumulative compound motor

11. Which method of speed control gives below the rated speed in DC series motor?
    A. Field diverter method
    B. Tapped field method
    C. Voltage control method
    D. Armature diverter method

12. What is the effect, if a four point starter resistance is cutoff during running?
    A. Motor stopped
    B. Runs at slow speed
    C. Runs at very high speed
    D. Runs at reverse direction

13. Why carbon composition brush requires in the armature circuit to operate the D.C motor?
    A. Increases the starting torque
    B. Protects from armature reaction
    C. Protects armature from over loading
    D. Reduces the spark in the commutator segment

14. Why series motor produce high torque and speed initially without load?
    A. Absence of back emf
    B. Load current flows through field winding
    C. Armature current and field current are same
    D. Series field winding wound with thick wire
15 Why the series field is short circuited at the time of starting in differential compound motor?
A To reduce the starting current  
B To increase the speed of motor  
C To decrease the speed of motor  
D To maintain proper direction of rotation

16 Which is the most effective method of balancing armature?
A Static balancing  
B Dynamic balancing  
C Attached with counter balancing  
D Plugged with lead weight balancing

17 Which material is used for starting resistance of DC starters?
A Eureka  
B Nichrome  
C Manganin  
D Constantine

18 Which DC compound motor is operated at constant speed under varying load?
A Differential long shunt  
B Cumulative long shunt  
C Differential short shunt  
D Cumulative short shunt

19 How No volt coil is connected in a three point starter with DC shunt motor?
A Directly connected to supply  
B Connected in series with armature  
C Connected in parallel with armature  
D Connected in series with shunt field

20 Which type of armature winding is illustrated?
A Duplex lap winding  
B Triplex lap winding  
C Simplex lap winding  
D Quadruplex lap winding

21 Which growler test for armature is illustrated?
A Open coil test  
B Ground coil test  
C Shorted coil test  
D Shorted commutator tests

22 Which speed control method is applied to obtain both below normal and above normal speed in DC motor?
A Field control method  
B Armature control method  
C Tapped field speed control  
D Ward Leonard speed control

23 Why commutators are sparking heavily?
A Incorrect brush position  
B Incorrect field connection  
C Incorrect direction of rotation  
D Incorrect armature connection

24 What is the action of the induced emf in a running D.C motor?
A Assists the applied voltage  
B Opposes the applied voltage  
C Increases the armature current  
D Decreases the armature current

25 Which motor has this characteristics curve?
A Series motor  
B Shunt motor  
C Cumulative compound motor  
D Differential compound motor
26 What is the purpose of resistor connected with holding coil in 4 point starter?
A  Limit current in NVC
B  Protect the coil from short circuit
C  Protect the motor from overload
D  Protect the armature from short circuit

27 Why the D.C series motor field winding is wound with thick wire?
A  To regulate field voltage
B  To carry the load current
C  To keep maximum inductance
D  To reduce the armature reaction

28 Which type of speed control of D.C series motor?

29 Which type of D.C motor is suitable for shearing machines?
A  Shunt motor
B  Series motor
C  Cumulative compound motor
D  Differential compound motor

30 Where D.C compound motors are preferred?
A  Constant load requirements
B  Constant speed requirements
C  High starting torque requirements
D  Constant speed under varying load requirements

31 What is the necessity of starter for D.C motor?
A  Limit the field current
B  Limit the field voltage
C  Control the motor speed
D  Limit the armature current

32 Which type of instrument is used to test the armature winding?
A  Megger
B  Growler
C  Multimeter
D  Ohmmeter

33 Why the holding coil of a 3 point starter is connected in series with shunt field?
A  To limit the load current
B  To run motor at low voltages
C  To hold the handle plunger firmly
D  To protect the motor from high speed

34 What is the best method to change the DOR of a compound motor without change of its characteristics?
A  Change armature current direction
B  Change shunt field current direction
C  Change series field current direction
D  Change the current in armature and shunt field together

35 What is the purpose of NVC connected in series with the field in 3 point starter?
A  To improve the torque
B  Reduce the field current
C  To decrease the back EMF
D  To prevent increase in speed

36 Which type of DC motor is used for sudden application of heavy loads?
A  Shunt motor
B  Series motor
C  Differential compound motors
D  Cumulative compound motors

37 Which speed control method is used in food mixture motors?
A  Voltage control method
B  Field diverter control method
C  Armature diverter method
D  Series field tapping method

38 Which speed control system provides a smooth variation of speed from zero to above normal?
A  Field control
B  Armature control
C  Field diverter control
D  Ward-Leonard system control

39 What is the purpose of tapes in winding?
A  Insulate slots
B  Bind the coils
C  Wrap the conductor
D  Insulate exposed conductors
40 Which type of DC armature winding the front pitch ($Y_F$) is greater than back pitch ($Y_B$)?
A Lap winding  
B Wave winding  
C Progressive winding  
D Retrogressive winding

41 What reduces the cross sectional area of core material for VA rating?
A Dynamo sheet  
B Low alloy sheet  
C High alloy sheet  
D Normal steel sheet

42 How to obtain opposite polarity in adjacent poles into a 4 pole DC motor?
A Varying the number of turns in coil  
B Making series connection of coils  
C Making parallel connection of coils  
D Making current flow in different direction

43 What is the operation in the rewinding process?
A Cleaning of slots  
B Removing of winding  
C Removing of wedges  
D Cutting of winding wire

44 Which insulating material used in winding is a highly non-hygroscopic and possess good electrical strength?
A Empire cloth  
B Triplex paper  
C Millinex paper  
D Leatheroid paper

45 Which type of armature winding is illustrated?

46 Calculate the average pitch ($Y_A$) for retrogressive wave winding, if
   No. of armature conductor = 14  
   No. of slots = 7  
   No. of poles = 2
A 4  
B 6  
C 8  
D 14

47 Which type of test is illustrated for the armature after rewound?
A Open coil test  
B Shorted coil test  
C Voltage drop test  
D Grounded coil test

48 Why the newly rewound armature must be preheated before varnishing?
A Drive out the moisture from it  
B Help for quick drying of varnish  
C Make easy to penetrate varnish inside  
D Maintain uniform spreading of varnishing
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| 2 | What is the effect, if a four point starter resistance is cutoff during running? |
| A | Motor stopped |
| B | Runs at slow speed |
| C | Runs at very high speed |
| D | Runs at reverse direction |

| 3 | What is the effect in a D.C shunt motor, if its supply terminals are interchanged? |
| A | Runs in slow speed |
| B | Runs in high speed |
| C | Runs in the same direction |
| D | Runs in the reverse direction |

| 4 | What is the speed, if field winding of a DC shunt motor is in open circuit? |
| A | Stop running |
| B | Motor runs normally |
| C | Runs at slow speed |
| D | Runs in very high speed |

| 5 | What is the reason for reduction in speed of a D.C shunt motor from no load to full load? |
| A | Shunt field current increases |
| B | Shunt field current decreases |
| C | Armature voltage drop increases |
| D | Armature voltage drop decreases |

| 6 | Which winding fault is determined by the test? |
| A | Open coil fault |
| B | Short coil fault |
| C | Grounded coil fault |
| D | Grounded core fault |
Module 2: DC Motor - Key paper

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Electrician - 3rd Semester - Module 3 : AC Three Phase Motor

Question : Level 1

1. What is the formula to calculate the slip speed \((N_{\text{slip}})\) of 3 phase squirrel cage induction motor?
   A. \(N_{\text{slip}} = N_s - N_r\)
   B. \(N_{\text{slip}} = N_r - N_s\)
   C. \(N_{\text{slip}} = \frac{N_S - N_R}{N_r}\)
   D. \(N_{\text{slip}} = \frac{N_S - N_R}{N_S}\)

2. What is the type of control circuit?
   A. Inching control
   B. ON remote control
   C. OFF remote control
   D. Forward & reverse control

3. Which formula is used to calculate the total electrical degree in stator of an A.C motor?
   A. Total electrical degree = \(180^\circ / \text{no of slots}\)
   B. Total electrical degree = \(180^\circ \times \text{no of slots}\)
   C. Total electrical degree = \(180^\circ / \text{no of poles}\)
   D. Total electrical degree = \(180^\circ \times \text{no of poles}\)

4. What is the name of the A.C motor starter?
   A. DOL starter
   B. Auto transformer starter
   C. Semi automatic star delta starter
   D. Fully automatic star delta starter

5. What is the formula to find synchronous speed of a A.C 3 phase induction motor?
   A. Synchronous speed = \(\frac{120F}{P}\)
   B. Synchronous speed = \(\frac{120P}{F}\)
   C. Synchronous speed = \(\frac{120}{PF}\)
   D. Synchronous speed = \(\frac{PF}{120}\)

6. What is the fuse rate to run a 10 HP three phase induction motor at full load?
   A. 10 A
   B. 15 A
   C. 25 A
   D. 30 A
7. What is the name of the contact marked as ‘X’?
   A. Star contact
   B. Delta contact
   C. Auxiliary contact
   D. Over load relay contact

8. What is the type of A.C motor stator winding?
   A. Single layer basket winding
   B. Double layer basket winding
   C. Involute coil winding
   D. Diamond coil winding

9. Which formula is used to calculate percentage slip of an AC 3 phase induction motor?
   A. \( \frac{N_S - N_r}{N_S} \times 100 \)
   B. \( \frac{N_r - N_S}{N_S} \times 100 \)
   C. \( \frac{N_S - N_r}{N_r} \times 100 \)
   D. \( \frac{N_S - N_r}{N_r} \times 100 \)

10. Which operation the control circuit is used?
    A. Remote control
    B. Jogging/Inching
    C. Sequential control
    D. Forward and reverse

11. What is the phase displacement between windings in 3 phase motor?
    A. 90°
    B. 120°
    C. 180°
    D. 360°

12. What is the name of the part marked ‘X’?
    A. Shaft
    B. Brushes
    C. Bearings
    D. Slip rings

13. What is the name of AC coil winding?
    A. Half coil winding
    B. Whole coil winding
    C. Single layer winding
    D. Double layer winding

14. What is the name of the coil winding?
    A. Concentric coil winding
    B. Distributed coil winding
    C. Mesh shaped coil winding
    D. Diamond mesh shaped coil winding
15. Which speed is called as synchronous speed in 3 phase induction motor?
   A. No load speed  
   B. Full load speed  
   C. Rotating magnetic field speed  
   D. Relative speed between stator and rotor

16. What is the name of the starter symbol?
   A. D.O.L starter  
   B. Auto transformer starter  
   C. Automatic star/delta starter  
   D. Semi automatic star/delta starter

17. Name the part marked ‘X’ of the winding machine?
   A. Mandrel  
   B. Wire feed  
   C. Wire guides  
   D. Spool carrier

18. What is the electrical degree of 6 pole stator motor?
   A. 360°  
   B. 720°  
   C. 1080°  
   D. 1440°

19. Calculate the number of coils per phase per pair of poles of 3 phase motor having 2 pole, 24 slots, 12 coils?
   A. 1  
   B. 2  
   C. 3  
   D. 4

20. What is the name of the starter symbol?
   A. Star delta starter  
   B. Rheostatic starter  
   C. Direct on-line starter  
   D. Autotransformer starter

21. What is the formula to calculate pitch factor?
   A. Pitch factor = \( \frac{Pole\ pitch}{Winding\ pitch} \)  
   B. Pitch factor = \( \frac{Winding\ pitch}{Pole\ pitch} \)  
   C. Pitch factor = \( \frac{Number\ of\ slots}{Number\ of\ poles} \)  
   D. Pitch factor = \( \frac{Number\ of\ poles}{Number\ of\ slots} \)

22. How pole pitch is measured in terms of slots in AC winding?
   A. \( \frac{Total\ electrical\ degrees}{Number\ of\ slots} \)  
   B. \( \frac{Total\ electrical\ degrees}{Number\ of\ slots} \)  
   C. \( \frac{No\ of\ slots\ in\ the\ stator}{No\ of\ poles} \)  
   D. \( \frac{No\ of\ slots\ in\ the\ stator}{No\ of\ poles} \)

23. What is the formula to calculate the mean circumference of the coil?
   A. \( L_m = \frac{L_{out} - L_{in}}{2} \) cm  
   B. \( L_m = \frac{L_{in} + L_{out}}{2} \) cm  
   C. \( L_m = \frac{2}{L_{out} - L_{in}} \) cm  
   D. \( L_m = \frac{2}{L_{in} + L_{out}} \) cm
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| 1 | What is the synchronous speed of a A.C 3 phase induction motor having 6 poles at a frequency of 50 Hertz?  
A 800 rpm  
B 1000 rpm  
C 1200 rpm  
D 1440 rpm |
| 2 | Calculate the percentage slip in a 3 phase induction motor having 6 poles with a frequency of 50 Hertz rotating with actual speed of 960 rpm?  
A 2%  
B 3%  
C 4%  
D 5% |
| 3 | What is the rotor frequency of a 3 phase squirrel cage induction motor at the time of starting?  
A Equal to supply frequency  
B 3 times less than supply frequency  
C 3 times more than supply frequency  
D $\frac{\sqrt{3}}{2}$ times less than supply frequency |
| 4 | How the voltage is received in the rotor of induction motor?  
A Direct connection from stator  
B Due to back emf produced in stator  
C Direct connection to rotor from supply  
D By the transformer action of stator and rotor |
| 5 | Which method is applied to control the speed of 3 phase squirrel cage induction motor from its rotor side?  
A Cascade operation  
B Changing applied voltage  
C Changing applied frequency  
D Changing the number of poles |
| 6 | Which loss of 3 phase induction motor is determined by blocked rotor test?  
A Copper loss  
B Friction loss  
C Hysteresis loss  
D Eddy current loss |
| 7 | Why pre heating is necessary for motors before varnishing in rewinding process?  
A To dry the varnish quickly in winding  
B To easy flow of varnish in the winding  
C To increase the insulation resistance value  
D To drive out the moisture in between winding layers |
| 8 | Which type of test is conducted using internal growler in AC motor winding?  
A Ground test  
B Polarity test  
C Continuity test  
D Short circuit test |
| 9 | Which device is used to test starter winding short and open fault?  
A Tong Tester  
B Internal Growler  
C External Growler  
D Digital multimeter |
| 10 | What is the purpose of using thermal cutout in addition to fuse in A.C motor circuit?  
A Protect from heavy load  
B Protect against high voltage  
C Allow for continuous over loading  
D Protect against dead short circuit |
| 11 | Which type of motor is used to provide high starting torque at variable speed?  
A Universal motor  
B Permanent capacitor motor  
C 3 Phase slip ring induction motor  
D 3 Phase single squirrel cage induction motor |
| 12 | What is the relation between torque and slip in an A.C induction motor?  
A Slip increases torque decreases  
B Slip increases torque increases  
C Slip decreases torque increases  
D Slip decreases torque decreases |
| 13 | What is effect of A.C induction motor if rotor bar is in open circuit?  
A Vibration of shaft  
B Motor will not start  
C Runs in slow speed  
D Over heating of motor |
14. Which type of wire is used for rewinding of A.C 3 phase motors?
   A. Super enamelled copper wire
   B. PVC covered copper winding wire
   C. Single cotton covered copper wire
   D. Double cotton covered copper wire

15. Which material is used as wedges in winding process?
   A. Empire
   B. Cotton
   C. Bamboo
   D. Terylene

16. Which test in winding is essential before giving supply?
   A. Ground test
   B. Polarity test
   C. Open circuit test
   D. Short circuit test

17. Why the rotor bars are mounted in a slightly skewed position in 3 phase motor?
   A. Generate maximum flux
   B. Reduce the stray losses
   C. Maintain the rotor speed constant
   D. Produce more uniform rotor field and torque

18. Which loss is determined by no load test of 3 phase induction motor?
   A. Iron loss
   B. Copper loss
   C. Friction loss
   D. Windage loss

19. Which method of speed control two variable speeds only obtained in 3 phase motor?
   A. By rotor rheostat control
   B. By changing applied frequency
   C. By changing the applied voltage
   D. By changing the number of stator poles

20. Why slip ring induction motor is fitted with wound rotor?
   A. To reduce the slip
   B. To control the speed
   C. To reduce the losses
   D. To get high starting and running torque

21. What is the function of timer in automatic star delta starter?
   A. Trip at over load
   B. Switch ON at pre set time
   C. Change from star to delta
   D. Switch OFF at pre set time

22. Which instrument is used to measure insulation resistance of a 3 phase induction motor?
   A. Megger
   B. Multimeter
   C. Shunt type ohmmeter
   D. Series type ohmmeter

23. Which test in winding is illustrated?

24. What is the starting current of an A.C 3 phase induction motor?
   A. 1 to 2 times of full load current
   B. 2 to 3 times of full load current
   C. 4 to 5 times of full load current
   D. 5 to 6 times of full load current

25. Which method is used to control the speed of 3 phase induction motor from stator side?
   A. By cascade operation
   B. By rotor rheostat control
   C. By injecting emf in rotor circuit
   D. By changing the applied frequency

26. What is the speed control method of 3 phase induction motor?
   A. Cascade operation method
   B. Rotor rheostat control method
   C. Changing applied voltage method
   D. Injecting emf in rotor circuit method
27. What are the two functional circuits incorporated with a three phase motor starter?
   A. Open circuit and short circuit
   B. Closed circuit and open circuit
   C. Short circuit and closed circuits
   D. Control circuit and power circuit

28. Which is the main property of leatheroid paper insulation?
   A. Non moisturized material
   B. Highly non-hygroscopic
   C. Very good for class F insulation
   D. Better ageing and dielectric strength

29. Which type of insulating material is selected for binding the coils and over hangs?
   A. Cotton sleeves
   B. Empire sleeves
   C. Terylene thread
   D. Fibre glass tape

30. Which insulation is used for cuffing in AC winding?
   A. Fibre glass tape
   B. Leatheroid paper
   C. Empire fiber glass tape
   D. Fabric based adhesive tape

31. What refers coil in AC winding?
   A. Number of turns connected in series
   B. Number of turns connected in parallel
   C. Number of turns under two similar poles
   D. Number of turns under two dissimilar poles

32. Which type of AC winding the number of coil/pole/phase is more than one at different pitches?
   A. Involute coil winding
   B. Diamond coil winding
   C. Flat loop over lapped winding
   D. Flat loop non-over lapped winding

33. Calculate the number of coils/phase/pole for a 3 phase double layer distributed winding for a motor having 36 slots, 36 coils and 4 poles?
   A. 3 coils/phase/pole
   B. 6 coils/phase/pole
   C. 9 coils/phase/pole
   D. 12 coils/phase/pole

34. What is the type of rewinding process?
   A. Hand winding
   B. Skein winding
   C. Former winding
   D. Machine winding

35. What is the purpose of using thermal cutout in addition to fuse in motor circuits?
   A. Over load protection
   B. Over voltage protection
   C. Dead short circuit protection
   D. Continuous over loading protection

36. Which type of starter is used to start and run the 3 phase slip ring induction motor?
   A. Direct on-line starter
   B. Rotor rheostat starter
   C. Auto transformer starter
   D. Manual star-delta starter

37. Which copper wire is used to wind small capacity transformers?
   A. PVC coated copper wire
   B. Cotton covered copper wire
   C. Super enamelled copper wire
   D. Silk cotton covered copper wire

38. What is the function of collar?
   A. Provides insulation around field
   B. Provides insulation for coil tapping
   C. Helps tightening material for flange
   D. Provides insulation for heat transfer from coil

39. Which type of winding wire is used to wind submersible pump motors?
   A. PVC covered type
   B. Terylene thread type
   C. Super enamelled type
   D. Double cotton covered type
40 What is the reason of long chord winding is avoided in AC motors?
A Low efficiency
B Low starting torque
C More winding wire required
D Control the increased heat loss

41 Which type of winding has more space for cooling?
A Between overhanging coils
B Between overhanging coil and rotor
C Between overhanging coils and yoke
D Between overhanging coil and wedge

42 Where the panel boards are used?
A Industrial motor drives
B Domestic wiring circuits
C 3 phase domestic wiring
D Load distribution for AC & DC supply

43 Determine the torque in newton metres produced by a 7.5 HP squirrel cage motor rotating at 1440 rpm?
A 21.63 Nm
B 24.4 Nm
C 33.05 Nm
D 36.6 Nm

44 Which type of handle design of rotary switch is illustrated?
A Knob
B Lever
C Coin slot
D Key operation

45 What is the purpose of using rotor resistance starter to start 3 phase slip ring induction motor?
A Reduce rotor voltage
B Reduce rotor current
C Increase the torque
D Reduce the power loss

46 Which method of speed control is only applicable for 3 phase slipring induction motor?
A Cascade operation method
B Rotor rheostat speed control
C Changing the applied frequency method
D Changing the number of stator poles method

47 What is the name of the winding?
A Skew winding
B Skein winding
C Involute coil winding
D Diamond coil winding

48 What is the name of 3 phase motor winding, if the coil pitch is less than pole pitch?
A Full pitch winding
B Whole coil winding
C Long chocked winding
D Short chocked winding

49 Which is the demerit of 3 phase concentric winding?
A More space is required
B A stepped former is required
C More difficult to shape the coils uniformly
D It is not easy to make the end connection

50 What is the name of the diagram used for 3 phase motor winding?
A Ring diagram
B Development diagram
C Coil connection diagram
D End connection diagram
51. Calculate the phase displacement in terms of slots for a 3 phase, 36 slots, 12 coils, 4 pole stator winding?
   A. 3 slots
   B. 4 slots
   C. 6 slots
   D. 8 slots

52. Which type of AC motor winding having the number of coil/pole/phase is more than one arranged in different slots?
   A. Basket winding
   B. Concentric winding
   C. Distributed winding
   D. Concentrated winding

53. Which type of testing of winding is illustrated?

   A. Polarity test
   B. Resistance test
   C. Short circuit test
   D. Voltage drop test
Question : Level 3

1. Why external resistance is included in the rotor circuit at starting through 3 phase slipring induction motor starter?
   A) To get high running torque
   B) To get high starting torque
   C) To reduce the load current
   D) To get increased speed at starting

2. What is the effect of motor, if the rotor windings in slipring induction motor is open circuited at starting?
   A) Will not run
   B) Runs at slow speed
   C) Runs at very high speed
   D) Runs but not able to pull load

3. What happens to a 3 phase induction motor if one phase fails during running?
   A) Motor runs normally
   B) Motor stops instantaneously
   C) Motor runs slowly, finally it burns
   D) Motor runs with irregular speed

4. What is the effect on 3 phase induction motor if one phase is cut-off during running with load?
   A) Motor stops at once
   B) Motor will run normally
   C) Motor runs with humming noise with slow speed
   D) Motor will run slow speed but winding will be burnt out shortly

5. What is the defect if starter with single phasing preventer does not switch 'ON'?
   A) Improper phase sequence
   B) Fluctuations in line voltage
   C) Loose contact in supply lines
   D) Wrong terminal connections at motor

6. What is the defect in AC 3 phase induction motor runs at low speed if loaded?
   A) Wrong motor connection
   B) Wrong starter connection
   C) Open circuit in rotor winding
   D) Partially shorted in stator winding

7. Which fault condition thermal overload relay protects A.C induction motor?
   A) Short circuit
   B) Open circuit
   C) Over current
   D) Under voltage

8. What happens to the rotor of a 3 phase induction motor if its speed attains to synchronous speed?
   A) Rotor speed reduces
   B) Rotor speed increases
   C) Rotor speed remains same
   D) Rotor bars get damaged

9. What is the effect of open circuit in rotor of an induction motor?
   A) Motor does not start
   B) Over heating in motor
   C) Excess vibration of shaft
   D) Motor runs with very low speed

10. What is the reason for frequent blowing of fuse after motor running some time?
    A) Improper earthing
    B) Over loading of motor
    C) Heavy voltage fluctuation
    D) Poor insulation in winding

11. What happens to a 3 phase induction motor, if one phase fails during starting?
    A) Motor runs and stop immediately
    B) Motor runs in slow speed continuously
    C) Motor runs and draws more current
    D) Motor continues to run with irregular speed

12. Which is the cause for the 3 phase motor starter with single phase preventer trips frequently?
    A) Incorrect fuse ratings
    B) Unbalanced line voltages
    C) Incorrect settings of OLR
    D) Improper phase sequence

13. What indication denotes the shorted coil defect in 3 phase motor stator winding while testing with internal growler by keeping hacksaw blade?
    A) Hacksaw blade gets over heated
    B) Rapid vibration of hacksaw blade
    C) Hacksaw blade repels against the slots
    D) Attracted by the winding turns on the slot
### Module 3: AC Three phase motor - Key paper

#### Questions: Level 1

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Electrician - 3rd Semester - Module 4 : AC Single Phase Motor

Questions : Level 1

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<td>What is the name of single phase motor?</td>
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<td>Which type of single phase motor is illustrated?</td>
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Questions : Level 2

1. Which type of A.C single phase motor is classified under commutator motor type?
   A. Stepper motor
   B. Repulsion motor
   C. Shaded pole motor
   D. Permanent capacitor motor

2. Which method is adopted to start the single phase induction motor?
   A. Split phase method
   B. Varying supply voltage method
   C. Reversal of input supply terminals
   D. Reversal of running coil connection

3. What is the type of A.C single phase motor?
   A. Permanent capacitor motor
   B. Capacitor start capacitor run motor
   C. Induction start induction run motor
   D. Capacitor start induction run motor

4. What is the purpose of the capacitor (C) in centrifugal switch speed control method of universal motor?

   A. Maintain constant speed
   B. Improve the power factor
   C. Protect from the over loading
   D. Reduce the sparks on the contacts

5. Which type of winding wire is used for rewinding submersible pumps?
   A. PVC covered copper wire
   B. Super enamelled copper wire
   C. Single cotton covered copper wire
   D. Double cotton covered copper wire

6. Which type of AC single phase motor having low starting torque?
   A. Induction start induction run motor
   B. Capacitor start induction run motor
   C. Capacitor start capacitor run motor
   D. Resistance start induction run motor

7. What is the function of centrifugal switch in single phase motors?
   A. Maintain constant speed
   B. Break the starting winding
   C. Break the running winding
   D. Protect the motor from over loading

8. Which is the application of universal motor?
   A. Jet pump
   B. Food mixer
   C. Teleprinter
   D. Compressor

9. Which single phase motor is fitted with wound rotor?
   A. Repulsion motors
   B. Shaded pole motors
   C. Permanent capacitor motors
   D. Capacitor start capacitor run motors

10. What is the relation between running winding and starting winding of a single phase induction motor with respect to resistance?
    A. Both resistances will be equal
    B. Running winding is less, starting winding more
    C. Running winding is more, starting winding less
    D. Running winding is less, starting winding infinity

11. What is the function of the part marked ‘x’ in shaded pole motor?
    A. Increase the efficiency
    B. Maintain constant speed
    C. Initiate the rotor movement
    D. Strengthen the magnetic field
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| 12              | How the direction of rotation of a capacitor start induction run motor is reversed? | A. By changing the supply terminals  
                      B. By changing the capacitor connections  
                      C. By interchanging main winding terminals  
                      D. By interchanging both main and auxiliary winding terminals |
| 13              | Which single phase motor tapped field speed control method is employed? | A. Universal motor  
                      B. Shaded pole motor  
                      C. Capacitor start induction run motor  
                      D. Capacitor start capacitor run motor |
| 14              | Which type of single phase induction motor is used in food mixer? | A. Universal motor  
                      B. Repulsion motor  
                      C. Shaded pole motor  
                      D. Permanent capacitor motor |
| 15              | What is the angular displacement between starting and running winding of a single phase induction motor? | A. 45 electrical degree  
                      B. 60 electrical degree  
                      C. 90 electrical degree  
                      D. 120 electrical degree |
| 16              | Why the hysteresis motor is suitable for sound recording instruments? | A. Small in size  
                      B. High efficiency  
                      C. Noiseless operation  
                      D. Less error operation |
| 17              | Which motor is preferred for domestic water pumps? | A. Universal Motor  
                      B. Repulsion motor  
                      C. Shaded pole motor  
                      D. Capacitor start motor |
| 18              | Which type of motor has relatively small starting torque? | A. Universal motor  
                      B. Capacitor start capacitor run motor  
                      C. Capacitor start induction run motor  
                      D. Resistance start induction run motor |
| 19              | What is the function of centrifugal switch in single phase motor? | A. Protects from over current  
                      B. Maintains constant speed  
                      C. Protect the motor from over loading  
                      D. Make and break the starting winding from supply |
| 20              | How to produce starting torque in a shaded pole fan motor? | A. Using rings on poles  
                      B. Using capacitor on winding circuits  
                      C. Interchanging cage rotor windings by switch  
                      D. Interchanging the field coil windings by switch |
| 21              | What is the reason to use a permanent capacitor in fan motor circuit? | A. Speed regulation  
                      B. Lower power consumption  
                      C. Splitting of phase for torque  
                      D. Controlling electrical interference |
| 22              | Which motor is having half coil winding? | A. Mixer  
                      B. Grinder  
                      C. Ceiling fan  
                      D. Washing machine |
| 23              | Why running winding is placed in the bottom of the core? | A. To get low resistance  
                      B. To get low inductance  
                      C. To get high resistance  
                      D. To get high inductance |
| 24              | Calculate the slot distance for a ceiling fan having 28 slots, 14 poles, 14 coils in half coil connection? | A. 90°  
                      B. 120°  
                      C. 180°  
                      D. 240° |
| 25              | What is the application of shaded pole motor? | A. Hair dryer  
                      B. Ceiling fan  
                      C. Wet grinder  
                      D. Washing machine |
26 Which type of single phase motor is used for hard disk drives?
A Stepper motor
B Repulsion motor
C Hysteresis motor
D Reluctance motor

27 What is the function of centrifugal switch used in capacitor start, capacitor run induction motor?
A Disconnect the running winding after reached 75% to 80% speed
B Disconnect the starting winding after reached 75% to 80% speed
C Disconnect the starting capacitor after reached 75% to 80% speed
D Disconnect the starting and running winding after reached 75% to 80% speed

28 Which type of single phase motor is having very high starting torque than any other type of single phase motor?
A Universal motor
B Reluctance motor
C Repulsion start induction run motor
D Capacitor start induction run motor

29 Where the capacitor is connected in a single phase permanent capacitor motor?
A In series with starting winding
B In series with running winding
C In parallel with starting winding
D In parallel with running winding

30 Which motor is used in table fan?
A Universal motor
B Shaded pole motor
C Eddy current motor
D Permanent capacitor motor
Questions: Level 3

1. What is the effect, if coil group connection is wrongly connected in a single phase motor rewinding?
   A. Motor runs slowly
   B. Motor will not run
   C. Motor runs in very high speed
   D. Motor runs and takes more current at no load

2. What is the effect in a repulsion motor, if the magnetic axis shifted to another side?
   A. Direction of rotation will change
   B. Direction of rotation remains same
   C. Motor speed increases from rated speed
   D. Motor speed will reduce from rated speed

3. What is the effect if the centrifugal switch is not disconnected after the motor starts?
   A. Motor will run normally
   B. Motor will stop immediately
   C. Starting winding will burn out
   D. Motor will run very slow speed

4. How the direction of rotation of repulsion motors is to be reversed?
   A. By shifting the brush-axis
   B. By interchanging the supply terminals
   C. By changing the main winding terminals
   D. By changing the compensating winding terminals

5. Why a capacitor is connected across centrifugal switch in the centrifugal switch speed control method?
   A. To maintain constant speed
   B. To protect from over loading
   C. To improve the power factor
   D. To reduce the sparks in contacts

6. What is the effect, if some slots in a split phase motor left out without winding after completion of concentric winding?
   A. Works normally
   B. Reduction in speed
   C. Reduction in torque
   D. Runs with very high speed

7. How the radio interference can be suppressed in centrifugal switch method of speed control of universal motor?
   A. By connecting capacitor across centrifugal switch
   B. By connecting capacitor in series with centrifugal switch
   C. By adding compensating winding with armature
   D. By connecting an inductor in series with centrifugal switch
   D. Poor insulation in winding
## Module 4: AC Single Phase Motor - Key paper

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### Questions: Level 3

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Questions : Level 1

1. Which formula is used to calculate EMF/phase in an ideal alternator?
   A. \( E = \frac{\phi F T}{2.22} \)
   B. \( E = \frac{\phi F T}{4.44} \)
   C. \( E = 2.22 \phi F T \)
   D. \( E = 4.44 \phi F T \)

2. Which rule is used to find the direction of induced emf in an alternator?
   A. Cork screw rule
   B. Right hand palm rule
   C. Fleming’s left hand rule
   D. Fleming’s right hand rule

3. What is the name of the part of alternator?
   A. Stator
   B. Exciter
   C. Salient pole rotor
   D. Smooth cylindrical rotor

4. What is the formula to calculate emf equation of an alternator?
   A. \( E = 4.44 K_d K_c T \phi_m \)
   B. \( E = 2.22 K_d K_c F \phi_m \)
   C. \( E = 4.44 K_d K_c F T \phi_m \)
   D. \( E = 1.11 K_d K_c F \phi_m \)

5. How alternators are rated?
   A. KVA
   B. KW
   C. MW
   D. KV

6. Which formula is used to calculate the percentage voltage regulation in alternator?
   A. \( \frac{V_{fl} - V_{nl}}{V_{fl}} \times 100 \)
   B. \( \frac{V_{nl} - V_{fl}}{V_{fl}} \times 100 \)
   C. \( \frac{V_{nl} - V_{fl}}{V_{nl}} \times 100 \)
   D. \( \frac{V_{fl} - V_{nl}}{V_{nl}} \times 100 \)

7. What is the formula to calculate R.M.S value of emf / phase if ‘T’ is number of turns of alternator?
   A. \( E = 4.44 FT \)
   B. \( E = 2.22 \phi T \)
   C. \( E = 2.22 \phi FT \)
   D. \( E = 4.44 \phi FT \)

8. What is the supply frequency of an alternator having 6 poles runs at 1000 rpm?
   A. 25 Hz
   B. 40 Hz
   C. 50 Hz
   D. 60 Hz
Questions : Level 2

1. Calculate the speed of an alternator having 2 poles at a frequency of 50 Hz?
   A. 1500 rpm
   B. 2500 rpm
   C. 3000 rpm
   D. 6000 rpm

2. What condition the lamps become dark in dark lamp method of parallel operation of two alternators?
   A. Terminal voltages are equal
   B. Voltage and frequency are equal
   C. Voltage and power rating are equal
   D. Frequency are same in both alternator

3. How to compensate de-magnetizing effect due to armature reaction in an alternator?
   A. Reducing the speed of alternator
   B. Reducing field excitation current
   C. Increasing field excitation current
   D. Increasing the speed of alternator

4. What is the use of synchroscope?
   A. Adjust the output voltage
   B. Adjust the phase sequence
   C. Adjust the supply frequency
   D. Indicate the correct instant for paralleling

5. What is the name of the equipment that provides D.C to the rotor of alternator?
   A. Exciter
   B. Inverter
   C. Converter
   D. Synchroniser

6. What is the purpose of damper winding in alternator?
   A. Reduces the copper loss
   B. Reduces windage losses
   C. Reduces the hunting effect
   D. Improves the voltage regulation

7. Which condition is to be satisfied before parallel operation of alternators?
   A. Rating must be same
   B. Phase sequence must be same
   C. Rotor impedance must be same
   D. Stator impedance must be same

8. What is the speed of an alternator connected with a supply frequency of 50 Hz at rated voltage having 4 poles?
   A. 1000 rpm
   B. 1500 rpm
   C. 3000 rpm
   D. 4500 rpm

9. What condition the two lamps become bright and one lamp dark during paralleling of two alternators?
   A. Terminal voltages are equal
   B. Voltages and frequencies are equal
   C. Voltages and phase sequence are equal
   D. Both the alternators receive same frequency

10. What causes the terminal voltage of an alternator reduces, if the load increases?
    A. Field resistance
    B. Armature reaction
    C. Inductive reactance
    D. Armature resistance

11. What is the purpose of using damper winding in an alternator?
    A. Prevents heating
    B. Reduces copper loss
    C. Reduces windage loss
    D. Prevents the hunting effect

12. What is the type of alternator?
    A. Brushless alternator
    B. Three phase alternator
    C. Single phase alternator
    D. Salient pole type alternator

13. Calculate the speed in r.p.s of the 2 pole, 50Hz alternator?
    A. 50 rps
    B. 100 rps
    C. 1500 rps
    D. 3000 rps
14 What is the advantage of using rotating field type alternator?
A  Easy to locate the faults in the field
B  Easy to connect the load with alternator
C  Easy to dissipate the heat during running
D  Two slip rings only required irrespective of No. of phases

15 What is the effect in increasing the field excitation current in alternator?
A  Prevents demagnetizing
B  Over voltage protection
C  Dead short circuit protection
D  Alternator will be over loaded
Questions : Level 3

1. Calculate the pitch factor \(K_p\) for a winding having 36 stator slots 4 pole with angle \((\alpha)\) is 30\(^\circ\) in alternator?
   A. 0.942
   B. 0.965
   C. 0.978
   D. 0.985

2. What is the cause for hunting effect in alternators?
   A. Due to over load
   B. Running without load
   C. Running with fluctuation of speed
   D. Due to continuous fluctuation in load

3. How to compensate de-magnetizing effect due to armature reaction in an alternator?
   A. By reducing the speed of alternator
   B. By increasing the speed of alternator
   C. By increasing the field excitation current
   D. By decreasing the field excitation current

4. Calculate the voltage regulation in percentage if the load is removed from an alternator, the voltage rises from 480V to 660V?
   A. 27.2%
   B. 32.5%
   C. 37.5%
   D. 38.5%
**Module 5: Alternator - Key paper**

### Questions: Level 1

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## Electrician - 3rd Semester - Module 6: Synchronous Motor and MG Set

### Questions : Level 1

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<td>Motor-Generator set</td>
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Questions : Level 2

1. Why D.C supply is necessary for synchronous motor operation?
   A. Reduce the losses
   B. Start the motor initially
   C. Run the motor with over load
   D. Run the motor at synchronous speed

2. Which acts as both inverter and converter?
   A. Metal rectifier
   B. Mercury arc rectifier
   C. Semi conductor diode
   D. Synchronous converter

3. What is the function of inverter?
   A. Convert A.C to D.C
   B. Convert D.C to A.C
   C. Smoothening A.C sine wave
   D. Convert pulsating DC into pure D.C

4. Which converting device can be over loaded?
   A. Rectifier unit
   B. Rotary converter
   C. Motor generator set
   D. Mercury arc rectifier

5. Why exciter is essential to run a synchronous motor?
   A. Carry more load in motor
   B. Improve the power factor
   C. Reduce the losses in motor
   D. Run the motor at synchronous speed

6. Which application requires only DC?
   A. Electroplating
   B. Stepping up of voltage
   C. Operating induction motor
   D. Operating repulsion motor

7. Why the LED’s are avoided as converters in rectifier diodes?
   A. Heavily doped device
   B. Very low power device
   C. Designed for light emitting
   D. Very sensitive to temperature

8. Which is the main application of synchronous motors?
   A. Elevators
   B. Paper rolling mills
   C. AC to DC converter
   D. Power factor correction device

9. What is the advantage of motor generator set?
   A. Noiseless
   B. High efficiency
   C. Low maintenance required
   D. DC output voltage can be easily controlled

10. What is the function of the part marked ‘X’ of the rotary converter?

11. Why D.C supply is necessary for synchronous motor operation?
    A. Reduce the losses
    B. Start the motor initially
    C. Run the motor with over load
    D. Run the motor at synchronous speed

12. Which acts as both inverter and converter?
    A. Metal rectifier
    B. Mercury arc rectifier
    C. Semi conductor diode
    D. Synchronous converter

13. What is the purpose of damper winding in a synchronous motor at starting?
    A. Produce high voltage to initiate the rotation
    B. Produce high current to start rotate the motor
    C. Produces torque and runs near in synchronous speed
    D. Produce a high magnetic-field to maintain a constant speed
### Questions : Level 3

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<td>B Defective pony motor</td>
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<td>C Open in damper winding</td>
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<td>D Short in damper winding</td>
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<td>D Mercury arc rectifier</td>
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<td>How the synchronous motor is used as a synchronous condenser?</td>
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<td>A Varying the motor load</td>
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<td>B Varying the rotor excitation</td>
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<td>C Varying stator voltage in motor</td>
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<td>D Varying stator current in motor</td>
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<td>What is the function of damper windings in synchronous motor?</td>
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<td>A Maintain power factor</td>
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<td>B Excite the field winding</td>
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<td>D Start the synchronous motor</td>
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**4** Which converter is having high efficiency?

A. SCR converter
B. Rotary converter
C. Motor generator set
D. Mercury arc rectifier

**5** How synchronous motor works as a power factor corrector?

A. Varying the line voltage
B. Varying the field excitation
C. Increasing the speed of motor
D. Decreasing the speed of motor
### Module 6: Synchronous Motor and MG set - Key paper

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