

**TESTING AND MAINTENANCE OF ELECTRICAL  
EQUIPMENT ,CODE (26753).**


**5<sup>TH</sup> SEMESTER ELECTRICAL.**

WELCOME TO MY PRESENTATION BY

ENGR: MD. SHAKIBUL HASAN

*ELECTRICAL TECHNOLOGY,MYMENSINGH POLYTECHNICE  
INSTITUTE.*

**TO PROVIDE THE STUDENTS OPPORTUNITIES TO ACQUIRE KNOWLEDGE, SKILLS AND ATTITUDE IN THE AREA OF TESTING AND MAINTENANCE OF ELECTRICAL EQUIPMENT WITH THE SPECIAL EMPHASIZES ON:**

- 1. TROUBLE SHOOTING AND MAINTENANCE OF ELECTRICAL EQUIPMENT,**
  - 2. FAULTS FINDINGS AND REMEDY THE FAULTS OF BATTERY, DC GENERATORS, DC MOTORS,**
  - 3. FAULTS FINDINGS AND REMEDY THE TROUBLES TRANSFORMERS, INDUCTION MOTORS, ALTERNATORS,**
  - 4. FAULTS FINDINGS AND REMEDY THE TROUBLES SYNCHRONOUS MOTOR AND CIRCUIT BREAKER**
- 

**TO PROVIDE THE STUDENTS OPPORTUNITIES TO ACQUIRE KNOWLEDGE, SKILLS AND ATTITUDE IN THE AREA OF TESTING**

**AND MAINTENANCE OF ELECTRICAL EQUIPMENT WITH THE SPECIAL EMPHASIZES ON:**

- TROUBLE SHOOTING AND MAINTENANCE OF ELECTRICAL EQUIPMENT,**
- FAULTS FINDINGS AND REMEDY THE FAULTS OF BATTERY, DC GENERATORS, DC MOTORS,**
- FAULTS FINDINGS AND REMEDY THE TROUBLES TRANSFORMERS, INDUCTION MOTORS, ALTERNATORS,**
- FAULTS FINDINGS AND REMEDY THE TROUBLES SYNCHRONOUS MOTOR AND CIRCUIT BREAKER**

**Identify the hand tools and equipment for trouble shooting and maintenance of electrical equipment.**



# What is the name of a hand tool?



There is a huge range of tools and they all perform different functions, but 10 of the most commonly used are a hammer, a screwdriver, a mallet, an axe, a saw, a wrench, a chisel, pliers, a drill, and a tape measure

# How many types of electrical tools are there?



## Electrical Hand Tools



So, now that we've covered the tools needed for electrical projects, you can see that many are traditional and widely used tools, such as drills, tape measures and levels, screwdrivers and pliers. Others are more specialized, and essential for electrical work, such as millimeters, fish tapes, and wire strippers.


# CHAPTER -2

Find the trouble and repair the troubles of Batteries, DC Generator and DC Motors.

After the session student will be able to do the following Topics.

- 1 Identify the troubles of Batteries
- 2 Explain the troubles of the storage Batteries
- 3 Describe the process of repair and maintenance of storage batteries
- 4 Identify the Faults of DC Generator and Dc Motor
- 5 Explain the faults of the Dc Generator and Dc Motor
- 6 Describe the process of repair and maintenance of DC Generator and Dc Moto

# IDENTIFY THE TROUBLES OF BATTERIES

- Physical Damage
  - Sulphation
  - Wear and Tear
  - Deep Cycling
  - Overcharging
  - False Claim
  - Incorrect Application
  - Undercharging
  - Battery Problems
  - Manufacturing Faults
  - Short Circuit/dead cell
  - Internal Break
- 

# DC MOTOR FAULTS REASONS OF FAILURE

- 1. Failure to start
- 2. Sparking at brushes
- 3. Vibrations and pounding noises
- 4. Overheating of DC Motor
- 1. ground fault
- 2. open or short-circuit fault
- 3. wrong connections
- 4. too low supply voltage
- 5. frozen bearing
- 6. excessive load.



# THE PROCESS OF REPAIR AND MAINTENANCE OF DC GENERATOR AND DC MOTO

## DC Generator Maintenance

- Noise and Vibration Inspections.
- Reviewing the Service History.
- Windings Tests.
- Visual Inspection.
- Bearings and Lubrication.
- Brush and Commutator Maintenance.

## DC Generator Repairing Process

- Your generator's electrical components are broken
- Your generator leaks fuel
- Your generator starts up slowly
- Your generator is physically damaged

# CHAPTER -3




Indicate the faults and remedy the faults of single phase and three phase transformer.

After the session student will be able to do the following Topics.

- List the name the Faults of single phase Transformer
- Explain the faults of single phase Transformer
- Describe the process of repair and maintenance of single phase Transformer
- Mention the Faults of three phase Transformer
- Explain the faults of three phase Transformer
- Describe the process of repair and maintenance three phase Transformer

# THE FAULTS OF SINGLE PHASE TRANSFORMER

- Over heating
  - Winding faults
  - Open circuits
  - External faults
  - Over fluxing
  - Earth faults
  - Phase faults
  - Inter turn faults
  - Core faults
  - Tank faults and cooling failure
  - Tap changer faults
- 


# THE PROCESS OF REPAIR AND MAINTENANCE OF SINGLE PHASE TRANSFORMER

It is important to note some of the essential maintenance tips to ensure your transformers are running efficiently.

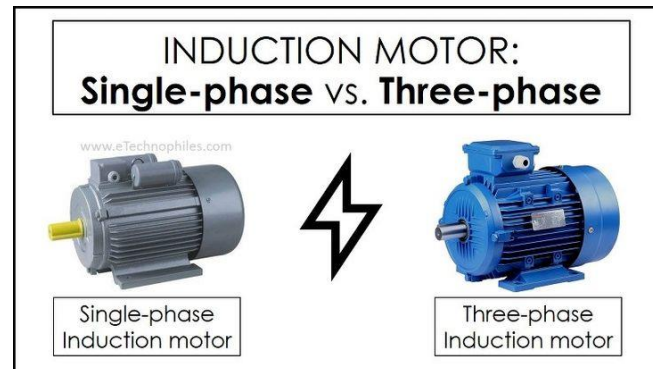
- Ensure the transformers are not overloaded. ...
- Conduct regular checks on the oil. ...
- Keep an eye on the silica gel. ...
- Conduct regular testing on the transformers. ...
- Get an expert's opinion

# THE PROCESS OF REPAIR AND MAINTENANCE THREE PHASE TRANSFORMER

## MAINTENANCE PROCEDURE

- Sludge, dust, dirt ,moisture can be removed by filtration.
  - Oil when topped up shall be of the same make. ...
  - Insulation resistance of the transformer should be checked once in 6 months.
  - Megger values along with oil values indicate the condition of transformer.
- 

# CHAPTER -4




Outline the probable faults of single phase and three phase Induction motor.


After the session student will be able to do the following Topics.

- List the name the Faults of single phase Induction Motor
- Illustrate the faults of single phase Induction Motor
- Describe the process of repair and maintenance of single phase Induction Motor
- Mention the Faults of three phase Induction Motor
- Explain the faults of three phase Induction Motor
- Demonstrate the process of repair and maintenance three phase Induction Motor

# THE FAULTS OF SINGLE PHASE INDUCTION MOTOR

- Broken rotor bars
  - Phase to phase short circuit fault
  - Line to phase short circuit fault
  - Crossing the stator thermal limit
  - Crossing the rotor thermal limit
  - Stator open circuit fault
- 

# THE PROCESS OF REPAIR AND MAINTENANCE OF SINGLE PHASE INDUCTION MOTOR

- Clean the motor completely, blowing dirt out of the windings and wiping the commutator and brushes.
  - Replace any brushes that are more than half worn.
  - Examine brush holders and, if necessary, clean them.
  - Drain, clean, and refill the oil in the sleeve bearings.
- 



# EXPLANATION OF THE FAULTS OF THREE PHASE INDUCTION MOTOR

- Stator faults: These can include short circuits, open circuits, and insulation breakdown in the stator windings, which can lead to reduced efficiency and motor performance.
- Rotor faults: Common rotor faults include broken rotor bars, cracked end rings, and rotor eccentricity, which can cause unbalanced magnetic fields and lead to motor vibration and reduced performance.
- Bearing faults: Bearing faults, such as wear, misalignment, or lack of lubrication, can lead to increased friction, overheating, and eventual bearing failure.
- Overheating: Overheating can be caused by factors such as overloading, voltage imbalance, or poor ventilation, and can lead to insulation degradation and motor failure.
- Electrical faults: These can include phase unbalance, voltage fluctuations, and power supply issues, which can affect the motor's performance and longevity.

Proper maintenance and regular inspections can help mitigate these faults and ensure the smooth operation of 3-phase induction motors

# THE METHOD OF MAINTENANCE OF A THREE-PHASE INDUCTION MOTOR

Check and make sure the frame or terminal box of the motor is grounded .  
Insulation Resistance. To test the stator and rotor windings by their terminal connectors . Testing device of 500V be used to test stator windings below 3KV. Stator windings above 3KV be tested by 1000V device

Proper maintenance and regular inspections can help mitigate these faults and ensure the smooth operation of 3-phase induction motors

# CHAPTER -5


The trouble and remedy the troubles of Circuit breaker



After the session student will be able to do the following Topics.

- Express the trouble and remedy the troubles of Circuit breaker
- List the name the Faults of Circuit breaker
- Illustrate the faults of Circuit breaker
- Describe the process of repair and maintenance of Circuit breaker

# THE TROUBLE AND REMEDY THE TROUBLES OF CIRCUIT BREAKER

- Identify the tripped breaker. On the circuit breaker box, the tripped breaker will be between the “on” and “off” positions.
  - Turn off all appliances. Make sure to unplug or turn off any device connected to the tripped breaker.
  - Test your circuit breaker.
  - Check for loose electrical wiring
- 

# THE PROCESS OF REPAIR AND MAINTENANCE OF CIRCUIT BREAKER

- Evaluate, Clean, Service and Test.
  - Insulating parts which include bushings should be wiped down and cleaned.
  - Check fault operations.
  - Trip Testing to ensure manufacturer standards.
  - Inspection of alignment conditions and stationary contacts.
  - Remove damaged parts
- 