



I. R. D. T
INSTITUTE OF RESEARCH DEVELOPMENT AND TRAINING

SYLLABUS

SIX MONTHS – FULL TIME

Repair and Maintenance of Electrical gadgets

EFFECTIVE FROM:-



UNDER DEVELOPMENT

**Prepared By:
Curriculum Development Cell**

**INSTITUTE OF RESEARCH DEVELOPMENT AND TRAINING
KANPUR**

Repair and Maintenance of Electrical gadgets

Name : Repair and Maintenance of Electrical gadgets
Duration : 24 Weeks

Terminal competency : The participant will be able to

1. Observe the safety precautions while working
2. Test line cord for continuity with test lamp/multimeter
3. Prepare a heating element for a heater as required specification.
4. Replace the old element for heater, kettle, non –automatic electronic iron, room heaters etc., with a new one
5. Dismantle and reassemble an electric iron, heater, kettle, room heater, toaster, hair dryer, mixie etc.
6. Install a ceiling fan and the regulator.
7. Check a fluorescent lamp chock, starter and install it.
8. Understand the necessity of good earthing in an electrical installation.
9. Do the domestic installation testing before energizing a domestic installation.

Kindly mail your suggestions to director_irdt@rediffmail.com

Theory

1.	Safety practice – o Lifting and handling loads. o Heavy Equipments
2.	Safety practice – o Fire extinguishers o Types of fire extinguishers
3.	General safety of tools and equipments
4.	Electrical safety o Rescue a person who is in contact with live wire.
5.	o Treat a person for electric shock/injury.
6.	Introduction to Electricity Conductors and types of conductors Insulators and types of insulators Crimping & crimping tool Soldering
7.	Define simple electrical terms like voltage, current, resistance and their units.
8.	Simple series and parallel circuits
9.	Direct current and testing the polarity Alternating current and identifying phase, neutral and earth terminals
10.	Purpose of Earthing Types of Earthing. o Pipe Earthing o Plate Earthing
11.	Simple house wiring circuit.
12.	Install, service and repair all kinds of electrical home appliances
13.	Repair and rectification of an automatic electric iron, servicing and repairing of mixer, ceiling and table fan.
14.	Assemble and install a fluorescent lamp.
15.	Thermostat heat controls of Automatic electric iron, steam iron, spray irons. Understand home appliances like heater, iron, kettle ceiling fan, table fan, washing machine etc.
16.	Maintenance of decorative serial lamp for a required supply voltage
17.	Assemble, connect and install a twin fluorescent lamp with accessories
18.	Repair and service technique of cooking range, storage water heater, washing machines, wet grinders. Replace the heating element in a soldering.
19.	Introduction to re-winding Insulating material used
20.	Terminology used in single phase winding like pole pitch coil pitch etc.,
21.	Method of stripping the old winding and preparing the winding former and the coils.
22.	Preparation of winding data for given Motor.
23.	Procedure followed for re-winding of domestic electric motors like single phase A./C. motors, pump motors, ceiling fan motors, table fan motors, washing machine motors etc.
24.	Various methods used of inserting coil into the slots. Preparation of winding table , connection diagram, winding diagram for given Motor.
25.	Test to be done after re-winding-impregnation methods of winding

Practical

1. Safety practices – lifting and handling.
2. Safety practices – Fire fighting
3. Nature of working of tools and equipments.
4. Electrical safety practice o Rescue a person who is in contact with live wire.
5. Treat a person for electric shock/injury.
6. Prepare Terminations o Skinning Different types of cable ends o Make various joints in cable o Crimping cable ends. o Soldering the cable lugs
7. Simple electrical connections using resistance, voltmeter, and ammeter, multimeter
8. Connecting number of lamps in series connection.
9. Connecting number of lamps in parallel connection.
10. Testing the polarity of DC supply. Identification of phase and neutral in single phase supply
11. Carry out of pipe earthing Carry out of plate earthing
12. Repairing of house wiring faults.
13. General repair of heating iron, kettle, ceiling fan, table fan, washing machine etc.,
14. Test the fan capacitors. Clean and lubricate the bearing of ceiling and table fan, and check the speed. Regulator of both fan.
15. Measure the insulation resistance between the terminals and body of the appliance. Check the oscillator mechanisms of table fan
16. Select the fuse size according to the load of circuit
17. Dismantle and reassemble automatic iron, ceiling fan table fan cooking range, storage heater, washing machines, and wet grinders etc.
18. Determine the number of lamps to be connected in series for particular supply voltage for making decorative serial lamp.
19. Check the internal connections of cooking range selector switch and circuits. connections in different temperature arrangements
20. Check the simple mechanical timer, small water pump of washing machines and regular service and faults.
21. List the conducting and insulating materials used in motor winding
22. Testing the motor before declaring for rewinding
23. Prepare the winding former and the coils
24. Method of stripping the old winding and preparing the winding former and the coils
25. Method of inserting coil in the slots.
26. Making end connections
27. Testing the motor after rewinding
28. Impregnation methods of winding

Tools and Equipments:

1. Electric Heater
2. Electric Iron
3. Electric Kettle
4. Ceiling Fan
5. Table Fan
6. Washing Machine
7. Automatic Iron
8. Cooking Range
9. Storage Heater
10. Wet Grinder
11. Cooler
12. Connector, 6"
13. Screw Driver 8", 10", 12"
14. Cutting Pliers 6", 8"
15. Neon Tester
16. Heavy Duty Screw Driver 10", 12"
17. Nose Pliers 6"
18. Soldering iron
19. Multimeter
20. Speedometer
21. Hacksaw 30cm
22. BP Hammer 1/2kg, 1/4kg
23. Bench Wipe
24. Combination Pliers 6", 8"
25. Electric Drill Machine
26. Standard Wire Gauge
27. Line Tester



I. R. D. T
INSTITUTE OF RESEARCH DEVELOPMENT AND TRAINING

SYLLABUS

SIX MONTHS – FULL TIME

Repair and Maintenance of Batteries & Inverter

EFFECTIVE FROM:-



UNDER DEVELOPMENT

**Prepared By:
Curriculum Development Cell**

**INSTITUTE OF RESEARCH DEVELOPMENT AND TRAINING
KANPUR**

Repair and Maintenance
Of
Batteries and Inverter

Name : **Repair and Maintenance of Batteries Inverters**

Duration : **24Weeks**

Terminal Competency: **The participants will be able to:**

1. Observe the safety precautions while working
2. Preparation of electrolyte
3. Preparation of cells and arrangements of cells
4. Assembling of battery
5. Charging / recharging of battery
6. Care and preventive maintenance of battery

Course Content:

Theory

- Safety precautions
- Practice procedure for electrical and personal safety measures
- Use of multimeter
- Construction a lead acid battery
- How to keep lead acid battery health.
- Recharging of battery
- Check the condition of battery, reading of hydrometer, preparation of electrolyte and Chemical effect. Battery chargers and its application precautions to be taken while operation.

- Testing of active and passive components
- Testing of transformers (Step up and Step down)
- Testing of semiconductor components
- Testing of unregulated and regulated voltages
- Soldering and de-soldering techniques
- Assemble and test rectifier circuits – half wave, full wave & bridge rectifier
- Assemble a power amplifier circuit (ce, emitter follower)
- Assemble and test an audio power amplifier (buzzer)
- Construct a RC- oscillator and test it
- Find the total load and select a suitable Inverter (rating factor)
- Installation of battery and Inverters
- Opening & dismantling an equipment and identifying the major parts , testing of major components, identifying transformers and hacking , checking of power modules, Charging , discharging and testing of batteries, repairing of SMPS, simulating various faults diagnosing and rectifying it.

Practical

- Safety precautions
 - Electrical and personal safety, dangers and preventions
 - Multimeter and its various application
 - Preparation of electrolyte
 - Preparation of cells and arrangements of cells
 - Assembling of battery
 - Charging / recharging of battery
 - Care and preventive maintenance of battery
-
- Basics of electricity – define DC, AC Practical measuring units of voltage, current, resistance. Types of transformers – its construction, testing
 - Testing of proper earth using test lamp
 - Testing of earth using multimeter
 - Fuse – types, use of fuses and its rating
 - Basic Electronics – passive and active components – testing of components, MOSFET – precautions when handling
 - Applications of transistor – its uses
 - Op-Amp – Introduction, applications, construction, comparators
 - Voltage Regulator and their types
 - DIAC, SCR, TRIAC - application
 - Digital electronics – gates and its application, multiplexers, de-multiplexers, counter
 - Electrical load their VA and watts. Various types of batteries used in UPS and Inverters and their maintenance.
 - Single phase and three phase system, Different types of inverter, Working principle, specifications, explanation with the help of block diagram, basic principle of working of power switches, testing Methods, discussions of various faults, diagnosing methods, rectifying common faults.

Tools and equipments:

1. Screw Driver 8" 10", 12"
2. Cutting Pliers 6", 8"
3. Neon Tester
4. Heavy Duty Screw Driver 10", 12"
5. Nose Pliers 6"
6. Hydrometer
7. High Discharge Tester
8. Battery charger
9. Technicians tool kit
10. Digital multimeter
11. v. Clip on ammeter
12. Soldering gun
13. Desoldering pump
14. Soldering / desoldering temp controlled station
15. SMD soldering tools
16. Antistatic mat with proper grounding and wrist band