IV ENGINEERING & TECHNOLOGY GROUP

(i)TRADE :
ELECTRICAL
12th
VOCATIONAL

PAPER-I **ELEMENTS OF ELECTRICAL TECHNOLOGY**

THEORY

Time : 2 hrs

Theory : 30 Marks
InA : 10 Marks
Practical : 50 Marks
Total : 90Marks

Transformer

Working Principles, Constructions, Types of Transformer - Step Up and Step Down, Rating and Applications of Different Types of Transformer, Voltage and Current Transformer, Autotransformer, Rewinding of Transformers, Introduction to a Welding Transformer, Study of Star Connection and Delta Connection with Simple Derivation related to above Contents.

D.C. Motors

Constructions, Working Principles, Types of Motors - Series, Shunt, Compound and Applications of Different Types of Motors (Fractional Horse Power), Starting methods and need of Starters, 3 point Starters for D.C. Motors, Speed Control method and Speed Reverse Method of D.C. Motor, Common Faults, Their Causes, Testing and Repair (No Derivation).

A.C. Motor (Single Phase)

Constructions, Working Principles,Types of A.C. Motors - Induction Motor (Split Phase and Repulsion Start), Capacitor Motor, Shaded Pole Motor, Universal Motor, Special Characteristics, and Applications of Different Types of Fractional Horse Power Motors, Rotation, Reversal and Speed Control of A.C. Motors, Installation of A.C. Motors, Common Faults and Causes, Testing and Repairs.

Diodes

Types of Diodes, its symbols, Working and its V-I Characteristics of Diodes, Specifications and Ratings, Diode as Rectifier its types (Half wave an full wave), Zener diode and L.E.D.

Power

Generation, Transmission and Distribution of Electrical Power, Sources of Electricity, Study of Hydro, Thermal, Diesel, Nuclear Power Plants, Introduction, Types of Substation, Types of Poles, Span, Classification of Cables As Per Voltage.

ELEMENTS OF ELECTRICAL TECHNOLOGY

Time: 3 hrs **PRACTICAL** **Marks : 50**

- To test and repair a defective cycle dynamo.
- Measurement of resistance of series, shunt field and armature and identification of terminals by multimeter.
- Measurement of insulation resistance of armature and field.
- Testing, fault finding and repair of a D.C. motor.
- Overhauling of a D.C. motor.
- Dismantling, studying and reassembling of a D.C. motor starters.
- To study D.C. series motor, its running, speed control, reversing rotation, measurement of current, voltage and speed.
- To study D.C. shunt motor, its running, speed control and reversing rotation and measurement of current, voltage and speed.
- To study D.C. compound motor, its running, speed control and reversing rotation and measurement of current, voltage and speed.
- To study D.C. universal motor, its running, speed control, and reversing rotation, measurement of current, voltage and speed.
- Identification of semi conductor diodes.
- Characteristics of diode.
- To observe the input and output wave shape of a half-wave rectifier circuit with and without filter Using CRO.
- To observe the input and output wave shape of a Full-wave rectifier circuit with and without filter Using CRO.
- To observe the input and output wave shape of a bridge rectifier circuit with and without filter Using CRO.
- To Study the connections of - Voltage transformer, Current transformer, Auto-transformer.
- Dismantling, studying and reassembling of an A.C. motor.
- Overhauling of an A.C. Motor.
- Dismantling, studying and reassembling of an A.C. motor starters.
- Testing, fault finding and repairing of an A.C. motor starters.
- Connecting, starting, running and reversing of an induction moto(Split phase/repulsion Start).

- Connecting, starting, running and reversing of an capacitor motor.
- Connecting, starting, running and reversing of a shaded pole motor.
- Connecting, starting, running and reversing of an A.C. universal motor.
- Study of different types of cables.

TRADE :
ELECTRICAL
12th
VOCATIONAL

PAPER-II **ELECTRICAL DOMESTIC APPLIANCES - II**

THEORY

Time : 2 hrs

Theory : 30 Marks
InA : 10 Marks
Practical : 50 Marks
Total : 90Marks

ectric Fans

Types of Fans - Ceiling Fan, Pedestal Fan, Fresh - Air Fan, Table Fan, Bracket Fan, Exhaust Fan, Constructions, Working Principles, Special Characteristics and Applications of Electric Fans, Common Faults and Causes, Testing and Repairs, Installation of Bracket Fan and Exhaust Fan.

Electric Mixer

Constructions, Working Principles, Special Characteristics and Applications of Electric Mixer, Common Faults and Causes, Testing and Repairs, Servicing, Maintenance and Overhauling of Electric Mixer.

Electric Washing Machines

Constructions, Working Principles, Special Features and Applications of Different Types of Washing Machines, Common Faults and Causes, Testing and Repairs, Servicing, Maintenance and Overhauling of Washing Machines.

Hair Dryer

Construction and Working Principles of Hair Dryer, Common Faults and Causes, Testing and Repair.

Room Cooler

Construction and Working Details of Room Cooler, Common Faults and Causes, Testing and Repair, Installation of Room Cooler.

Vacuum Cleaner

Construction and Working Principles of Vacuum Cleaner, Common Faults and Causes, Testing and Repair.

A.C. Voltage Stabilizer (Manual)

Construction, Working Principles of Stabilizer, Common Faults and Causes, Testing and Repair.

Electric Hand Drill

Construction and Working Principles of Electric Hand Drill, Common Faults and Causes, Testing and Repair.

Battery Charger

Construction, Working, Common Faults and Causes, Testing and Repair, Specifications of a Battery Charger.

Fire Alarm

Construction and Working Principles of Fire Alarm, Common Faults and Causes, Testing and Repair.

ELECTRICAL DOMESTIC APPLIANCES - II

Time: 3 hrs **PRACTICAL** **Marks : 50**

- Testing, fault finding, repairing and overhauling electric fans.
- Testing, fault finding, repairing and overhauling electric mixer.
- Testing, fault finding, repairing and overhauling washing machine.
- Testing, fault finding, repairing and overhauling hair dryer.
- Testing, fault finding, repairing and overhauling room cooler.
- Testing, fault finding, repairing and overhauling vacuum cleaner.
- Testing, fault finding, repairing and overhauling voltage stabilizer (manual).
- Testing, fault finding, repairing and overhauling electric hand drill.
- Testing, fault finding, repairing and overhauling fire alarm.

TRADE :
ELECTRICAL
12th
VOCATIONAL

PAPER-III **MATERIALS & WORKSHOP PRACTICE - II**

THEORY

Time : 2 hrs

Theory : 30 Marks

InA : 10 Marks
Practical : 50 Marks
Total : 90 Marks

Assembly Shop

Tools, Machines, Equipment and Instruments required for Assembly Shop, their Working and use, Planning Layout and Setting of an Assembly Shop, Rules and Methods of Sequential Assembly of Appliances, Safety Precautions and Measures in Assembly Shop, up keeping of Assembly Shop.

Testing Laboratory

Tools and Instruments required for Testing Laboratory, their Working and use, Planning, Layout and Setting of a Testing Laboratory, Methods of Testing Continuity, Open Circuit, Short Circuit, Earth Fault In Open Winding and Closed Winding, Methods of Measuring Resistance, Insulation Resistance, Voltage, Current, Power Consumption, Temperature and Speed, Safety Precautions and Measures in Testing Laboratory, Up keeping of Testing Laboratory.

Repairing Shop

Tools, Machines, Equipment and Instruments required for Repairing Shop, their Working and use, Planning, Layout and Setting of Repairing Shop, Rules and Methods of Repairing, Servicing and Overhauling Domestic Appliances, Safety Precautions and Measures in Repairing Shop, Up keeping of Repairing Shop.

Winding Shop

Tools, Machines, Equipment and Instruments required for Winding Shop, their Working and use, Planning, Layout and Setting of a Winding Shop, Safety Precautions and Measures in Winding Shop, Up keeping of Winding Shop.

Estimating, Costing and Billing

Elements of Estimation, Quantity and Specifications of required Materials, Knowledge of Waste and Extra Material Requirement, Performa for Estimation, Elements of Costing - Market Value of Materials, Labor Cost, Production Cost, Overhead Cost, Profit and Total Cost, Method of Costing, Costing Performa, Billing Methods and Terms of Payments.

Load, Estimation and Test Report

Specifications of Various Electrical Accessories and Appliances, Load Calculations of an Electrical Installation and Preparation of Test Report as per Norms, Tariff, Estimation of a Bimonthly Electricity Bill.

MATERIALS & WORKSHOP PRACTICE - II

Time: 3 hrs **PRACTICAL** **Marks : 50**

- Drawing layout of - Assembly shop, Testing laboratory, Repairing shop, Winding shop.
- Practice for making a card-board bobbin/ former.
- Practice for assembly of domestic appliances.
- Rotor winding of motor used in electric mixer.
- Estimating repairing, service and overhauling of domestic appliances, it's costing and billing.
- Study of a given project report.
- Preparation of a test report.
- Study of an electricity bill issued by electricity department.
- Estimating electricity bill of a given electrical installation.
- Study of different type of tools used in Assembly shop.
- Study of different types of meter used in testing lab.