

## I. INTRODUCTION

Competency based Curriculum for Electrical Engineering Technician Course (Formerly known as EW&SEA course) had been developed for a two year course (+2 level) in intermediate education. It is designed to ensure that a student acquire knowledge and skills as required to perform a given job in a more effective way.

Competency is the ability to perform a specific task or job in an acceptable way. The "Competency based education" establishes a direct link between the theory and skills expected. It provides adequate scope for self and wage employment. Competency based vocational education paves the way to

- (1) Identity the competencies required for a particular job
- (2) Prepare the student to learn objectives in a precise way
- (3) To make the student to know the reality or world of work

When learning deals with the performance of critical activities, it is necessary to analyse each job keeping in view the technology in force. Teaching and skill learning should be arranged in a systematic manner. In this process, identification of competencies to be attained by the student is a prerequisite condition. Accordingly, the designed curriculum has the following (components)

- (1) Job opportunities identified
- (2) Identification of duties to be performed in the world of work
- (3) The desired knowledge and skill levels to be taught/learned
- (4) List of course objectives.

Skills and techniques for performing a job varies with the change in technology. This necessitates to train the skilled personnel in emerging areas of critical importance. Therefore, it becomes necessary to revise the curriculum to meet the present requirements. Hence, it is determined to review and revise and reorganise the existing curriculum on developed

"Electrical Wiring & Contracting /Electrical Domestic Appliances and Rewinding" in March 1984 for updating. Subsequently it is revised during the year 2000.

The exercise of developing Competency Based Curriculum on Electrical Engineering Technician/Electrical wiring and serving of Electrical Appliances" is a fruitful venture for making vocational courses as employment oriented and useful to the students and teachers, teacher educators, curriculum planners, educational planners and employers.

Board of Intermediate Education with the Co-ordinated efforts of SIVE and other Vocational Lecturers and subject experts had taken the adventure of revising the curriculum to suit the present day requirements. A workshop was conducted for 5 day in for December 2004 to bring out the curriculum in the present form.

## **II. OBJECTIVE OF THE COURSE**

1. To create awareness about types and make of domestic appliances
2. To acquire knowledge about principle of operation, working and application of various domestic appliances
3. To acquire skills in assembly, repair, installation, test and maintenance of domestic appliances
4. To acquire skills in sales and marketing of domestic appliances
5. To acquire skills in entrepreneurship in the vocation
6. To familiarise with BIS specifications & IE Rules.
7. To create awareness towards energy conservation
8. To acquire knowledge about tools, equipment and Instruments required for different types of wiring systems & testing
9. To understand the various types of wiring systems & to select suitable
10. To acquire skills in house wiring
11. To acquire skills in Industrial wiring
12. To acquire skills in Theatre and Auditorium wiring

### **III. SKILLS TO BE PROVIDED**

There is a broad way for successful students of this course. They may opt for wage employment, or select employment or choose for further studies. The following discussion provides an abstract of the scope. It is necessary to create suitable skills to meet the desire of the student.

#### **A. WAGE EMPLOYMENT**

##### **Electrical Domestic Appliances Assemblers**

1. Setting of assembly shop
2. Layout of tools and equipment of Assembly shop
3. Selection of tools and instruments for assembly
4. Selection and procurement of component and materials
5. Stocking of procured components for assembly
6. Sequential Operation of assembling
7. Testing during assembling
8. Final Testing and checking for conformity with BIS
9. Packing and storage of assembled appliances
10. Transportation of assembled appliances
11. Up-Keeping Assembly shop
12. Safety Rules for Assembly Shop

##### **Electrical Domestic Appliances Tester**

1. Identification of Relevant Test
2. Setting of Testing Laboratory
3. Layout of Tools and Instruments in Testing Laboratory
4. Selection and Procurement of tools and instruments for inspecting and testing
5. Inspection Scheduling
6. Testing Procedure as per BIS and other specific requirement
7. Checking and Testing of tools and instruments for proper functioning

8. Preparation of Inspection/Test Report
9. Reporting Test Results
10. Up-Keeping of Testing Laboratory
11. Safety Consciousness in Testing

### **Electrical Domestic Appliances Installation and Service Installation**

1. Site selection for installation
2. Rules and practices of installation for various appliances
3. Acceptance Testing of Appliances before installation
4. Selection and procurement of installation materials
5. Installation procedure
6. Testing of appliances after installation
7. Safety measures

### **Service**

8. Receiving Complaints
9. Inspection and fault finding
10. Service Schedules
11. Assessment of anticipated work and cost
12. Preparation of tool kit and materials
13. Dealing with Customers
14. Fault Finding & Servicing
15. Estimating and costing of services
16. Reports of Servicing

### **Electrical and Domestic Appliances Repair**

1. Setting of Repair-shop
2. Layout of tools, equipment and instruments for repair-shop
3. Selection and procurement of tools and instruments for repair
4. Inspection and fault finding of appliances
5. Procurement of components and materials for repair

6. Stocking of procured component and material for repair
7. Repair and Reconditioning methods
8. Overhauling of appliances
9. Servicing of appliances
10. Acceptance test of repaired appliance
11. Up-keepment of Repair-shop
12. Safety Consciousness in Repair-shop
13. Corrosion protection of appliances
14. Submission of job card

### **Electrical Domestic Appliances Winder/Rewinder (Motor)**

1. Setting of Winding shop
2. Layout of tools, equipment and instrument for winding shop
3. Selection and procurement of tools, equipment and instructions for winding
4. Selection and procurement of materials for winding
5. Rewinding of armature and field coils
6. Testing of the winding/coils
7. Re-assembling motor
8. Testing of motor
9. Up-keepment of Winding shop
10. Safety consciousness in Winding shop

### **Electrical Domestic Appliances Salesman**

1. Comparative awareness of appliances and their manufacturers
2. Organising Sales Promotion
3. Showroom Management
4. Quoting of rates and collection of orders
5. Supply of scheduling
6. After sales service and feedback

## **B. SELF EMPLOYMENT**

### **Dealership/Agency of Electrical Domestic Appliances**

1. Market survey and product selection
2. Awareness of financial institution/agencies promoting self-employment and their roles
3. Selection of location for outlet.
4. Registration for dealership with company and Government agencies
5. Financial Management
6. Management of Human Resources
7. Showroom management
8. Sales promotion
9. After-sale service
10. Feedback of sales position to the company

### **Repair-shop of Electrical Domestic Appliances**

1. Development of Entrepreneurial Abilities
2. Awareness of self-employment opportunities
3. Market survey for starting a Repair shop
4. Awareness of financial institutions/agencies promoting self-employment and their roles
5. Preparation of project report
6. Registration of Repair-shop with concerned authorities
7. Financial Management
8. Selection of personnel
9. Setting up a Repair-shop
10. Procurement of components and materials
11. Stocking of procured components and materials
12. Inspection, testing and fault finding of appliances
13. Estimating, costing and billing

14. Repair and reconditioning methods
15. Overhauling of appliances
16. Servicing of appliances
17. Test of repaired appliances as per BIS
18. Corrosion protection of appliances
19. Up-keepment of Repair-shop
20. Safety Consciousness of Repair-shop

### **Manufacturing of Electrical Domestic Appliances**

1. Development of Entrepreneurial Abilities
2. Awareness of self-employment opportunities
3. Role of Small Scale Industry
4. Market Survey and Product Selection
5. Awareness of financial institutions/agencies promoting self-employment and their roles
6. Preparing a Project Report
7. Registration of a Small Scale Unit
8. Financial Management
9. Selection of personnel
10. Planning, layout and setting up a Workshop
11. Selection and Procurement of components and raw materials
12. Inventory
13. Production process and assembly
14. Testing as per specification
15. Store Management
16. Maintenance and up-keeping of Workshop
17. Safety consciousness and energy conservation
18. Estimating production cost and pricing policy
19. Organising Sales Promotion
20. Showroom management
21. Quoting of rates & Collection of orders
22. Supply Scheduling of supply
23. After sales service

## **IV. JOB OPPORTUNITIES**

### **A. Wage Employment**

1. Electrical Domestic Appliances Assembler
2. Electrical Domestic Appliances Tester
3. Electrical Domestic Appliances Installations and Service
4. Electrical Domestic Appliances Repairer
5. Electrical Domestic Appliances Winder/Rewinder (Motor)
6. Electrical Domestic Appliances Salesman

### **B. Self Employment**

7. Dealership/Agency of Electrical Domestic Appliances
8. Repair-shop of Electrical Domestic Appliances
9. Manufacturing of Electrical Domestic Appliances
10. Electrical Contractor
11. Electrician
12. Wireman
13. Service Technician/Service Engineer

## **V. SCHEME OF INSTRUCTION & EXAMINATION FOR ELECTRICAL ENGINEERING TECHNICIAN**

### **Annual Scheme of Instruction and Examination for ELECTRICAL ENGINEERING TECHNICIAN 1st & 2nd Year**

| <b>Part - A</b>          | Theory     |            | Practicals |            | Total       |            |
|--------------------------|------------|------------|------------|------------|-------------|------------|
|                          | Periods    | Marks      | Periods    | Marks      | Periods     | Marks      |
| 1. English               | 185        | 75         | -          | -          | 185         | 75         |
| 2. G.F.C.                | 185        | 75         | -          | -          | 185         | 75         |
| <b>Part - B</b>          |            |            |            |            |             |            |
| 3. Vocational Subjects   |            |            |            |            |             |            |
| Paper - I                | 160        | 50         | 160        | 50         | 320         | 100        |
| Paper - II               | 160        | 50         | 160        | 50         | 320         | 100        |
| Paper - III              | 160        | 50         | 160        | 50         | 320         | 100        |
| <b>Part - C</b>          |            |            |            |            |             |            |
| 4. On the Job Training - | -          | -          | 210        | 50         | 210         | 50         |
| <b>Total</b>             | <b>850</b> | <b>300</b> | <b>690</b> | <b>200</b> | <b>1540</b> | <b>500</b> |

### **Scheme of Instruction per week for EET Vocational Course**

| <b>Part - A</b>        | Theory | Practicals | Total |
|------------------------|--------|------------|-------|
| 1. English             | 6      | -          | 6     |
| 2. G.F.C.              | 6      | -          | 6     |
| <b>Part - B</b>        |        |            |       |
| 3. Vocational subjects |        |            |       |
| Paper - I              | 5      | 5          | 10    |
| Paper - II             | 5      | 5          | 10    |
| Paper - III            | 5      | 5          | 10    |

**VI(A) LIST OF SUBJECTS IN  
ELECTRICAL ENGINEERING TECHNICIAN**

**(ELECTRICAL WIRING AND SERVICING OF  
ELECTRICAL APPLICANCES)**

**FIRST YEAR**

**Theory**

1. Elements of Electrical Engineering (Theory Paper I)
2. Electrical Engineering Materials and Wiring (Theory Paper II)
3. Electrical Measuring Instruments and  
Fundamentals of Electronics (Theory Paper III)

**Practical**

1. Basic Electrical Instrumentation and Computer Fundamentals.  
(Practical Paper I)
2. Electrical Wiring and Workshop (Practical Paper II)
3. Engineering Drawing (Practical Paper III)

**SECOND YEAR**

**Theory**

1. Electrical Machines and Power Systems (Theory Paper I)
2. Domestic Appliances and Re-winding (Theory Paper II)
3. Electrical Estimationg and Utilization (Theory Paper III)

**Practical**

1. Electrical Machines Lab (Practical Paper I)
2. Motor Rewinding and Domestic  
Applicances Lab (Practical Paper II)
3. Electrical Estimationg and Ulitization Lab (Practical Paper III)

**VI(B) DETAILED SYLLABUS**  
**ELECTRICAL ENGINEERING TECHNICIAN**  
**(ELECTRICAL WIRING AND SERVICING OF**  
**ELECTRICAL APPLIANCE)**

**SUBJECT : ELEMENTS OF ELECTRICAL ENGINEERING**  
**FIRST YEAR THEORY PAPER - I**

**(Max. Marks : 50, Periods/week :5, Total periods : 160)**

| <b>Sl.No.</b> | <b>Major Topics</b>  | <b>No.of Periods</b> | <b>Weightage</b> |
|---------------|--|----------------------|------------------|
| 1.            | Magnetism  | 25                   | 06               |
| 2.            | Electrical current-Ohms Law-<br>Kirchoff's Law and<br>network theorms (D.C.only) | 30                   | 15               |
| 3.            | Units-Works Power Energy   | 20                   | 10               |
| 4.            | Effect of Electric Current   | 25                   | 12               |
| 5.            | Electro magnetism and<br>Electro magnetic induction                              | 40                   | 16               |
| 6.            | Fundamentals of<br>Alternating current   | 20                   | 9                |
|               | <b>Total:</b>  | <b>160</b>           | <b>68</b>        |

**ELEMENTS OF ELECTRICAL ENGINEERING**  
**COURSE CONTENTS**  
**(Periods : 160, Marks : 50)**

**1. Magnetism**

- 1.1. Introduction to Magnets
- 1.2. Magnetic Pole-Magnetic axis-Pole strength
- 1.3. Properties of Magnets
- 1.4. Typical shapes of Magnets
- 1.5. Classification of Magnets - Natural, Artificial and Electro-magnets
- 1.6. Rules to find-out polarity
- 1.7. Magnetic fields
- 1.8. Typical fields - Isolated north pole, south pole
- 1.9. Inverse square law-Definition of Unit Pole
- 1.10. Simple problems

**2. Electric Current - OHM's Law - Kirchoff's Laws :**

- 2.1. Electric current
- 2.2. Conductors-Semiconductors-Insulators
- 2.3. Conventional Electric Current flow
- 2.4. Idea of Electric Potential
- 2.5. Electrical resistance
- 2.6. Specific resistance
- 2.7. Calculation of resistance of conductor
- 2.8. Simple problems
- 2.9. Effect of Temperature on resistance
- 2.10. Simple Problems
- 2.11. Ohm's Law and resistance calculations
- 2.12. Ohm's Law
- 2.13. Resistance in series

- 2.14. Resistance in parallel
- 2.15. Resistance in series and parallel combination
- 2.16. Simple problems
- 2.17. Explanations of elements of D.C.Network- Junction, Branch, Loop
- 2.18. Kirchoff's Current Law and Kirchoff's Voltage Law
- 2.19. Wheat stone bridge-solution of network using Kirchoff's Laws.
- 2.20. Star-Delta configuration - Transformation from star to Delta and Delta to Star - Formula only and simple problems.

### **3. Units-Work-Power-Energy**

- 3.1. System of Units
- 3.2. S.I.System
- 3.3. Work
- 3.4. Definition of work-units
- 3.5. Power
- 3.6. Definition of Power-Units
- 3.7. Energy
- 3.8. Definition of Energy-Units
- 3.9. Conversion of Energy-Units
- 3.10. Conversion of units thermal to electrical
- 3.11. Simple problems on work, power and energy
- 3.12. Problems on energy consumption and monthly billing for domestic installations

### **4. Effects of Electric current**

- 4.1. Heating effect of electric current
- 4.2. Heat produced due to flow of current in conductor
- 4.3. Joule' Law-Mechanical equivalent of heat
- 4.4. Practical applications of heating effects of electric current
- 4.5. Simple problems
- 4.6. Magnetic effect of electric current

- 4.7. Force on a current carrying conductor placed in a magnetic field
- 4.8. Direction of force-Flemming's left hand rule
- 4.9. Field pattern due to a long straight current carrying conductor - Direction of lines of force
- 4.10. Field pattern of solenoid and toroid
- 4.11. Field strength on the axis of solenoid
- 4.12. Force between two long parallel current carrying conductor- Definition of Ampere
- 4.13. Magnetic circuit- Definition of Flux, MMF and reluctance
- 4.14. Relation between MMF, flux and reluctance
- 4.15. Comparison between magnetic circuit and electric circuit
- 4.16. Flux density and magnetising force
- 4.17. Magnetisation of magnetic material - B.H. curve
- 4.18. Cycles of Magnetisation - Definition of coercive force Residual magnetism
- 4.19. Hysteresis loop -loss-formula with stemintz constant
- 4.20. Simple problems
- 4.21. Chemical effect of electric current-electolysis-faraday's laws of electrolysis - simple problems on first law only
- 4.22. Cell-its compenents- Definition of Battery
- 4.23. Primary cells - defects and remedies, Dry cell.
- 4.24. Secondary cell - Defference between primary and secondary cells
- 4.25. Laed acid cell-principle of working
- 4.26. Efficiencies of cell Ah and Wh
- 4.27. Methods of charging and maintenance of lead acid cells
- 4.28. Preparation of fluid mixture measurement of specific gravity of acid during charging and discharging
- 4.29. Testing of lead acid batteries

## **5.0. Electro-Magnetic Induction**

- 5.1. Concept of electro-magnetic induction  
(a) Lenz's law (b) Fleming's right hand rule
- 5.2. Farady Laws of Electro-Magnetic induction
- 5.3. Types of e.m.f's - Dynamically and statically induced e.m.fs.
- 5.4. Self and Mutually induced e.m.fs.
- 5.5. Self induction and mutual induction
- 5.6. Coefficient of coupling
- 5.7. Energy stored in a magnetic field
- 5.8. Lifting power of an electro-magnet
- 5.9. Simple problems

## **6.0. Fundamentals of Alternating currents**

- 6.1. Definition of Alternating quantity-production of alternating e.m.f.
- 6.2. Different wave forms
- 6.3. Definition of cycle, periodic time, frequency and relation between them
- 6.4. Definition of instantaneous value, Max.value, average value and R.M.S. value
- 6.5. Form factor and peak factor of sinusoidal wave only
- 6.6. Phasor representation of Alternating current
- 6.7. Phase, Phase difference, Phase-angle, power factor
- 6.8. Simple problems

# ELECTRICAL ENGINEERING TECHNICIAN

(ELECTRICAL WIRING AND SERVICING OF  
ELECTRICAL APPLIANCE)

**SUBJECT : ELECTRICAL ENGINEERING MATERIALS AND WIRING**

(Max. Marks : 50, Periods/week:5, Total periods : 160)

**FIRST YEAR THEORY PAPER - II**

## MAJOR TOPICS

### A. ENGINEERING MATERIALS

| SI.No. | Topics                    | No.of Periods | Weightage |
|--------|---------------------------|---------------|-----------|
| 1.     | Introduction              | 5             | 03        |
| 2.     | Conducting Materials      | 15            | 07        |
| 3.     | Semi conducting Materials | 15            | 07        |
| 4.     | Magnetic Materials        | 15            | 05        |
| 5.     | Insulating Materials      | 20            | 17        |
| 6.     | Dielectric Materials      | 10            | 03        |
| 7.     | Special purpose Materials | 10            | 05        |

### B. WIRING

|     |                                 |            |           |
|-----|---------------------------------|------------|-----------|
| 8.  | Wiring tools and wire jointing  | 10         | 05        |
| 9.  | Wiring accessories              | 10         | 05        |
| 10. | Wiring systems                  | 10         | 05        |
| 11. | Wiring circuits                 | 10         | 03        |
| 12. | Housewiring                     | 15         | 05        |
| 13. | Earthing                        | 5          | 04        |
| 14. | Safety precautions & I.E. Rules | 10         | 04        |
|     | <b>Total</b>                    | <b>160</b> | <b>68</b> |

**ELECTRICAL ENGINEERING MATERIALS AND WIRING**  
**COURSE CONTENTS**  
**(Periods : 160, Marks : 50)**

**1. Introduction**

- 1.1. Structure of an Atom
- 1.2. The electronic configuration of typical atoms
- 1.3. Atomic Number and valency of electrons
- 1.4. Valency of an Atom
- 1.5. Atomic bond Metallic bond, co-valent bond and ionic bond.
- 1.6. Classification of electrical engineering materials in detail.

**2. Conducting materials**

- 2.1. Concept on conducting materials
- 2.2. Effect of Alloying on resistivity
- 2.3. Effects of temperature on alloying
- 2.4. Applications of the some alloys
- 2.5. Hardening - Annealing
- 2.6. Low resistance materials and their uses.
- 2.7. Requirements of low resistivity or good conducting materials
- 2.8. Mechanical and electrical properties of copper and Alluminium
- 2.9. Conductor used in trasmission and distribution, winding of Transformers, electrical Motors and generators
- 2.10. High resistance materials - Properties and applications.
- 2.11. Eureka (Constantan)
- 2.12. Nichrome
- 2.13. Tungsten
- 2.14. High resistance materials used for Starter resistance, Heating elements, Precision resistances, Loading resistances, Incandescent lamp filaments

### **3.0. Semi-conducting materials**

- 3.1. Explain the semi-conductors
- 3.2. Classification of Semiconducting materials
- 3.3. Application of semi-conducting materials
- 3.4. Rectifiers
- 3.5. Thermistors
- 3.6. Photo conductive cells
- 3.7. Photovoltaic cells
- 3.8. Varistors
- 3.9. Transistors

### **4.0. Magnetic materials**

- 4.1. Permeability and susceptibility
- 4.2. Classification of the magnetic materials as Ferro, Para, Dia Magnetic Materials
- 4.3. Curie point
- 4.4. Magneto striction
- 4.5. Soft and hard magnetic materials
- 4.6. Soft Magnetic materials, Pure iron, Silicon alloys, Grain oriented steel, Annealed steel, Nickel, Nickel iron alloys, Cobalt steel, Alnico
- 4.7. Introduction to hard magnetic materials

### **5.0. Insulating materials**

- 5.1. Important properties of insulating materials [Electrical properties]
- 5.2. Insulating resistance, Volume and Surface resistance.
- 5.3. Factors affecting insulating resistance, di-electric strength, di-electric loss
- 5.4. Classification of insulating materials on the basis of temperature (like Y,A,E,B,F,H and C class)
- 5.5. General classification of insulating materials

- 5.6. Fibrous materials wood, paper properties and uses
- 5.7. Impregnated fibrous materials-impregnated paper, varnished impregnated textiles uses only.
- 5.8. Asphalt, Bitumens and waxes uses only.
- 5.9. Liquids and special Mineral insulating liquids, syanthetic liquids and special insulating liquids like flourinated and silicon liquids - properties and uses
- 5.10. Ceramics - Advantages and Applications
- 5.11. Porcelain, Mica, Mica Paper properties and uses
- 5.12. Insulating glasses - uses of Quartz, Borosilicate glass (pyrex), Fibre glass, State natural and synthetic rubbers,Natural rubber,Hard rubber, Synthetic rubber
- 5.13. Insulating resins
- 5.14. Natural Resins - Amber, wood resins, shellac - Applications only
- 5.15. Synthetic resins - Thermo Plastic,Thermosets, Bakalite - applications only
- 5.16. Poly vinyl chloride (PVC)
- 5.17. Insulating gases - Applications only. Air, Nitrozen, Hydrogen, Sulpha-Hexaflouride

## **6.0 Di-electric materials**

- 6.1. Di-electric strength
- 6.2. Permittivity
- 6.3. Polarisation
- 6.4. Di-electric loss
- 6.6. The applications of di-electric Materials

## **7.0. Special purpose materials**

- 7.1. Protective materials
- 7.2. Lead
- 7.3. Steel tapes, wires and strips
- 7.4. Thermo couple materials

- 7.5. Bi-metals
- 7.6. Soldering materials
- 7.7. Fuse and fuse materials
- 7.8. Galvanising and impregnations

## **8.0. Wiring Tools and Wire Jointing**

- 8.1. Introduction to wiring tools
- 8.2. Screw drivers
- 8.3. Standard screw driver, thin blade screw driver, square blade screw driver
- 8.4. Pliers
- 8.5. Side cutting plier, Diagonal cutting plier, long nose plier slip joint plier
- 8.6. Electrician Knife
- 8.7. Hammers
- 8.8. Straight claw hammer, ball pane hammer, wooden mallet
- 8.9. Wooden saw
- 8.10. Key hold saw
- 8.11. Chisels
- 8.12. Cold chisels and wood chisel
- 8.13. Scratch awl
- 8.14. Hand drill
- 8.15. Ratchet brace
- 8.16. Auger bits
- 8.17. Rowl plug tool
- 8.18. Hacksaw
- 8.19. Centre punch
- 8.20. Twist drills
- 8.21. Putty Knife
- 8.22. Blow lamp

- 8.23. Files - Flat, Half round and round
- 8.24. Plumb Bob
- 8.25. Conduit wiring tools - Pipe vice, Conduit pipe cutter, Conduit cutting by Handsaw, Reamer, Die set, Conduit Bending tools  
Taps, Wrenches
- 8.26. Wire Jointing
- 8.27. Sizes of wires
- 8.28. Standard wire guage
- 8.29. Wire splicing and termination
- 8.30. T-joint
- 8.31. Married Joint
- 8.32. Pigtail Joint
- 8.33. Soldering of the joint
- 8.34. Taping of joints
- 8.35. Termination of wires at terminal screws

## **9.0. Wiring Accessories**

- 9.1. Types of wires  
VIR, PVC, Lead sheathed TRS/CTS weather proof, flexible wires, bare or cables-copper, Aluminium and specifications
- 9.2. Switches & Switch boards - Tumbler switches, Flush swiches  
Ceiling roses, Rotary switches Push button switches, ICDP, ICTP single way two-way switches.
- 9.3. Different types of switch boards wooden & metal
- 9.4. Lamp holders - Screwed lamp holders, Edison screw lamp holder, switch, lamp holder, fluorescent lamp holder, adopters
- 9.5. Ceiling Roses - Two plate ceiling roses 3 plate ceiling roses
- 9.6. Teak wood round blocks
- 9.7. Socket out lets -Two pins, 3 pins socket out lets and plugs
- 9.8. Main switches and distribution boards ICTP, ICDP, ICTPN - main switches

9.9. Fuses - Fuse with different current ratings their materials

9.10. Fuse holders

### **10.0. Wiring Systems**

10.1. Looping system-from switch, ceiling rose and junction box

10.2. Tree system

10.3. Ring system

10.4. Distribution box system

10.5. Selection of a system for a given situation

### **11.0. Wiring circuits**

11.1. Simple lamp circuit

11.2. Bed room lighting Circuits

11.3. Stair case wiring

11.4. Series parallel Circuits

11.5. Master switch Circuits

11.6. Circuit for controlling lamp from more than two places-corridor wiring

11.7. Floursent tube lighting Circuits

11.8. Flasher for moving lights Circuits

11.9. Connection of sodium vapours and Mecury vapour lamp

### **12.0.0. House wiring**

12.1. Types of House wiring

12.2. Materials required for cleat wiring advantages and disadvantages

12.3. Materials required for CTS/TRS wiring

12.4. Metal conduit & PVC conduit system

12.5. Accessories needed in conduct wiring

12.6. Advantages and disadvantages of conduit wiring

12.7. Concealed wiring

12.8. Metal sheathed wiring, advantages and disadvantages

12.9. Comparison of the different wiring methods in house wiring

12.10. Selection of Number of circuits

12.11. Selection of size of wires

### **13.0. Earthing**

- 13.1. Necessity of earthing
- 13.2. Methods of earthing pipe-rod-and plate earthing
- 13.3. Materials required for earthing a domestic installation and power installation
- 13.4. Equipment to be earthed
- 13.5. Specification of earthing conductor and earth electrode

### **14.0. Safety precautions and I E Rules**

- 14.1. Precautions in handling tools
- 14.2. Cure of electric shock-first aid artificial respiration. Precautions againsts shocks
- 14.3. Precautions to be observed in Bath rooms fixed with Geysers
- 14.4. Indian Electricing - Rules I.E.Rules
- 14.5. I.E. Rules regarding internal wiring such as, size of conductor, Mounting hight of switch boards and running of wires of switch, earthing conductor, No. of points in a sub-Ckts, maximum load in Sub-ckts
- 14.6. I.E.Rules regarding earth faults voltage drop-insulation test-continuty-test periodical testing
- 14.7. I.E.Rules regarding power wiring ckts appliances with regard to earthing
- 14.8. I.E. Rules regarding earthing power and domestic appliances
- 14.9. I.E.Rules regarding metal conduct wiring installation.

## **ELECTRICAL ENGINEERING TECHNICIAN**

**(ELECTRICAL WIRING AND SERVICING OF  
ELECTRICAL APPLIANCE)**

### **SUBJECT : ELECTRICAL MEASURING INSTRUMENTS AND FUNDAMENTALS OF ELECTRONICS**

**(Max. Marks : 50, Periods/week:5, Total periods : 160)**

#### **FIRST YEAR THEORY PAPER - III**

| <b>Sl.No.</b> | <b>Topics</b>                                  | <b>No.of Periods</b> | <b>Weightage</b> |
|---------------|--|----------------------|------------------|
| <b>A.</b>     | <b>Electrical Measuring Instruments</b>        |                      |                  |
| 1.            | Introduction to Electrical<br>Measuring System | 5                    | 03               |
| 2.            | Indicating Instruments                         | 25                   | 08               |
| 3.            | Integrating Instruments                        | 15                   | 08               |
| 4.            | Special Instruments                            | 20                   | 08               |
| 5.            | Introduction to Digital<br>Instruments         | 15                   | 07               |
| <b>B.</b>     | <b>Fundamentals of Electronics</b>             |                      |                  |
| 1.            | Semi-conductor components                      | 35                   | 12               |
| 2.            | Power Supplies                                 | 20                   | 10               |
| 3.            | Amplifiers                                     | 15                   | 08               |
| 4.            | Integrated Circuits                            | 10                   | 04               |
|               | <b>Total</b>                                   | <b>160</b>           | <b>68</b>        |

**ELECTRICAL MEASURING INSTRUMENTS AND**  
**FUNDAMENTALS OF ELECTRONICS**  
**COURSE CONTENTS**  
**(Periods : 160, Marks : 50)**

**A. Electrical Measuring Instruments :**

**1. Introduction to Electrical Measuring System**

- 1.1. Fundamental Units
- 1.2. Derived units
- 1.3. Systems of units
- 1.4. SI system
- 1.5. Multiplication factors
- 1.6. Importance of measuring instruments
- 1.7. Electrical quantities and their units.

**2. Indicating instruments**

- 2.1. Classification of measuring instruments
- 2.2. Effects of currents used in indicating instruments
- 2.3. Deflecting, controlling and damping torque
- 2.4. Basic requirements of indicating instruments
- 2.5. Moving coil and moving iron instruments
- 2.6. Extension of range of MC and MI instruments
- 2.7. Dynamo-meter type instruments
- 2.8. Induction type instruments
- 2.9. Errors in indicating instruments

**3. Integrating Instruments**

- 3.1. Integrating instruments
- 3.2. Induction type energy meter (1- $\phi$  and 3 $\phi$ )
- 3.3. Errors in energy meters

#### **4. Special Instruments**

- 4.1. Power factor meter
- 4.2. Frequency meter
- 4.3. Synchronoscope
- 4.4. Multimeter
- 4.5. Hydrometer
- 4.6. Tongue tester
- 4.7. Megger
- 4.8. Instrument transformers

#### **5. Introduction to Digital instruments**

- 5.1. Need of digital instruments
- 5.2. Advantages of digital instruments
- 5.3. Digital voltmeter, ammeter and frequency meter
- 5.4. Digital multimeter
- 5.5. Tachometer (photo electric type)

### **B. Fundamentals of Electronics**

#### **1. Semi-conductor Components**

- 1.1. Conductor, insulator and semiconductor
- 1.2. P type and N type materials
- 1.3. P.N. junction diode
- 1.4. Forward and reverse bias of PN Junction
- 1.5. Brief study on zenar diode, LED, LCD, Tunnel diode, varactor diode, solar cell, PV array
- 1.6. Transistors,
- 1.7. Transistor configuration
- 1.8. Brief study on special transistors UJT, FET, SCR

#### **2. Power Supplies**

- 2.1. Regulated Power supply
- 2.2. Rectifiers

- 2.3. Semi conductor & metal rectifiers
- 2.4. Filters
- 2.5. Brief study of UPS, Inverter, Servo stabilizers and stabilizers

### **3. Amplifiers**

- 3.1. Clasification of amplifiers
- 3.2. Voltage and power amplifiers
- 3.3. Gain, band width and frequency response of amplifiers
- 3.4. Multi stage amplifier
- 3.5. RC coupled amplifier
- 3.6. Transformer coupled amplifier
- 3.7. Direct coupled amplifiers
- 3.8. Feed back in amplifiers

### **4. Integrated Circuits**

- 4.1. Advantages of IC's
- 4.2. Comparision between integrated and descrete circuits
- 4.3. Classification & applications of IC's

# **ELECTRICAL ENGINEERING TECHNICIAN**

**(ELECTRICAL WIRING AND SERVICING OF  
ELECTRICAL APPLIANCE)**

**SUBJECT : BASIC ELECTRICAL INSTRUMENTATION &  
COMPUTER FUNDAMENTALS**

**(Max. Marks : 50, Periods/week:5, Total periods : 160)  
FIRST YEAR PRACTICAL PAPER - I**

## **A. Basic Electrical Instrumentation**

1. Verification of Ohms Law by using Ammeter, Voltmeter in a DC Circuit
2. Verification of the characteristics of D.C. Series circuits
3. Verification of the characteristics of D.C. Parallel Circuits
4. Verification of Kirchoffs Laws by using metre bridge
5. Verification of Laws of Resistance by using Ohm meter
6. Measurement of Resistance by different methods (by Ohms Law/Voltmeter and Ammeter)
7. Testing of Accumulator for charge and discharge conditions by hydrometer/Tongue tester or cell tester
8. Charging an Accumulator
  - a. constant current charging
  - b. constant voltage charging
9. Measurement of Power factor, frequency
10. Verification of Faradays Laws of Electromagnetic Induction
11. Measurement of power
12. Measurement of Energy and Testing of energy meter.
13. Tracing the magnetic lines of force for Bar magnet,U- Magnet

## **B. Computer Fundamental Lab**

### **WINDOWS-98 OPERATING SYSTEM (15 Periods)**

#### **Chapter-1 : Introduction to Window-98**

##### **Features of Window-98**

1. Graphical user interface (GUI)
2. Graphics Manipulation
  - 32-Bit File System
  - Multitasking
  - System Robustness
  - Long File Names
  - Plug and Play Support
  - Multimedia Support
  - Object Linking and Embedding (OLE)
  - Comparison with CUI (Dos or Unix)

##### **Starting Windows-98**

##### **Elements of Windows-98 Interfasce**

- My Computer
- My Documents
- Internet Explorer
- Network Neighbourhood
- Recycle Bin
- Taskbar
- My Briefcase
- Channel Bar
- Desktop Toolbar
- Shortcut Menus
- Property Sheets

##### **Mouse Operation**

- Dragging the Items with Mouse
- Activating Shortcut Menus

## **Starting a Program (Application)**

- Start Menu
- Programs Menu
- Documents Menu
- Settings Menu
- Find and Help Menu
- Run Dialog
- Shutdown Dialog
- Log-Off Dialog

## **Windows Manipulation**

### **Customising Windows**

- Minimising a Window
- Enlarging a Minimised Window
- Maximising a Window
- Manually Resizing a Window
- Moving a Window
- Closing a Window
- Dialog Box & its Elements
  - 1. Check Boxes
  - 2. Radio Button
  - 3. Cosbo Box etc.

### **Shutting Down the PC**

- Stand By
- Shut Down
- Restart in Ms. Dos Mode
- Restart
- Log Off Windows
- Log on as a Different User

## **Chapter-II : Managing Files and Folders**

### **working in Windows-98**

- Folders
- Desktop
- My Computer Folder
- My Document Folder
- Notepad

Creating Text Files

Editing Text Files

All the Menu Features of Notepad

### **Renaming the Folders**

### **Selecting the Objects in Folders**

Selecting One Folder

Boundary Box Method to Select Multiple Files

Selecting Single Group of Consecutive Folders

Selecting Non-Consecutive Folders

Selecting Group of Consecutive Folders

Deleting Files and Folders

### **Using Recycle-Bin**

Restoring Deleted File or Folder

Emptying the Recycle Bin

### **Opening Multiple Objects :**

Open Multiple Objects

Open Multiple Applications using the Mouse

Creating our Own Folder

Copying Objects

Drag and Drop Feature

Using Keyboard

Using Standard Toolbar

Right Dragging Method

### **Moving Objects**

Drag and Drop Feature

Using Keyboard

Using Standard Toolbar

Right Dragging Method

### **Configuring Win-98 for unique user and Desktop:**

Managing Passwords

Setting Programs

Starting Programs on Start-up Menu

Changing the Icon for File Tag or Other Object

- Control Panel
- Setting Mouse Properties
- Setting Display Properties
- Setting Printer Properties
- Setting Date and Time Options
- Controlling the Folders Appearance
- Setting the Font Appearance
- Using the Task Bar
- Features of Taskbar
- Setting the Properties of Taskbar

### **Dest Top**

- Features of Desk Top
- Customising the Desk Top

### **Windows Explorer**

- Viewing Files and Folders
- Creating Files and Folders
- Dragging and Dropping Files
- Cut-Copy-Paste
- Searching Files
- Deleting Files and Folders
- Previewing a Document with Quick View

## **Chapter-3 : USING ACCESSORIES, DISK TOOLS AND PRINTERS**

### **Assessories available in Windows:**

- Using Standard Calculator
- Using Scientific Calculator
- Statistics Box
- Word Pad
- Starting Word-Pad
- Creating New Wordpad Document
- Opening Wordpad Document
- Saving a Document
- Selecting Text
- Moving and Copying Text

## **Drawing Pictures with Paint**

- Starting Windows Paint
- Drawing with Pencil Tool
- Drawing the Picture With Tools
- Embedding a Paint Object
- Linking a Paint Object
- Previewing Painting

## **LOCATING YOUR FILES AND ORGANISING DISK:**

- Finding Files using File Tool
- Using Wild-Cards
- Finding a Program-File
- Searching by Modification Date
- Making a Search Case-Sensitive
- Formatting and Labelling Disks
- Back-up Files

- Creating Back-Up File
- Saving File Set
- Opening File-Set for using in Back-Up
- Restoring Files
- Verifying Back-Up Files

## **Using Printers**

- Windows-98 Printing Features
- Spooled Printing

## **Printing from Windows-Applications**

- Printing a Document
- Printing Multiple Copies
- Printing From Desktop
- Printing from Context Menu
- Printing with Drag and Drop
- Printing with Send to
- Printing from a Folder

## **VERSIONS OF WINDOWS OPERATING SYSTEMS:**

- Features of Different Versions
- Comparison of Windows-98 with other Versions.

## **MS-OFFICE (15 Periods)**

### **1. Introduction to Ms-Office**

#### **MS-WORD**

1. Introduction to Word Processing
2. Features of Word Processor
3. Getting Started with Ms-Word
4. Contents of Ms-Word Window
5. Working with Word Documents
  - Creating A Document
  - Moving around the Document
  - Closing a Document

### **6. Opening an Existing Document**

- Getting around the Document
- Changing the Views
  - Normal View
  - Online Layout View
  - Page Layout View
  - Out Line View
  - Mater Document View
  - Splitting the Screens
  - Zooming and View
  - Tool Bars

### **7. Formating the Document**

- Selecting Text
- Editing Text
- Deleting
- Moving or Copying
- Drag and Drop Feature
- Formating Charecters
- Changing Case
- Paragraph Formating
- Text Alignment

- Spacing
- Indents
- Page Formatting
- Changing the Paper Size
- Page Margins
- Header and Footer
- Numbering Pages
- Page Breakes
- Bullets and Numbering
- Boarders and Shading
- Drop Caping
- Columns
- Inserting Menu

## **8. Spelling And Grammer**

## **9. Editing and Proffing the Text**

- Spell Check
- Checking Grammer
- Thesaures
- 10. Mail Merging
- 11. Tables
- 12. Working with Window
- 13. Help
- 14. Quitting MS Word
- 15. Short Cut Keys

# **ELECTRICAL ENGINEERING TECHNICIAN**

## **ELECTRICAL WIRING AND SERVICING OF ELECTRICAL APPLIANCE**

### **SUBJECT : ELECTRICAL WIRING AND WORKSHOP**

**Max. Marks : 50, Periods/week:5, Total periods : 160)**

#### **FIRST YEAR PRACTICAL PAPER - II**

1. Simple Carpentry Practice - cutting - chiseling - drilling of Round blocks and switchboards
2. Practice joints on bare Aluminium conductor (Married Joint and T joint)
3. Drawing the schematic diagram of distribution board
4. **Practice the following circuits in conduit, PVC casing-capping wiring**
  - a. One lamp controlled by one SPT switch
  - b. Two lamps controlled by one switch in series and parallel
  - c. Two lamps controlled by two independent SPT switches
  - d. Godown wiring
  - e. Staircase wiring
  - f. Tube light connection
6. Measurement of insulation resistance of wiring installation by meggar and ohm meter
7. Installation of Pipe and Plate earthing
8. Measurement of earth resistance by earth tester
9. Wiring diagram of Ammeter, Voltmeter with the help of C.T.'s and P.T.'s
10. Wiring diagrams of 1- $\phi$  and 3- $\phi$  energy meters and measurement of energy consumed in a 1- $\phi$  and 3- $\phi$  circuits

## **Electronics**

11. Soldering practice
12. Colour coding of Resistors
13. Identification and testing of electronic components by multimeter
14. Construction of Rectifier
15. Rigging up of Small Eliminator
16. Study of Inverter
17. Study of stabilizer
18. Study of Servo Stabilizer
19. Study of U.P.S.
20. Study of Battery Charger

# **ELECTRICAL ENGINEERING TECHNICIAN**

**(ELECTRICAL WIRING AND SERVICING OF  
ELECTRICAL APPLIANCE)**

**SUBJECT : ENGINEERING DRAWING**

**(Max. Marks : 50, Periods/week:5, Total periods : 160)**

**FIRST YEAR PRACTICAL PAPER - III**

| <b>Sl.No.</b> | <b>Major Topics</b>        | <b>No.of Periods</b> |
|---------------|----------------------------|----------------------|
| 1.            | Introduction               | 6                    |
| 2.            | Lettering and Dimensioning | 10                   |
| 3.            | Geometrical Construction   | 24                   |
| 4.            | Orthographic Projection    | 45                   |
| 5.            | Isometric Projection       | 35                   |
| 6.            | Sections of Solids         | 20                   |
| 7.            | Development of Surfaces    | 20                   |
|               | <b>Total</b>               | <b>160</b>           |

## **Detailed Syllabus**

### **1.0. Introduction**

- 1.1. Scope and objective of the subject
- 1.2. Importance of engineering drawing as a communication medium
- 1.3. Drawing instruments and their uses
- 1.4. Scales : Recommended scales, reduced & enlarged
- 1.5. Sheet sizes : A0, A1, A2, A3, A4, A5. Layout of drawing sheet sizes of title block and its contents
- 1.6. Simple exercises on the use of drawing instruments.

### **2.0. Lettering and Dimensioning**

- 2.1. Types of Lettering
- 2.2. Guide Lines for lettering
- 2.3. Recommended sizes of letters and numbers
- 2.4. Single stroke letters.
- 2.5. Dimensioning - rules and systems of dimensioning - dimensioning a given drawing

### **3.0 Geometric Construction**

- 3.1. Bisecting a line - perpendiculars - parallel lines - division of a line
- 3.2. Angles - bisection, trisection
- 3.3. Tangent lines touching circles internally and externally
- 3.4. Polygons - Regular polygons - circumscribed and inscribed in circles.
- 3.5. Conic sections - Definitions of focus, directrix, eccentricity
  - (i) Construction of Ellipse by Concentric circles method.
  - (ii) Construction of parabola by rectangular method.
  - (iii) Construction of Hyperbola when given the position of point from X-axis and Y-axis.

#### **4.0 Orthographic Projection**

- 4.1. Definition - Planes of Projection - Four quadrants - Reference line.
- 4.2. First angle projection - Third angle projection
- 4.3. Projections of points
- 4.4. Projections of straight lines
- 4.5. Projections of planes
- 4.6. Projections of solids
- 4.7. Conversion of pictorial views into orthographic views

#### **5.0. Isometric Projection**

- 5.1. Definition - Isometric axes, lines and planes
- 5.2. Isometric Scale - Isometric view
- 5.3. Drawing of isometric views of plane figures
- 5.4. Drawing of isometric views of prisms and pyramids
- 5.5. Drawing of isometric view of cylinders and cones

#### **6.0. Sections of Solids**

- 6.1. Need for drawing sectional views - section planes - sections - true shape of a section
- 6.2. Sections of prisms and pyramids
- 6.3. Sections of cones and cylinders.

#### **7.0. Development of Surfaces**

- 7.1. Need for preparing development of surface
- 7.2. Concept of true length - Principal methods of development
- 7.3. Development of simple solids like cubes, prisms, cylinders, pyramids, cones.

# ELECTRICAL ENGINEERING TECHNICIAN

(ELECTRICAL WIRING AND SERVICING OF  
ELECTRICAL APPLIANCE)

## SUBJECT : ELECTRICAL MACHINES & POWER SYSTEMS

(Max. Marks : 50, Periods/week:5, Total periods : 160)

### SECOND YEAR THEORY PAPER - II

| Sl.No. | Topics                                   | No.of Periods | Weightage |
|--------|--|---------------|-----------|
| 1.     | D.C.Generators                           | 20            | 08        |
| 2.     | D.C. Motors                              | 15            | 08        |
| 3.     | A.C.Circuits (1- $\phi$ ,3- $\phi$ )     | 25            | 08        |
| 4.     | Transformers                             | 15            | 08        |
| 5.     | Alternators                              | 20            | 06        |
| 6.     | Three Phase Induction Motors             | 15            | 05        |
| 7.     | Single Phase Motors                      | 15            | 05        |
| 8.     | Generation of Power                      | 15            | 10        |
| 9.     | Distribution of Power<br>and substations | 20            | 10        |
|        | <b>Total</b>                             | <b>160</b>    | <b>68</b> |

# **SUBJECT: ELECTRICAL MACHINES AND**

## **POWER SYSTEMS**

### **COURSE CONTENTS**

**(Periods : 160, Marks : 50)**

#### **1.0. D.C. Generators**

- 1.1.1. Generator Principle, simple loop generator
- 1.1.2. Production of induced EMF and its nature
- 1.2.0. Construction details of DC Generator
  - 1.2.1. Yoke-poles-pole shoes-Armature-Commutator brush assembly bearing
  - 1.2.2. Field coils
  - 1.2.3. Armature winding-lap and wave winding
  - 1.2.4. E.M.F. equation
  - 1.2.5. Simple problems
- 1.3.0. Types of Generators - separately - self excited
  - 1.3.1. Self excited-series-shunt-compound
  - 1.3.2. Building up of voltage in a shunt generator and conditions for building up of Voltage in a shunt generator
- 1.4.0. Losses and efficiency of generators
  - 1.4.1. Losses-iron-copper-mechanical losses
  - 1.4.2. Efficiency of generator
  - 1.4.3. Applications of D.C. generators

#### **2.0. D.C. Motors**

- 2.1.0. Principle of working
  - 2.1.1. Significance of back EMF, relation between back EMF applied voltage and armature resistance
- 2.2.0. Speed and Torque equation
  - 2.2.1. Speed equation
  - 2.2.2. Torque equation

- 2.2.3. Simple problems
- 2.3.0. Types of dc motors
- 2.3.1. Series-shunt and compound motors
- 2.4.0. Losses and efficiency
- 2.4.1. Losses-iron-copper-mechanical losses
- 2.4.2. Simple problems
- 2.5.0. Speed Control of Motors :
- 2.5.1. Field control method for series and shunt motors
- 2.5.2. Armature control methods (for shunt motors only)
- 2.6.0. DC motor starters :
- 2.6.1. necessity of starter
- 2.6.2. 3-point starter
- 2.6.3. 4-Point starter
- 2.6.4. Applications of motors

### **3. A.C.Circuits :**

- 3.1.0. Single phase A.C. Circuits
- 3.1.1. Pure Resistance circuit
- 3.2.1. Current-voltage-phasor diagram
- 3.2.2. Power-power factor
- 3.3.0. Pure capacitive circuit
- 3.3.1. Current-voltage-phasor diagram
- 3.3.2. Power-power factor
- 3.4.0. R-L Circuit
- 3.4.1. Current-voltage-phasor diagram
- 3.4.2. Power-power factor
- 3.5.0. R-C circuit
- 3.5.1. Current-voltage-phasor diagram
- 3.5.2. Power power factor
- 3.6.0. R-L-C circuit

- 3.6.1. Current-voltage-phaser diagram
- 3.6.2. Power-power factor
- 3.6.3. Simple problems
- 3.7.0. A.C. Parallel circuits
- 3.8.0. Poly phase circuits
- 3.8.1. Advantages of polyphase over single phase
- 3.8.2. Inter connection of phases
- 3.8.3. Star or wye connection
- 3.8.4. Relation in star connection
- 3.8.5. Delta or mesh connections
- 3.8.6. Relations in Delta connections
- 3.8.7. The vector diagram of star and delta connections
- 3.8.8. Simple problems

#### **4.0.0. Transformers :**

- 4.1.0. Principle of working
- 4.1.1. E.M.F. equation (No derivation) - Transformation ratio
- 4.1.2. Step up and step down transformers
- 4.2.0. Construction details of Transformer
- 4.3.0. Types of transformers
- 4.3.1. Core type shell type and Berry Type
- 4.4.0. Losses and efficiency of Transformers
- 4.4.1. Iron-copper losses
- 4.4.2. Efficiency-condition for maximum efficiency (no derivation)
- 4.4.3. All day efficiency
- 4.4.4. Simple problems
- 4.5.0. Cooling of Transformer
- 4.5.1. Methods of cooling with plain tank radiator, oil filled-self cooled, oil filled-water cooled- oil filled air blast type
- 4.6.1. Auto Aransformer

#### **5.0.0. Alternators :**

- 5.1. Principle of operation

- 5.2. Relation between no. of poles - speed and frequency (No. derivation)
- 5.3. Constructional Details of alternator
- 5.4. EMF equation

### **6.0. 3-phase Induction Motors :**

- 6.1. Production of rotating magnetic field by 3-phase currents
- 6.2. Principle of operation of 3- $\phi$  induction motor
- 6.3. Calculation of synchronous speed
- 6.4. Relations between synchronous speed, no. of poles and supply frequency
- 6.5. Slip
- 6.6. Simple problems
- 6.7. Constructional details of Induction Motors
- 6.8. Schematic diagrams of squirrel cage and slipring motors
- 6.9. Losses-iron loss-copper losses-mechanical losses
- 6.10. Power stages-efficiency
- 6.11. Relation between Rotor-copper loss-slip and input
- 6.12. Simple problems
- 6.13. Starters for Induction Motors
- 6.14. Necessity of starter
- 6.15. D.O.L. starter
- 6.16. Star/delta starter
- 6.17. Rotor resistance starter for slip ring Induction Motor - effect of rotor resistance on starting torque

### **7.0. Single phase Induction Motors :**

- 7.1. Principle of operation of Simple Phase Induction Motors
- 7.2. Split phase, capacitor start induction run - capacitor start-capacitor run-shaded pole motors - Universal Motor
- 7.3. Application of Single Phase Induction Motors

## **8.0. Generation of Power :**

- 8.1.0. Generation of Electric power - conversion of energy from one form to another
- 8.1.1. Conventional and non conventional energy sources
- 8.1.2. Brief study on Thermal, Hydel and Nuclear Power Stations

## **9.0 Transmission and Distribution of Power**

- 9.1.0. Transmission of power from generating station to receiving stations
  - 9.1.1. Use of stepup and step down transformers and associated equipment such as circuit breaker - Isolators - earth switches, C.T.'s etc.
  - 9.1.2. Line diagram of Transmission line from generating station to receiving station
- 9.2.0. Distribution of power
  - 9.2.1. Line diagrams of a feeder from HV substation to distribution substation
- 9.3.0. Transformer substations
  - 9.3.1. Distribution T/F substation-Double Pole structure - Pole mounted and Plinth mounted T/F substation associated equipment such as A.B.switch L.A. - H.G.Fuse- Circuit Breaker.

# **ELECTRICAL ENGINEERING TECHNICIAN**

**(ELECTRICAL WIRING AND SERVICING OF  
ELECTRICAL APPLIANCE)**

**SUBJECT : DOMESTIC APPLIANCES AND RE-WINDING**

**(Max. Marks : 50, Periods/week:5, Total periods : 160)**

**SECOND YEAR THEORY PAPER - II**

| <b>Sl.No.</b> | <b>Topics</b>                   | <b>No.of Periods</b> | <b>Weightage</b> |
|---------------|---------------------------------|----------------------|------------------|
| 1.            | Introduction                    | 5                    | 02               |
| 2.            | Heating Appliances              | 20                   | 14               |
| 3.            | Motorised Appliances            | 20                   | 14               |
| 4.            | Other Appliances                | 25                   | 10               |
| 5.            | General Procedure For Rewinding | 20                   | 06               |
| 6.            | D.C.Machine Winding             | 20                   | 06               |
| 7.            | AC Motor winding                | 30                   | 06               |
| 8.            | Transformer winding             | 15                   | 04               |
| 9.            | Winding Shop                    | 5                    | 06               |
| <b>Total</b>  |                                 | <b>160</b>           | <b>68</b>        |

**DOMESTIC APPLIANCES AND RE-WINDING**  
**COURSE CONTENTS**  
**(Periods : 160, Marks : 50)**

**1. Introduction :**

Classification of domestic appliances - General Procedure for servicing  
- Drives used in domestic appliances.

**2. Heating appliances :**

Construction, working and trouble Shooting of electric room heater, electric iron, electric stove, grill, electric toaster, immersion heater, geyser, kettle, coffee maker, hair drier, dish washer and micro-wave oven.

**3. Motarised appliances :**

Construction, working, trouble shooting and overhauling of electric fans, mixer-grinder, washing machine, room cooler, vaccum cleaner, electric shaver, hand drill, domestic water pumps.

**4. Other Appliances :**

Different lamps (light sources), construction, working and trouble shooting of table lamp, electric bell, buzzer, emergency light, re-chargable torch, mosquito repeller, water purifier, voltage stabilizer, battery charger.

**5. General Procedure for Re-winding :**

Tools required for re-winding-removing of amature rotor, old coils, collecting of winding information - preparation of armature for placing coils - testing and repair of re-wind armature with the help of growler - varnishing, baking and re-assembling.

**6. DC Machine Winding :**

Fundamental definitions - materials used in DC armature winding - Types of DC windings - lap and wave windings - simple winding diagrams - generalised trouble shooting.

**7. AC Motor Winding :**

Fundamental definitions - materials used in AC motor winding - types of AC winding - placing of coils - starting winding and running winding - different motors used in domestic appliances - simple winding diagrams - generalised trouble shooting - maintenance of motors.

**8. Transformer winding :**

Design of small transformer - materials used in transformer winding - process of transformer winding - winding of choke coil - Auto transformer generalised troubleshooting.

**9. Winding Shop :**

Tools, machinary and equipment in winding shop - layout of winding shop

# ELECTRICAL ENGINEERING TECHNICIAN

## ELECTRICAL WIRING AND SERVICING OF ELECTRICAL APPLIANCE

### SUBJECT : ELECTRICAL ESTIMATING AND UTILIZATION

(Max. Marks : 50, Periods/week:5, Total periods : 160)

#### SECOND YEAR THEORY PAPER - III

| Sl.No. | Topics   | No.of Periods | Weightage |
|--------|--|---------------|-----------|
| 1.     | Domestic Wiring  | 25            | 10        |
| 2.     | Power Wiring   | 20            | 10        |
| 3.     | L.T. Distribution Lines and<br>Village Electrification | 30            | 15        |
| 4.     | Transformer Substations<br>and earthing                | 10            | 06        |
| 5.     | Theatre/Auditorium wiring and<br>P.A. System           | 20            | 06        |
| 6.     | I.E. Rules   | 15            | 06        |
| 7.     | Contracting  | 15            | 05        |
| 8.     | Utilization  | 25            | 10        |
|        | <b>Total</b>   | <b>160</b>    | <b>68</b> |

**ELECTRICAL ESTIMATING AND UTILIZATION**  
**COURSE CONTENTS**  
**(Periods : 160, Marks : 50)**

**1.0. Domestic Wiring**

- 1.1. Various types of house wiring and basic requirements of various utilities, Estimate, standard format of estimation.
- 1.2. Materials and Accessories used in domestic wiring and their cost, types of loads and subcircuits
- 1.3. Types of service mains
- 1.4. Design of number of subcircuits and distribution boards as per IE rules
- 1.5. Preparation of wiring installation plan, layout with light load, power load and control points (switch boards)
- 1.6. Selection of main switch, cable etc., based on the load in circuit/ sub circuits.
- 1.7. Calculation of length of wiring, cable and labour charges.
- 1.8. Preparation of detailed estimate in standard proforma
- 1.9. Problems on small residential buildings, offices and commercial establishments like shops, sales counters, stores etc.

**2.0. Power Wiring**

- 2.1. Discussion on various loads and wiring methods, circuits used in industries, agriculture etc.,
- 2.2. Materials and accessories used in motor installation and their cost
- 2.3. Designing of distribution board, cable, motor control panel, etc. based on power rating (HP) of motor and selection of -Starter
- 2.4. Preparation of wiring installation plan and single line diagram
- 2.5. Calculation of length of wiring, cable and labour charges
- 2.6. Detailed estimate in the standard proforma

- 2.7. Related problems on installation of motors for small workshops and irrigation pumpsets

### **3.0. Low Tension (LT) Distribution Lines and Village electrification:**

- 3.1. Types of distribution lines, line supports and main components of O.H. Lines; Single line diagram
- 3.2. Estimation of Quantity of materials and accessories required for erection of OH lines over a small length (upto 5 km) to meet the requirements of single phase (1- $\phi$ ), three phase (3-- $\phi$ ) domestic and industrial consumers with/without street light provision - simple problems
- 3.3. Load survey in village and location of distribution transformer
- 3.4. Preparation of single line diagram of OH distribution line of colony/ village/small town
- 3.5. Preparation of estimate in standard proforma with quantity of materials and accessories only
- 3.6. Simple problems

### **4. Erection of Tranformer substations and earthing**

- 4.1. Types of transformer substations and various components used in erection of transformer substations
- 4.2. Detailed elevation and single line representation of transformer substations
- 4.3. Preparation of estimate, schedule of materials and accessories for erection of Pole-mounted and plinth mouted transformer substations
- 4.4. Types of Earthing and schedule of material
- 4.5. Estimation of materials required for pipe earthing and plate earthing
- 4.6. Sketch of pipe and plate earthing

### **5. Theatre/ Auditorium wiring and public address system**

- 5.1. Basic requirements of an Auditorium
- 5.2. General wiring layout of an auditorium

- 5.3. Preparation of Estimation for electrification of small auditorium in standard proforma
- 5.4. Public Address system - major components of P.A. system
- 5.5. Designing of P.A. system
- 5.6. Layout of P.A. System for a hall, open ground and estimation of quantity of materials, accessories and equipments to install P.A. systems

## **6. I.E. Rules**

- 6.1. Extracts from IE rules 1956 and code of practice by AP Transco to supply electric energy
- 6.2. I.E. rules connected with domestic and Industrial wiring
- 6.3. Testing of Electrical Installations as per IE rules

## **7. Contracting**

- 7.1. Estimate, Types of Projects Tender, quotation, schedule of materials, schedule of rates, standard specifications, tender form, caution deposit, earnest money deposit
- 7.2. Procedure for filling up of tender forms, agreement forms for contractign and receving back the EMD after completion of work

## **8. Utilization of Electrical Energy**

- 8.1. Illumination - lighting schemes - lamps - levels of illumination for various applications
- 8.2. Design of lighting and lighting schemes/lamps for decoration and advertisement, Neon signs, flashers, helide lamps.
- 8.3. Industrial applications of Electric energy (like heating, welding, refregiration and air-conditioning etc..)

# **ELECTRICAL ENGINEERING TECHNICIAN**

## **(ELECTRICAL WIRING AND SERVICING OF ELECTRICAL APPLIANCES)**

### **SUBJECT : ELECTRICAL MACHINES LAB**

**(Max. Marks : 50, Periods/week:5, Total periods : 160)**

#### **SECOND YEAR PRACTICAL PAPER - I**

1. Measurement of resistance of series, shunt field and armature of a D.C. machine by multimeter
2. Determination of O.C.C. of D.C. shunt generator
3. External Characteristics of D.C. shunt generator
4. Connecting, starting, speed control and Reversing of rotation of a D.C. series motor using a given starter-measure current and speed at different loads
5. Connecting, starting, speed control and reversing the rotation of D.C. shunt motor using a given starter-measure current and speed at different loads
6. Connection, starting, speed control and reversing rotation of a D.C. compound motor using a given starter - measure current and speed at different loads
7. Verification of voltage and current relationship in 3- $\phi$  star and delta connection
8. O.C. and S.C. test on a 1- $\phi$  Transformer to determine its efficiency
9. Load test on a 1- $\phi$  Transformer to determine efficiency
10. Connecting, starting, running and reversing of 3- $\phi$  squirrel cage induction motor
11. Connecting, starting, running and reversing of 1- $\phi$  capacitor motor
12. Connecting, starting, running of 1- $\phi$  shaded pole motor
13. Connecting, starting running of 1- $\phi$  commutator motor
14. Starting, running and reversing of 3- $\phi$  Slipring Induction Motor using rotor resistance starter

15. Starting of a 3- $\phi$  Induction motor using Auto Transformer
16. Determination of voltage current relationship in A.C. series circuit
17. Study of voltage and current relationship in A.C. parallel circuit
18. Verification of the characteristics of series, parallel and series parallel capacitors
19. Measurement of power and P.F. in an A.C. 1- $\phi$  R-L and R-C circuits
20. Power measurement in a 3- $\phi$  circuits using current and potential Transformer and Two-watt meters
21. Connecting, starting, running and reversing of a repulsion motor
22. Identify the terminals of a given 3- $\phi$  Induction Motor
23. Locate the fault if any, in a given star/delta starter and rectify and test it
24. Locate the fault in any given D.C. 3-Point starter, rectify the same and test it.

# **ELECTRICAL ENGINEERING TECHNICIAN**

## **ELECTRICAL WIRING AND SERVICING OF ELECTRICAL APPLIANCE**

### **SUBJECT : MOTOR REWINDING AND DOMESTIC**

#### **APPLIANCES LAB**

**(Max. Marks : 50, Periods/week:5, Total periods : 160)**

#### **SECOND YEAR PRACTICAL PAPER - I**

1. Continuity test of domestic appliances
2. Dismantling, re-assembling and trouble shooting of electric room-heater, iron, stove, grill, toaster, immersion heater, geyser, kettle
3. Dismantling, assembling and trouble shooting of motorised appliances like hair drier, ceiling fan, table fan, room cooler, vaccum cleaner, domestic monoblock pumps and grinding machines
4. Dismantling, reassembling and trouble shooting of table lamp, fluorescent lamp, electric bell, emergency light, rechargeable torch, voltage stabilizer and battery charger
5. Preliminary testing of motor before opening for rewinding - short circuit in armature field - open circuit in armature, field - bearing test
6. Noting the data & preparing for rewinding - dismantling the motor after noting name plate details - stripping off the winding and noting the winding data, winding connections - preparation of slots for placing of coils--
7. Coil making, cloth taping, varnishing, inserting in slots, and wedging
8. Testing of armature and re-assemble the motor
9. Re-winding of ceiling fan, table fan, mixer field coil
10. Re-winding of armature of D.C. motor/universal motor

# **ELECTRICAL ENGINEERING TECHNICIAN**

## **(ELECTRICAL WIRING AND SERVICING OF ELECTRICAL APPLIANCE)**

### **SUBJECT : ELECTRICAL ESTIMATION AND UTILIZATION LAB**

**(Max. Marks : 50, Periods/week:5, Total periods : 160)**

#### **SECOND YEAR PRACTICAL PAPER - III**

1. Preparation of Service mains and typical distribution board for 1- $\phi$  and 3- $\phi$  load
2. Workout the measurements of small residential building/sales counter/class room for installation of wiring and prepare the layout
3. Preparation of detailed estimation in the standard format for installation of surface conduit/casing and capping wiring in a small house/office/sales counter
4. Install the surface conduit/casing capping wiring in class room/ model residential building with standard assumptions and minimum requirements (like illumination, air flow etc.,)
5. Connections of 1- $\phi$ , 3 $\phi$  motor and practice wiring along with wiring diagram
6. Preparation of detailed estimate in a standard format for installing a 3HP and 5HP motors in a small workshop along with suitable lighting arrangement
7. Study and prepare a detailed layout of LT distribution line of near by streets and record the various components and other observations
8. Prepare a detailed schedule of material, layout to install a OH distribution line beside a street for a length of 2 KM
9. Conduct a load survey of a nearby colony/village and record the observations
10. Preparation of single line diagram of OH distribution line for a model colony/village with location of distribution Transformers

11. Preparation of detailed schedule of material and accessories of pole mounted and plinth mounted Transformer.
12. Visit nearby substation and prepare a single line diagram, list of various accessories in substation
13. Visit nearby theatre/auditorium and prepare a detailed wiring installation plan in a standard format
14. Install a P.A. System in college campus/open air auditorium/ground and prepare a detailed layout, schedule of materials
15. Testing of wiring installation as per IE rules
16. Collect unused/model tender documents to supply electrical accessories/install electrical wiring to a office/building/small project and file all the documents (like caution deposit, EMD etc) as per tender schedule
17. Prepare a lighting scheme for class room/drawing room of your college

**VII. INPUTS FOR THE COURSE**  
**(TOOLS, EQUIPMENTS, APPLIANCES, MOTORS, ACCESSORIES**  
**AND RAW MATERIALS FOR A BATCH OF TEN STUDENTS)**

**LIST OF TOOLS AND EQUIPMENT**

**HOLDING AND SUPPORTING TOOLS**

| <b>S.NO.</b> | <b>DESCRIPTION</b>             | <b>QUANTITY</b> |
|--------------|--------------------------------|-----------------|
| 1.           | Work Bench                     | 10              |
| 2.           | Bench Vice                     | 10              |
| 3.           | Pipe Vice                      | 02              |
| 4.           | Leg Vice                       | 02              |
| 5.           | Anvil (Big & Small)            | 01 each         |
| 6.           | Surface Plate                  | 02              |
| 7.           | Angle, T etc                   | 02              |
| 8.           | Armature Holder                | 02              |
| 9.           | Bearing Holder                 | 02              |
| 10.          | Bending Machine                | 01              |
| 11.          | Bearing Puller                 | 01              |
| 12.          | Pulley Puller                  | 02              |
| 13.          | Stand for Amature Winding      | 02              |
| 14.          | Wooden bin for wiring practice | 2 No's (8x4x4)  |

**MEASURING TOOLS**

|    |                   |    |
|----|-------------------|----|
| 1. | Rulers            | 06 |
| 2. | Tapes             | 06 |
| 3. | Micrometer        | 06 |
| 4. | Varnier Callipers | 06 |
| 5. | Wire Guage        | 06 |
| 6. | Feeler Guage      | 02 |
| 7. | Inspection Guage  | 03 |

|     |                                  |    |
|-----|----------------------------------|----|
| 8.  | Screw Guage                      | 04 |
| 9.  | Screw Pitch Guage                | 04 |
| 10. | Dial Guage                       | 04 |
| 11. | Combination set                  | 02 |
| 12. | Tri-Square                       | 06 |
| 13. | Tachometer                       | 02 |
| 14. | Level                            | 03 |
| 15. | Thermometer                      | 03 |
| 16. | Spring Scale                     | 02 |
| 17. | Line Tester, Testing Lamp        | 06 |
| 18. | Scale with Weight 50 gm to 10 kg | 02 |
| 19. | Hydrometer                       | 02 |
| 20. | Cell Testing Voltmeter 3-0-3V    |    |

### **CUTTING TOOLS**

|     |                                       |    |
|-----|---------------------------------------|----|
| 1.  | Scissors                              | 04 |
| 2.  | Hand Shearing Machine                 | 01 |
| 3.  | Pipe Cutter                           | 01 |
| 4.  | Hack Saw                              | 06 |
| 5.  | Hand Drill with Bits (small)          | 03 |
| 6.  | Hand Drill Machine with Bits (medium) | 03 |
| 7.  | Grinder                               | 02 |
| 8.  | Rivetting Machine                     | 01 |
| 9.  | Chisels (one set)                     | 01 |
| 10. | File (one set)                        | 01 |
| 11. | Wood Hand Saw                         | 02 |
| 12. | Scraper                               | 02 |
| 13. | Conduit Pipe Taps and Die (one set)   | 01 |
| 14. | Rawl Punch                            | 01 |
| 15. | Conduit Pipe Cutter                   | 01 |

|     |                        |    |
|-----|------------------------|----|
| 16. | Die and Die Stock      | 01 |
| 17. | Pipe Vice              | 03 |
| 18. | Conduit Bending Rack   | 01 |
| 19. | Drill Hand Brace       | 01 |
| 20. | Plane smoothing Cutter | 01 |

### **TOOLS KIT**

|     |                                      |         |
|-----|--------------------------------------|---------|
| 1.  | Wrenches                             | 01      |
| 2.  | Spanners                             | 01      |
| 3.  | Screw Drivers (one set)              | 01      |
| 4.  | Neon Tester                          | 02      |
| 5.  | Hammer                               | 02      |
| 6.  | Mallert-Plastic Hammer-Rubber Hammer | 01 each |
| 7.  | Gimlet                               |         |
| 8.  | Tweezer                              | 01      |
| 9.  | Drifts and Punches                   | 01      |
| 10. | Pocker                               | 01      |
| 11. | Abbrsives                            | 01      |
| 12. | Grease Gun                           | 01      |
| 13. | Oil Can                              | 01      |
| 14. | Electrician's Knife                  | 02      |
| 15. | Adjustable Wrench                    | 02      |
| 16. | Combinastion Pliers (insulated)      | 02      |
| 17. | Nose Pliers (Insulated)              | 02      |
| 18. | Long Nose Pliers (Insulated)         | 02      |
| 19. | Side Cutting Pliers                  | 02      |
| 20. | Circlip Pliers                       | 901     |
| 21. | Soldering Iron                       | 02      |
| 22. | First Aid Box                        | 01 set  |
| 23. | Pincer                               | 01      |

|     |                     |        |
|-----|---------------------|--------|
| 24. | Slip Joint Pliers   | 01     |
| 25. | Scraper             | 01     |
| 26. | Centre Punch        | 01     |
| 27. | Plumb Bob           | 01     |
| 28. | Multimeter          | 01     |
| 29. | Insulation Stripper | 01     |
| 30. | Hand gloves         | 01 set |

### **APPLIANCES**

|     |  |         |
|-----|--|---------|
| 1.  | Reflector Type room heater   | 01      |
| 2.  | Blower Type room heater  | 01      |
| 3.  | Electric iron ordinary/automatic/<br>thermostat control type                                     |         |
| 4.  | Electric stove-coiled type, covered type   | 01 each |
| 5.  | Electric Hot Plate   | 01      |
| 6.  | Electric Grill/Oven  | 01      |
| 7.  | Cooking range/Microwave oven   | 01      |
| 8.  | Electric Toasters-Ordinary, Automatic  | 01 each |
| 9.  | Electric Immersion heater  | 01      |
| 10. | Electric Geyser  | 01      |
| 11. | Electric Kettle  | 01      |
| 12. | Electric Coffee Percolator   | 01      |
| 13. | Electric Gas Lighter   | 01      |
| 14. | Fluorescent tube with fitting,<br>Table lamp, night lamp, emergency light,<br>rechargeable torch | 01 each |
| 15. | Electric bell, buzzer, door chimes   | 01 each |
| 16. | Electric Ceiling fan, Pedestal fan,<br>Table fan, Bracket fan and Exhaust fan                    | 01 each |
| 17. | Electric Mixer, Grinder and Juicer   | 01 each |

|     |                               |         |
|-----|-------------------------------|---------|
| 18. | Electric Washing Machine      | 01 each |
| 19. | Electric Cloth Dryer          | 01      |
| 20. | Electric Dish Washing Machine | 01      |
| 21. | Electric Hair Dryer/Curler    | 01 each |
| 22. | Electric Shaver               | 01      |
| 23. | Room Cooler                   | 01      |
| 24. | Vaccum Cleaner                | 01      |
| 25. | Voltage Stabiliser            | 01      |
| 26. | Battery Charger               | 01      |
| 27. | Electrical Grain Grinder      | 01      |
| 28. | Domestic Water Pump           | 01      |
| 29. | Cycle Dynamo                  | 01      |

### **MOTORS**

|     |   |         |
|-----|---|---------|
| 1.  | Split Phase Motor                         | 01      |
| 2.  | Capacitor Start Motor                     | 01      |
| 3.  | Capacitor Run Motor                       | 01      |
| 4.  | Shaded Pole Motor                         | 01      |
| 5.  | Two Speed Motor                           | 01      |
| 6.  | Repulsion Motor                           | 01      |
| 7.  | Universal Motor                           | 01      |
| 8.  | DC Shunt Motor                            | 01      |
| 9.  | DC Series Motor                           | 01      |
| 10. | 3 ph Induction Motor (Cage Type -5HP)     | 01      |
| 11. | 3 ph Induction Motor (Slip ring Type-5HP) | 01      |
| 12. | Starters for Dc and Ac Motors             | 01 each |

### **METERS**

|    |   |    |
|----|---|----|
| 1. | Voltmeter a.c./d.c.(Various ranges)         | 06 |
| 2. | Ammeter a.c./d.c. (Various ranges)          | 06 |
| 3. | Wattmeter (Induction type and Dynamic type) | 02 |

|     |                              |           |
|-----|------------------------------|-----------|
| 4.  | Single Phase Energy Meter    | 01        |
| 5.  | Ohm Meter                    | 01        |
| 6.  | AVO Meter                    | 01        |
| 7.  | Megger                       | 01 (each) |
| 8.  | Multimeter analog/digital    | 01        |
| 9.  | Clip -on-Ammeter             | 01        |
| 10. | Growler (inside and outside) | 01        |
| 11. | Phase Sequence Indicator     | 02        |
| 12. | Digital Speedo Meter         | 01        |
| 13. | Frequency Meter              | 01        |
| 14. | Power Factor Meter           | 01        |
| 15. | Earth Tester                 | 01        |
| 16. | Millimetre (various ranges)  | 03        |
| 17. | Micrometer (various ranges)  | 03        |
| 18. | Hydro meter                  | 01        |
| 19. | Three Phase Energy Meter     | 01        |
| 20. | MCB and EICB (1 each)        | 02        |

### **EQUIPMENT AND ACCESSORIES**

|    |  |    |
|----|--|----|
| 1. | Single phase transformer<br>2KVA, 240/400v, 50Hz | 01 |
| 2. | Current Transformer                              | 01 |
| 3. | Potential Transformer                            | 01 |
| 4. | Single Phase variac 230v 50 Hz 2 Kva             | 02 |
| 5. | Bench grinder (double wheel)                     |    |
| 6. | Rheostat of various rating                       | 06 |
| 7. | Decade Resistance Box                            | 02 |
| 8. | Decade Capacitance Box                           | 02 |
| 9. | Electrical Hand drill (Portable Type)            | 01 |

|     |  |        |
|-----|--|--------|
| 10. | Bench Type Drilling Machine                | 01 set |
| 11. | Bar magnet                                 | 01     |
| 12. | Horse Shoe Magnet                          | 02     |
| 13. | Magnetic Compass Needle                    | 02     |
| 14. | Thermo Couple                              | 02     |
| 15. | Thermostat                                 | 02     |
| 16. | Timer                                      | 03     |
| 17. | Fire Fighting Equipment                    | 01 set |
| 18. | Battery 6V, 9V, 12V, 50V AH (1 each)       | 01 set |
| 19. | Ladder                                     | 01     |
| 20. | ICDP,ICTP, ICTPN Main Switches (2 each)    | 08     |
| 21. | Blow Lamp for Brazing                      | 01 set |
| 22. | Belt Drive with Accessories                | 01 set |
| 23. | Shaft Drive for Accessories                | 01 set |
| 24. | Gear Drive with Accessories                | 01 set |
| 25. | Chain Drive with Accessories               | 01 set |
| 26. | Friction Drive with Accessories            | 01 set |
| 27. | Coil Winding machine with counter (Manual) | 01 set |

### **LIST OF RAW MATERIALS**

|    |   |              |
|----|---|--------------|
| 1. | Connecting Wires (various Size)   | 01 Coil Each |
| 2. | Adhesive tape (6 rolls of different size)   | 06 each      |
| 3. | Conducting materials: Copper, Aluminium   | 1Kg each     |
| 4. | High Resistance Materials: Tungsten,<br>Nichrome, Eureka, Selenium                      | 0.5 Kg each  |
| 5. | Carbon Graphite Brushes (Different sizes)   | 5 sets       |
| 6. | Electric Bulb of various types (4 No. each)   |              |
| 7. | Various Insulating Materials: Amber cloth,<br>PVC, porcelian, Bistumen, Mica, Bakelite, |              |

|     |   |              |
|-----|---|--------------|
|     | Fibre Glass, Phenolic, Presshan paper,<br>Leatheroid paper  | 1 sq.m each  |
| 8.  | Magnetic Materials : soft and hard                          | 0.5 Kg. each |
| 9.  | Brass, Gun metal  | 0.5 Kg each  |
| 10. | Fuse wire of various rating                                 | 1 roll each  |
| 11. | Solder lead and flux (Resin core solder)                    | 6 packets    |
| 12. | Brazing materials   | 2 packets    |
| 13. | Conduit Pipes   | 200 ft.      |
| 14. | Battens (Wooden)  | 200 ft.      |
| 15. | Iron Clad Switches (Various range)                          | 10           |
| 16. | Switches (5A/15A rating)                                    | 6 No. each   |
| 17. | Lamp Holder   | 1            |
| 18. | Ceiling roses   | 1            |
| 19. | Plugs   | 1            |
| 20. | Sockets   | 1            |
| 21. | Wooden Boards (Various Sizes)<br>Three of each size         |              |
| 22. | Solid, Semi-solid and liquid lubricants                     | 1 kg each    |
| 23. | Anti corrosive paints                                       | 1 kg each    |
| 24. | Raw materials for blue prints 1 liter Ammonia               |              |
| 25. | Materials for safety charts                                 | 2 papers     |
| 26. | Silicon/Stampings for rotor and stator                      | 1 set        |
| 27. | CRGO Stampings  | 5 kg         |
| 28. | Bobbin/Former for winding                                   | 2            |
| 29. | Different types of Enameled<br>copper wires (various sizes) | 10 kg        |
| 30. | Varnish   | 5 Lt.        |
| 31. | Pilot Lamp  | 12           |
| 32. | Resistors of various ratings                                |              |

|     |                               |         |
|-----|-------------------------------|---------|
| 33. | Capacitors of various ratings | 10      |
| 34. | Inductors of various ranges   | 10      |
| 35. | Various types of diodes       | 10      |
| 36. | Transistors                   | 10      |
| 37. | Transformers (small)          | 10      |
| 38. | Tubelight sets                | 5 sets. |

## **VIII. A) COLLABORATING INSTITUTIONS FOR CURRICULUM TRANSACTION**

### **Name of Institutions for conducting on-the-job training or practical training**

1. K.C.Engineering Works, Jodhpur
2. Power Appliances Ltd, Guindy Industrial Estate, Madras
3. B.E.Pump, Taratala Road, Calcutta
4. Phillips India Ltd, Calcutta
5. P.S.G.Industrial Institute, Peelamedu, Coimbatore
6. Local Industries related to domestic appliances/service centres
7. A.P.Transco/Genco/Private & Public Sector Power Stations
8. Co-ordinating Polytechnics Collages/Near by Govt. Polytechnics
9. Advance Training Institute Vidyanagar & Ramanthapur, Hyderabad

### **Name of Institutions for conducting Teacher Training Programme**

8. P.S.G. College of Technology, Peelamelu, Coimbatore
9. Foreman Training Institute, Bangalore
10. Engineering Colleges/Polytechnics/PSSIVE, Bopal
11. SISI, Balanagar, Hyderabad

### **Name of Institutions for developing Instructional Materials**

12. TTTI at Calcutta, Chandigarh, Bhopal, and Madras
13. Central Instructional Media Institute, Ministry of Labour, Guindy, Madras 6600032
14. Engineering Colleges of Concerned States.

## **B) ON THE JOB TRAINING CENTRES, SYLLABUS AND EVALUATION**

Vocational students are required to undergo at least Six Weeks on-the-Job training (OJT) in industry/Collaborating institution during their course of study. The programme may be conducted as per the guidelines give in acadamic organiser.

### **1.0. OJT sites and Syllabus**

- 1.1. Module I :Study of Electrical Appliances
- 1.2. Training Site

#### **Manufacturing Industry of Domestic Appliances**

### **1.3. Syllabus**

Mixer, Juicer, Fan, Electric Iron, Electric Bell, Washing Machine, Percolator, Grain Grinder, Hair Drier, Cooler, Stabiliser, Hand drill, Water Pump, Single-phase motor, Vaccum Cleaner.

- (a) Main parts and their functionins
- (b) Dismantling and reassembling
- (c) Overhauling
- (d) Application

### **2. Module II : Testing of Electrical Appliances**

Training Site :

#### **Manufacturing Industry of Domestic Appliances**

### **2.1. Syllabus**

Different type of tests on electrical Appliances :

- (a) Continuity Test
- (b) Earthing Test
- (c) Terminal Test
- (d) Maintenance Scheduling

### **3.0. Module III : Electrical Appliances Installation**

- 3.1. Training Site

## **Dealers of Domestic Appliances, Service Centre of Domestic Appliances**

### 3.2. Syllabus

Activities pertaining to starting service centre/dealership of electrical domestic appliances:

- (a) Site Selection
- (b) Installation procedure
- (c) Layout/Installation (indicating safe clearance)
- (d) Illumination requirement
- (e) Safety measures

### 4.0. Module IV : Servicing of Appliances

#### 4.1. Training Site :

## **Manufacturer of Domestic Appliances, Dealers of Domestic Appliances, Service Centre of Domestic Appliances**

### 4.2. Syllabus

Activities pertaining to servicing of appliances:

- (a) Different type of faults
- (b) Fault finding and remedial measures
- (c) Estimation of servicing cost and billing
- (d) Dealing with customers
- (e) Service Schedule

### 5.0. Module V : Electrical Appliances Repair Shop

#### 5.1. Training Site :

## **Manufacturer of Domestic Appliances, Dealers of Domestic Appliances, Service Centre of Domestic Appliances**

### 5.2. Syllabus :

Activities pertaining to starting a repair-shop of electrical appliances :

- (a) Details of Setting up of repair-shop
- (b) Requirements of different tools and materials
- (c) Repair sequence
- (d) Safety measures.

### 6.0. Module VI : Electrical Appliances Rewinding

#### 6.1. Training Site :

**Manufacturer of Domestic Appliances, Dealers of Domestic Appliances, Service Centre of Domestic Appliances**

- 6.2. Syllabus :
- Activities pertaining to winding/rewinding of fractional h.p.motor:
- (a) Details of winding shop
  - (b) Location of faults
  - (c) Rewinding of armature and field coils
  - (d) Testing of winding
- 7.0. Module VII: Electrical Appliances Salesman
- 7.1. Training Site :

**Manufacturer of Domestic Appliances, Dealers of Domestic Appliances**

- 7.2. Syllabus
- Activities pertaining to starting dealership of electrical appliances:
- (a) Sales promotion strategies
  - (b) rate quoting and order collections
  - (c) Supply scheduling and feedback
  - (d) After sales service
- 8.0. Module VIII : Manufacturing Process of Electrical Appliances
- 8.1. Training Site :

**Manufacturer of Domestic Appliances**

- 8.2. Syllabus
- Activities pertaining to manufacturing of domestic appliances :
- (a) Role of Small Scale Industry (SSI)
  - (b) Product selection and market survey
  - (c) Project Report
  - (d) Selection of site
  - (e) Planning and availing of financial assistance
  - (f) Inventory control

- (g) Production process
- (h) Testing and quality control
- (i) Certification
- (j) Packaging
- (k) Sales (Marketing)
- (i) Feedback from customers
- (m) Suggestions regarding innovative changes

## **9.0. Evaluation of OJT**

Evaluation of the various components of OJT is required to be done by adopting the techniques stated below.

### **9.1. Observation**

Emphasis of the OJT programme is on the development of skills, good work habits and attitudes. Hence, observation technique is to be adopted for assessment of students' performance. The training supervisor in consultation with the concerned vocational teacher develops a rating scale and records his observations on various criteria.

### **9.2. Interview and VIVA**

The trainign supervisor or the concerned Vocational Teacher conducts one or more sessions with the students to assess their communication skills, maturity, self-confidence, comprehension and overall disposition.

### **9.3. Report**

The student should maintain a day-to-day record of activities performed by him and should prepare a consolidated report on completion of each module. These reports will be examined by the training supervisor and the concerned vocational teacher or assessment.

## **IX. QUALIFICATIONS FOR LECTURERS**

### **Vocational Junier Lecturer :**

1. Diploma in Electrical Engineering (LEE/DEEE)  
with Two (2) years experience in related field  
OR
2. B.E. in Electrical Engineering

## **X. CAREER MOBILITY**

### **Employment**

#### **A. WAGE EMPLOYMENT**

1. In manufacturing Industries of Domestic Appliances
2. In Service Centres of Domestic Appliances
3. Wireman

#### **B. SELF EMPLOYMENT**

4. Dealership of Domestic Appliances
5. Owning Service Centres
5. Owning Manufacturing Units of Fractional H.P.Motors
6. Job Contract with Government Agencies, Public Undertaking, Hostels, Hotels, Hotels for Repair, Maintenance of water punmps, Ceiling fans, fluorescent lamp fittings
7. Job contract with a group of house holds for preventive maintenance and reapiir of domestic appliances
8. Job contract with builders of Apartments and group of house holds for wiring of their flats, houses and for maintainance

#### **C. VERTICAL MOBILITY**

1. The persons working as Electrical Domestic Appliances Assembler, Tester, Repairor, Rewinder and Salesman can be promoted to Supervisor Grade III, II and I.
2. After completing the Bridge Course the 10+2 vocational passouts can enter in second year of three year diploma in electrical & electronics engineering from polytechnics and can be promoted to higher position on completion of the course in supervisory cadre. They can appear EMCET & they can study B.Sc. in Degree Colleges.

After certain period of service and acquiring diploma from polytechnics the vocational passouts can take admission in part-time degree course in electrical engineering and can be promoted to higher position on completion of the course in managerial cadre.

After passing the Inter Vocational Course the student can join and study B.A. & B.Com courses

(Without appear / doing Bridge Course)

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## **XII.SUGGESTIONS FOR IMPLEMENTATION**

- ★ Students should be made aware of career prospect of the course before admission.
- ★ Teachers should be well qualified and should have adequate professional experience.
- ★ Teachers should be sent for refresher courses for improvement of teaching/training at regular intervals.
- ★ Experts from concerned industry/establishment should be invited for delivering special lectures
- ★ The course may be introduced in those institutions where simulated training facilities are available
- ★ The institution should take up commercial activities in electrical domestic appliances to promote on-the-job training facilities
- ★ Wide publicity should be made about the course and its trainees to the prospective employers
- ★ Students opting for self-employment may be give the basic tool kit
- ★ More stress may be given on the practical aspects of the training programme. This will go a long way in improving the level of confidence of the students
- ★ Students should be exposed to environmental protection/rural development and entrepreneurial traits by experts.

**XIII. MODEL QUESTION PAPERS**  
**ELECTRICAL ENGINEERING TECHNICIAN**  
**ELEMENTS OF ELECTRICAL ENGINEERING**  
**FIRST YEAR THEORY PAPER - I**

**Time : 3 Hours**

**Max. Marks : 50**

**Section - A**

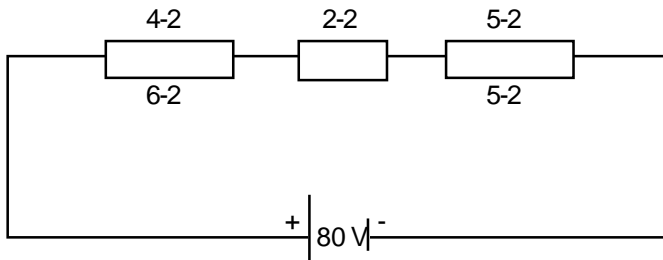
**Note :** (i) Answer all the Questions 10 x 2 = 20  
(ii) Each Question carries 2 marks

1. Define magnetic field
2. Define Ohms Law
3. Write the types of cells
4. What are the effects of Electric Current
5. Define frequency
6. Define Power and mention Electrical and Mechanical units
7. Define Self Induction
8. Define capacitance
9. Write the applications of Magnets
10. Define Laws of Resistance

**Section - B**

**Note :** (i) Answer any 5 Questions 5 x 6 = 30  
(ii) Each Question carries 6 marks

11. Determine the total Resistance and the current supplied by battery for the given circuit



12. Calculate the monthly electricity bill at Rs.2.50 per unit for a residential building with the following load. Meter rent per month is Rs.12/-
- i) 4 No. of 60 watts ceiling fans uses for 10 hrs/day
  - ii) 4 No. of 40 watts lamps used for 8 hrs/day
  - iii) 1 No. of 200 watts refrigerator working for 18 hrs/day
  - iv) 1 No. 1/2 HP motor working for 4 hrs/day
13. The equation of an a.c. current wave is  $i = 54.52 \sin 520t$  determine its
- a) R.M.S. Value      b) Average Value
  - c) Frequency      d) Peak factor and Form factor
14. a) State Kirchoff's Law  
b) State Faraday's Laws of Electro magnetic Induction
15. Define and explain the following
- a) Time period      b) Form factor      c) R.M.S. Value
16. Write differences between primary and secondary cells.
17. What is the cost of running a 4 H.P. motor of efficiency 80% at full load for 24 hours at Rs.2.50 per unit
18. a) State Joules Law of Heat  
b) Define Lenz's Law

**MODEL QUESTION PAPER**  
**ELECTRICAL ENGINEERING TECHNICIAN**  
**ELECTRICAL ENGINEERING MATERIALS & WIRING**  
**FIRST YEAR THEORY PAPER-II**

**Time : 3 Hours**

**Max. Marks : 50**

**Section - A**

**Note :** (i) Answer all the Questions 10 x 2 = 20  
(ii) Each Question carries 2 marks

1. Write the properties of Aluminium
2. Define Fuse
3. What is Rectifier
4. Define Di-electric Strength
5. Write any Four Wiring tools
6. What are the types of Heat treatments
7. Write four electrical properties of copper
8. What are the applications of Semi-Conductors
9. Explain the thermocouple material
10. Write the applications of Magnetic material

**Section - B**

**Note :** (i) Answer any 5 Questions 5 x 6 = 30  
(ii) Each Question carries 6 marks

11. a) List the properties and uses of copper  
b) Explain how to prepare the straight joint for 7/18 SWG wire with a neat sketch
12. Explain Pipe earthing with a neat sketch
13. Mention any three properties and uses of
  - a) Copper
  - b) Eureka

14.
  - a) Explain about C.T.S. wire
  - b) Draw the circuit diagram of one-lamp controlled from two different places by using two-way switches
15. Explain Ring main system of wiring with a neat sketch
1.
  - a) State the classification of insulating materials
  - b) Write properties of mica
17. Classify the types of wires
18. Draw the staircase wiring circuit diagram and write its application

**MODEL QUESTION PAPER**  
**ELECTRICAL ENGINEERING TECHNICIAN**  
**ELECTRICAL MEASURING INSTRUMENTS &**  
**FUNDAMENTALS OF ELECTRONICS**  
**FIRST YEAR THEORY PAPER-III**

**Time : 3 Hours**

**Max. Marks : 50**

**Section - A**

**Note :** (i) Answer all the Questions 10 x 2 = 20  
(ii) Each Question carries 2 marks

1. Classify the electrical measuring instruments in detail
2. List the different effects of electric current used in measuring instruments
3. What are the basic requirement of indicating instruments
4. Write the uses of
  - a) Hydrometer
  - b) Synchronoscope
  - c) CT
  - d) Ohm meter
5. What are the errors in energy meters
6. Define conductor, semi conductor and give two examples for each
7. Draw the symbols of
  - a) PN Junction Diode
  - b) LED
  - c) PNP Transistor
  - d) Solar Cell
8. Define forward bias, reverse bias of PN-Junction
9. What is feedback of amplifiers
10. What are the advantages of Integrated circuits

**Section - B**

**Note :** (i) Answer any 5 Questions 5 x 6 = 30  
(ii) Each Question carries 6 marks

11. Explain with neat sketch about Moving Coil-permanent magnet type instrument
12. Draw the construction of
  - a) Moving Iron-deflection type instrument

- b) Moving Iron repulsion type instruments
- 13. Draw the neat sketch of single phase energy meter
- 14. Write a short notes on
  - a) Tongue Tester      b) Potential Transformer
- 15. Explain briefly about
  - a) UJT      b) SCR      c) LED
- 16. Explain the working of Bridge rectifier with neat sketch
- 17. Draw the circuit diagram of Transformer coupled amplifier
- 18. a) Write the comparison between integrated circuits and discrete circuits
  - b) Define gain, band width of amplifier

**MODEL QUESTION PAPER**  
**ELECTRICAL ENGINEERING TECHNICIAN**  
**ELECTRICAL MACHINES AND POWER SYSTEMS**  
**SECOND YEAR THEORY PAPER - I**

**Time : 3 Hours**

**Max. Marks : 50**

**Section - A**

**Note :** (i) Answer all the Questions 10 x 2 = 20  
(ii) Each Question carries 2 marks

1. Explain the principle of operation of a D.C. Generators
2. Describe conventional and non-conventional sources of energy
3. Define slip
4. Write the types of motors used in Alternators
5. Where do we install a pole mounted transformer
6. Define transformation ratio
7. Define back emf
8. What is the principle of alternation
9. Write any four types of single phase motors
10. Define R.M.S. value

**Section - B**

**Note :** (i) Answer any 5 Questions 5 x 6 = 30  
(ii) Each Question carries 6 marks

11. a) Write the working principle of a Transformer and explain briefly  
b) Write the types of cooling transformer
12. Explain the constructional details of a D.C. Generator
13. Write the comparison between polyphase over single phase
14. A 4 pole lapwound Generator has 24 slots and 12 slots/conductor, if the fluo/pole is 0.08 wb, the speed is 1400 rpm. Find the emf induced

15. Draw pole mounted substation and name the parts
16. a) Write the methods of speed control of a 3 phase induction motor  
b) A 4-Pole, induction motor is connected to 400v, 50 Hz, 30 supply, calculate the actual speed of the motor, if the slip is 0.02
17. The current in an A.C. circuit is  $i=100 \sin 2\pi t$ . supply frequency is 25 Hz. Find the time if current rises to 50A
18. Draw R-L Circuit and explain the Inductive Reactance, Impedance, power and power factor

**MODEL QUESTION PAPER**  
**ELECTRICAL ENGINEERING TECHNICIAN**  
**DOMESTIC APPLIANCES & RE-WINDING**  
**SECOND YEAR THEORY PAPER - II**

**Time : 3 Hours**

**Max. Marks : 50**

**Section - A**

**Note :** (i) Answer all the Questions 10 x 2 = 20  
(ii) Each Question carries 2 marks

1. Classify the domestic appliances and give two examples for each type
2. List the different types of electric irons and mention the type of material used for making the heating element
3. What are the generalised faults in motorised domestic appliances
4. List the different parts of Hair drier
5. What is the purpose of centrifugal switch in 1- $\phi$  motor
6. List the different types of waship machines
7. Define back pitch, front pitch in DC armature winding
8. Draw the circuit diagram of 1- $\phi$  permanent capacitor motor
9. What are the materials used in transformer winding
10. List the Important lods in winding ship

**Section - B**

**Note :** (i) Answer any 5 Questions 5 x 6 = 30  
(ii) Each Question carries 6 marks

11. Draw the circuit diagram of Automatic electric iron and explain the trouble shooting procedure
12. Draw connection diagram of mixer grinder and list the general faults and their remedies in it.
13. What is voltage stabiliser, and draw the connections of non-automatic voltage stabilizer

14. List the different tools for rewinding  
Explain in details about the testing of armature winding with grower
15. Compare the starting winding with running winding
16. Write the construction, working principle and uses of energy lamp
17. Write a short notes on
  - a) Transformer designing
  - b) Universal motor
18. Write a short notes on
  - a) Vacuum cleaner
  - b) Domestic water pump

**MODEL QUESTION PAPER**  
**ELECTRICAL ENGINEERING TECHNICIAN**  
**ELECTRICAL ESTIMATING & UTILIZATION**  
**SECOND YEAR THEORY PAPER-III**

**Time : 3 Hours**

**Max. Marks : 50**

**Section - A**

**Note :** (i) Answer all the Questions 10 x 2 = 20  
(ii) Each Question carries 2 marks

1. Define estimate
2. Draw the connection of typical 3- $\phi$  service mains with distribution board
3. What are the permissible conditions in lighting & power circuits as per IE rules
4. What are the types of conduits used in electrical wiring
5. How the labour charges are decided for execution of wiring
6. Mention the illumination level in
  - i) Kitchen
  - ii) Drawing Hall
  - iii) Mechanic Shop
  - iv) Classroom
7. Write the standard height of mounting of
  1. Switch board
  2. Wiring in residential building
  3. Main board
  4. lamp
8. Define Tender
9. What are the various types of lighting schemes
10. Write the application of
  - a) sodium vapour lamp
  - b) Neon lamp
  - c) Neon signs
  - d) Halogen lamp

## Section - B

**Note :** (i) Answer any 5 Questions 5 x 6 = 30

(ii) Each Question carries 6 marks

11. Estimate the quantity of materials required for a hall of 12x6x4 in surface conduit wiring. Assume any other required data
12. Draw the wiring diagram and estimate the materials required for 5 HP, 30, 440V, 50 Hz and 1 HP, 1 $\phi$ , 110V, 50 Hz in a workshop of 18x6x4. Assume any missing data.
13. Estimate the quantity of materials to install a PA system in a hall of 25x15. Assume any other data.
14. Install an OH line over a length of 2 km with a span of 50m, to supply domestic and small industrial consumers along with street lights of 40w.
15. Draw the elevation and write schedule of material for installing pole mounted transformer
16. Draw the layout of model village and propose the suitable supply system. Make the list of materials in a standard format
17. Draw the connection diagram for "ELECTRICAL" by using near sign tubes
18. Explain briefly about plate earthing

#### XIV. LIST OF PARTICIPENTS

Board of Intermediate Education with the Co-ordinated efforts of SIVE and other Vocational Lecturers and subject experts had taken the adventure of revising the curriculum to suit the present day requirements. A workshop was conducted for 5 day in for December 2004 to bring out the curriculum in the present form.

1. **Sri N. Mallappa Raju** M.Tech.  
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2. **Sri Daniel Venkata Tarnam** M.Tech.  
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3. **Sri K.U.V.V. Prasada Rao** LEE  
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5. **Sri M. Paul Prasad** B.E.(Ele.) MISTE  
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Reader, SIVE,  
%Director of Intermediate Education,  
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**VOCATIONAL CURRICULUM-2005**  
(With effect from the Academic Year 2005-2006)

Curriculum of Intermediate Vocational Course  
in

**ELECTRICAL  
ENGINEERING  
TECHNICIAN**



**STATE INSTITUTE OF VOCATIONAL EDUCATION &  
BOARD OF INTERMEDIATE EDUCATION A.P.  
Nampally, Hyderabad**



## **FOREWORD**

The National Policy on Education (1986) while proposing educational reorganization, placed high priority on the programme of vocationalisation of education. It emphasized that well planned, systematic and rigorously implemented vocational education will create a distinct stream to prepare students for identified occupations encompassing several areas of activity. The primary aim of vocational courses was to cut across several occupational fields and prepare students with employable skills in organized sectors and self employment. Vocationalisation through re-orientation of educational strategies focused on creating a talent pool of skilled youth who are trained in courses relevant to the market and emerging needs of the various sections of the economy.

Inspired by this vision of the National Policy, the Government of Andhra Pradesh introduced Vocational Education at +2 level with an aim to diversify a sizeable segment of students at the senior secondary stage to the world of work. The State Government aimed at reducing the pressures on higher education through empowering youth by harnessing their capabilities. The requirement of skilled manpower industry is being fulfilled by charting a student's career with right options based on aptitude and talent. An right alternative to medical and engineering courses is envisaged in vocationalisation of education in the State.

In view of the changing needs of the students and growing demand for a spectrum of skill competencies in the economy, the Board of Intermediate Education has reviewed the curriculum of Vocational Courses in order to re-orient them based on their viability and practicability. The revised curriculum for Vocational Courses at Intermediate Level will come into effect from the Academic Year 2005-06 1st Year and from Academic Year 2006-07 for 2nd Year students.

I am confident that the revised curriculum will attract more and more students into vocational stream and help them train in need-based, productive courses leading to gainful employment.



**SHASHANK GOEL**

Secretary, BIE



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