

# BEACON BY SIESGST [ISR]

## SUBJECT: ELECTRICIAN [Duration:12 Weeks]

### **1. BASICS OF ELECTRICAL ENGINEERING**

- 1.1 Define ohm's Law, Electric current, Electric potential, Resistance
- 1.2. Conductors, insulators, Semi conductors
- 1.3. Resistances in series and parallel- formulas-simple problems.
- 1.4. Definitions of work, power & energy
  - 1.4.1 Simple problems on power & energy
  - 1.4.2 Problems on energy consumption and monthly billing.
- 1.5 Cells - primary cells, secondary cells, lead acid cell
  - 1.5.1 Construction and working
  - 1.5.2 Efficiencies of cells
  - 1.5.3 Defects in cells
  - 1.5.4 Charging methods
  - 1.5.5 Care & maintenance of Battery
  - 1.5.6 Applications of batteries.

### **2. SAFETY PRECAUTIONS - FIRST AID**

- 2.1 Precaution to be taken while handling tools, during wiring etc, electric fire  
Electrical shocks
- 2.2 First aid - artificial respiration

### **3. WIRING INSTRUMENTS, ACCESSORIES AND MEASURING INSTRUMENTS**

- 3.1 Wring instruments-
  - 3.1.1 Handling of various wiring tools- Screw driver, combination pliers, Hammer, Electrician knife, hand saw, chisels, hand drill, rowel plug tool, hack saw,files, Ratchet brace, auger bit, plumb bob, pin vice, pipe vice, bench vice,hand vice, center punch, pipe wrench, blow lamp, spanner sets-double ended,ring spanner, slide wrench, box spanners, crimping tool, measuring tape, neontester, reamer, wire stripper & cutter, pipe cutter, die set, wire gauge etc.
- 3.2 Wiring Accessories-
  - 3.2.1 Switches, different types of switch boards, lamp holders, tapes ceiling rose, Round blocks, socket outlets, plug tops ICDP, ICTP, ICTPN main switches, Distribution boards, Types of Fuse and MCB
- 3.3 Measuring Instruments –
  - 3.3.1 Connection and use of Ammeter, Voltmeter, Wattmeter, Energy meter, Earth resistance meter, Megger & Multimeter

### **4.Cables and Wire Jointing**

#### 4.1 Cables

4.1.1 Types and specifications- VIR, PVC, CTS/ TRS, Lead Sheathed, weather proof, flexible, Copper & Aluminum;

#### 4.2 Wire-Jointing

4.2.1 Procedure for straight Joint, Married Joint, TEE Joint, and Pig tail Joint etc.

### 5. WIRING SYSTEMS - HOUSE WIRING - WIRING CIRCUITS

#### 5.1 Wiring Systems

5.1.1 Energy Distribution Systems - Single phase and three phases

5.1.2 Distribution Board System - T. System - Tree System Loop-in-System - Advantages - Disadvantages.

5.1.3 Lamp circuits incorporating main switch, energy meter, fuse cut-out and distribution box;

#### 5.2 House Wiring

5.2.1 Selection of wiring - C.T.S. Wiring casing and capping, Conduit wiring- (Concealed and Surface), comparison of different types of wirings.

#### 5.3 Wiring Circuits

Simple Lamp circuits, Staircase wiring, Corridor wiring, Lodge wiring, Godown wiring, Fluorescent lamp circuit – Use of starter and choke.

### 6. EARTHING

#### 6.1 Necessity of Earthing

6.2 List the materials that are to be used in the earth pit surrounding the earth electrode.

6.3 Methods - Pipe Earthing, Plate Earthing

6.4. Selection of the suitable type of Earthing for a given installation

### 7. WIRING TESTS AND I.E. RULES

7.1 Wiring Tests: Megger Tests, Continuity Test, Insulation Test, Polarity Test, Earthing system test.

7.2 I.E. Rules for Internal wiring, Earthing, Power circuit wiring.

### 8. A.C. MOTORS - STARTERS

8.1 A.C. Motors: 1-phase Motors, Split Phase Motors, Capacitor Motors, Universal Motors, Shaded pole Motors,

8.2 3-phase Motors-construction and working of 3-phase Induction Motors;

8.3 A.C. Starters

8.3.1 Necessity of starter –

8.3.2 Construction and working of D.O.L. Starter, Star-Delta Starter.

### 9. ESTIMATION

9.1 To prepare Estimation for Residential Buildings, offices, commercial shops

- 9.2 Estimation of Load Determination of No. of Sub-Circuits - Distribution of Load over Sub circuits
- 9.3 Calculation of Rating of Cable
- 9.4 Length of Batten / PVC Pipe, Length of cable preparation of material schedule along with their cost in standard proforma
- 9.5 Labour cost - Illumination requirement at various working places.

