

# PHOTOGRAPHS OF CHARTS ON ELECTRICAL TECHNOLOGY

### ELECTRICAL TECHNOLOGY (ET - 1) ELECTRIC CELLS

#### VOLTA'S SIMPLE CELL

**NAME OF THE CELL**

NAME OF THE CELL	POSITIVE POLE	NEGATIVE POLE	DEPOLARISER	USES
Volta's Simple Cell	Copper Rod	Zinc Rod		
Daniel Cell	Copper Vessel	Amalgamated Zinc Rod	Copper Sulphate Solution	Used in Electric Bell, Telegraphic Machine
Leclanche Cell	Carbon Rod	Amalgamated Zinc Rod	Manganese Dioxide	Used in Torch, Transistor, Radio, etc.
Dry Cell	Carbon Rod	Zinc Can	Manganese Dioxide	Used in Torch, Transistor, Radio, etc.

#### DANIEL CELL

#### LECLANCHE CELL

#### DRY CELL

### ELECTRICAL TECHNOLOGY (ET - 2) PERMANENT MAGNET MOVING COIL INSTRUMENT

**PRINCIPLE OF OPERATION**

The working of the P.M.M.C. instrument is based on the principle that when a current-carrying conductor is placed in a magnetic field, it is acted upon by a force which tends to move the conductor. The D.C. motor also works on this principle.

### ELECTRICAL TECHNOLOGY (ET - 3) MOVING IRON INSTRUMENT

**PRINCIPLE OF OPERATION OF MOVING IRON INSTRUMENT**

The attraction type instrument works on the principle of magnetic repulsion between two adjacent pieces of soft iron, magnetized by the same magnetic field.

**REPULSION TYPE OF MOVING IRON INSTRUMENT**

**ATTRACTION TYPE OF MOVING IRON INSTRUMENT**

### ELECTRICAL TECHNOLOGY (ET - 4) WALL - HOUR METER

**PRINCIPLE OF OPERATION OF WATT - HOUR METER**

A Single Phase kWh Meter is used to measure the amount of ELECTRICITY used by domestic consumers. There is an aluminium disc free to rotate in the magnetized field set up by two sets of coils. One set is series with the current coil and the other is parallel to the potential coil. The rate of rotation of the disc is proportional to the POWER being used.

### ELECTRICAL TECHNOLOGY (ET - 5) HYDRO-ELECTRIC POWER PLANT

Most hydroelectric power comes from the potential energy of dammed water driving a water turbine and generator. The power extracted from the water depends on the volume and on the difference in height between the source and the water's outflow. This height difference is called the head. The amount of potential energy in water is proportional to the head. A large pipe (the "penstock") delivers water to the turbine.

### ELECTRICAL TECHNOLOGY (ET - 6) THERMO-ELECTRIC POWER PLANT

Thermal Power Plants - Rankine cycle based steam power plants are the major source of power generation. In a thermal power plant, the chemical energy stored in fossil fuels such as coal, fuel oil, natural gas is converted successively into thermal energy, mechanical energy and finally electrical energy for continuous use and distribution across a wide geographic area.

#### COAL FIRED THERMOELECTRIC POWER PLANT

**SCHEMATIC DIAGRAM OF THERMOELECTRIC POWER PLANT**

NAME OF THE UNIT AND ITS FUNCTION	
BOILER	Releases steam
STEAM TURBINE	Converts heat energy of the steam into mechanical energy
GENERATOR	Increases mechanical energy of the turbine into electrical energy
CONDENSER	Converts mechanical energy of the turbine into an electrical energy

### ELECTRICAL TECHNOLOGY (ET - 7) SOLAR POWER PLANT

**APPLICATIONS OF SOLAR ENERGY**

- SOLAR CELL PANEL
- SOLAR COOLER
- SOLAR STREET LIGHTING

### ELECTRICAL TECHNOLOGY (ET - 8) NUCLEAR POWER PLANT

**LAYOUT OF NUCLEAR POWER PLANT**

**NUCLEAR FISSION**

Inside a reactor uranium atoms break apart when struck by neutrons. Each atom then produces more neutrons which strike more uranium atoms. These atoms in turn break apart and produce neutrons. This chain reaction produces large amounts of heat.

### ELECTRICAL TECHNOLOGY (ET - 9) STEAM - ELECTRIC POWER PLANT

Steam Electric power plants create steam by heating water in a nuclear reactor or in a combustion chamber, where coal, oil, or gas is burned. The steam turns a turbine that runs a generator. The generator has a rotating electromagnet called a rotor and a stationary part called a stator. A separate generator called an exciter powers the rotor, creating a magnetic field that produces an electric charge in the stator.

### ELECTRICAL TECHNOLOGY (ET - 10) WORKING OF AN ELECTRIC MOTOR

**ROTATION BEGINS** because the north poles of the armature (conductor) and the fixed magnet repel each other as do their south poles.

**THE CURRENT IS REVERSED**, as are the poles on the armature, after the armature passes the gap in the split ring. Rotation can then continue.

**ROTATION CONTINUES** as the armature passes the gap in the split rings. The opposite poles of the armature and the fixed magnet attract each other.

### ELECTRICAL TECHNOLOGY (ET - 11) DIRECT CURRENT MOTOR

**PRINCIPLE OF WORKING OF ELECTRIC MOTOR**

An electric motor works on the principle that a current-carrying conductor placed in a magnetic field experiences a force.

**CONSTRUCTION AND WORKING OF ELECTRIC MOTOR**

THE MAIN PARTS OF A D.C. MOTOR ARE -

- (1) Armature coil ABCD
- (2) Sliding magnet
- (3) Split ring Commutator
- (4) Two brushes
- (5) Battery

### ELECTRICAL TECHNOLOGY (ET - 12) ALTERNATING CURRENT MOTOR

Rotating magnetic field of the stator

**PRINCIPLE** - In A.C. motors, the alternating current flows around the field coils in the stator and produces rotating magnetic field. This field induces an electric current in the rotor, resulting in another magnetic field. The magnetic field from the rotor interacts with the magnetic field from the stator, causing the rotor to turn.

The main parts of an A.C. motor are:

1. Stator and
2. Rotor

### ELECTRICAL TECHNOLOGY (ET - 13) CUTAWAY OF A SINGLE PHASE INDUCTION MOTOR

Figure shows a cutaway of a fractional - horsepower single - phase induction motor. Since a single - phase motor with a squirrel - cage rotor cannot start from standstill, a secondary circuit is included in which a capacitor causes the current in a starting winding to lead the applied voltage, thus enabling rotor to begin.

### ELECTRICAL TECHNOLOGY (ET - 14) D. C. GENERATOR

An electric generator is a device that converts mechanical energy to electrical energy using electromagnetic induction.

The energy conversion in generator is based on the principle of the production of electromotive induced e.m.f. Whenever a conductor cuts magnetic flux, electromotive induced e.m.f. is produced in it according to Faraday's Law of Electromagnetic induction. This e.m.f. induces a current as long as the conductor circuit is closed.

### ELECTRICAL TECHNOLOGY (ET - 15) ALTERNATING CURRENT GENERATOR

**PRINCIPLE OF WORKING** - An alternating current generator works on the principle of Faraday's law of induction. Whenever a conductor moves in a magnetic field set up by the lines of force of an AC and is induced in the conductor. The amount of induced e.m.f. depends upon the rate of motion of cutting in linkage of flux.

The direction of induced current can be determined using Fleming's right hand rule.

Generator terminal voltage at different positions:

- 0° POSITION
- 90° POSITION
- 180° POSITION
- 270° POSITION
- 360° POSITION

### ELECTRICAL TECHNOLOGY (ET - 16) TRANSFORMERS

**TRANSFORMER SCHEMATIC DIAGRAM OF A TRANSFORMER**

**TYPES OF TRANSFORMER**

- CORE TYPE TRANSFORMER
- BERRY TYPE TRANSFORMER
- SHELL TYPE TRANSFORMER

### ELECTRICAL TECHNOLOGY (ET - 17) ELECTRIC STOVE / ELECTRIC IRON

**ELECTRIC STOVE**

**ELECTRIC IRON**

### ELECTRICAL TECHNOLOGY (ET - 18) SOLDERING IRON / IMMERSION HEATER / GEYSER

**SOLDERING IRON**

**IMMERSION HEATER**

**ELECTRIC GEYSER**

### ELECTRICAL TECHNOLOGY (ET - 19) ELECTRIC BELL

An electric bell is a mechanical bell that functions by means of an electromagnet. When an electric current is applied, it produces a repetitive buzzing or clanging sound.

**TREMBLER BELL**

**CONTINUOUS RINGING BELL**

### ELECTRICAL TECHNOLOGY (ET - 20) TREATMENT AGAINST SHOCK

**STEP - 1 : OPEN AIRWAY**

**STEP - 2 : CHECK FOR BREATHING**

IF NOT BREATHING, GIVE 2 FULL BREATHS

**STEP - 3 : CHECK FOR PULSE**

IF NO PULSE

**STEP - 4 : IF NO PULSE**

CONTINUOUS CHEST COMPRESSION (CPR)

### ELECTRICAL TECHNOLOGY (ET - 21)

#### WIREMAN'S TOOLS - I

- FOUR FOLD RULE**  
It is used for taking linear measurements, for an accuracy of 1/16th of an inch.
- PUSH PULL TAPE**  
Used to determine the size of workpiece or surface area.
- WIRE GAUGE**  
Used to measure the gauge of wire and thickness of sheet metal.
- FEELER GAUGE**  
Used to measure the thickness of sheets, plates and the clearance between mating objects such as an inlet valve seat.
- MICROMETER**  
Used for measuring the thickness of work surfaces.
- TRY SQUARE**  
Used for checking right angles and squareness of work surfaces.
- AWL**  
To make starting holes for screws and nails to prevent splitting in wood.
- CHISEL**  
To bore holes in wood.
- AUGER**  
To bore holes in wood.

### ELECTRICAL TECHNOLOGY (ET - 22)

#### WIREMAN'S TOOLS - II

- POWER DRILL**
- HAND DRILLING MACHINES**
  - WHEEL BRACE**
  - RATCHET BRACE**
- RAWAL PUNCH**
- RASP AND FILE**
- WIREMAN'S KNIFE**
- SCRIBER**
- HAMMERS**
- CHISELS**

### ELECTRICAL TECHNOLOGY (ET - 23)

#### WIREMAN'S TOOLS - III

- SAWS**
- ELECTRICIAN'S PLIER**
- SCREWDRIVERS**
- TEST LAMP**
- SPANNERS**
- LINE TESTER**
- APRONS**
- LOW TAP**
- SOLDERING IRON**

### ELECTRICAL TECHNOLOGY (ET - 24)

#### TYPES OF CABLE / CONDUCTOR TER.

- CRIMP CONNECTION**
  - CRIMPING TOOL**
  - CRIMPING TERMINAL CONNECTION**
- INSERT SCREW SETTING**
- METHODS OF SECURING CONDUCTOR IN ACCESSORIES**
- USE OF TWO-WAY CONNECTOR**

### ELECTRICAL TECHNOLOGY (ET - 25)

#### PROCEDURE OF MAKING A JOINT / TELEGRAPH JOINT

- PROCEDURE OF MAKING A JOINT**
  - Remove the insulation on the wire.
  - Clean all the wires, solder the joint and make the joint insulated.
- TELEGRAPH JOINT**

### ELECTRICAL TECHNOLOGY (ET - 26)

#### BRITANNIA / BELHANGER'S JOINT

- PROCEDURE FOR MAKING A BRITANNIA JOINT**
- BRITANNIA JOINT**
- BRITANNIA TEE JOINT**
- PROCEDURE FOR MAKING A BELHANGER'S JOINT**

### ELECTRICAL TECHNOLOGY (ET - 27)

#### WESTERN UNION JOINT / T-JOINT BETWEEN 1/18" WIRES

- PROCEDURE OF MAKING WESTERN UNION JOINT**
- PROCEDURE OF MAKING T-JOINT OF 1/16" INSULATED WIRES**

### ELECTRICAL TECHNOLOGY (ET - 28)

#### T-JOINT BETWEEN 3/22" WIRES / PVC INSULATED WIRES

- T-JOINT BETWEEN 3/22" WIRES**
- T-JOINT BETWEEN 7/12" WIRES**

### ELECTRICAL TECHNOLOGY (ET - 29)

#### TYPES OF FUSES

- FUSES**
- REWRILABLE FUSE**
- FERRULE-CONTACT CARTRIDGE FUSES**
- DIAZED SCREW-TYPE CARTRIDGE FUSES**
- FUSE SOCKET**
- FUSE BASE**
- HIGH RUPTURING CAPACITY (HRC) FUSE**

### ELECTRICAL TECHNOLOGY (ET - 30)

#### EARTHING

- SYSTEM EARTHING**
- EQUIPMENT EARTHING**
- TYPES OF EARTH ELECTRODES**
  - ROD AND PIPE ELECTRODES**
  - PLATE ELECTRODES**

### ELECTRICAL TECHNOLOGY (ET - 31)

#### ELECTRICAL ACCESSORIES - I

- SINGLE-WAY OR SINGLE POLE SWITCH**
- TWIN KNOB SWITCH**
- SINGLE POLE TWO-WAY SWITCH**
- PULL OR CEILING SWITCH**
- DOUBLE POLE IRON-CLAD SWITCH (DPS)**
- TRIPLE POLE IRON-CLAD MAIN SWITCH (TMC)**
- PENDANT LAMP HOLDER**
- BRASS BATTEN HOLDER**

### ELECTRICAL TECHNOLOGY (ET - 32)

#### ELECTRICAL ACCESSORIES - II

- ANGLE HOLDERS**
- BRACKET HOLDERS**
- EDISON SCREW TYPE HOLDER**
- GOLIATH EDISON SCREW TYPE HOLDERS**
- ANGLE SWIVEL LAMP HOLDER**
- KIT - KAT FUSE**
- IRON-CLAD CUT-OUT**
- THREE PIN SOCKETS**

### ELECTRICAL TECHNOLOGY (ET - 33)

#### ELECTRICAL ACCESSORIES - III

- THREE-PIN PLUG**
- FLAT & IRON CONNECTOR**
- ADAPTOR**
- TWO-PLATE CEILING ROSE**
- THREE-PLATE CEILING ROSE**
- CONNECTORS**
- DISTRIBUTION BOARD**
- NEUTRAL LINK**

### ELECTRICAL TECHNOLOGY (ET - 34)

#### TYPES OF ELECTRICAL POLES

- WOODEN POLE**
- R.C.C. POLE**
- STEEL POLES**
- STAY WIRE METHOD**
- STAY ARM METHOD**
- USING SUPPORTING POLE**
- USING THE POLE**

### ELECTRICAL TECHNOLOGY (ET - 35)

#### METHODS OF SUPPORTING A POLE

- STAY WIRE METHOD**
- STAY ARM METHOD**
- USING SUPPORTING POLE**
- USING THE POLE**

### ELECTRICAL TECHNOLOGY (ET - 36)

#### TYPES OF INSULATORS / BRACKETS

- SHACKLE TYPE INSULATOR**
- PIN TYPE INSULATORS**
- SUSPENSION TYPE INSULATORS**
- EGG OR STAY INSULATORS**
- TYPES OF BRACKETS**

### ELECTRICAL TECHNOLOGY (ET - 37)

#### FILAMENT LAMPS

- METAL FILAMENT LAMP OR TUNGSTEN FILAMENT LAMP**
- FILAMENT**
- CARBON FILAMENT LAMP**

### ELECTRICAL TECHNOLOGY (ET - 38)

#### FLUORESCENT TUBE

- CONSTRUCTION**
- CIRCUIT DIAGRAM**
- GLOW TYPE STARTER**
- BALLAST (CHOKER)**

### ELECTRICAL TECHNOLOGY (ET - 39)

#### MERCURY VAPOUR LAMP

- 1. MA type lamp**
- 2. MAT type lamp**
- 3. MB type lamp**

### ELECTRICAL TECHNOLOGY (ET - 40)

#### SODIUM VAPOUR LAMP

- HIGH PRESSURE SODIUM VAPOUR LAMP**
- LOW PRESSURE SODIUM VAPOUR LAMP**
- NEON SIGN TUBE**