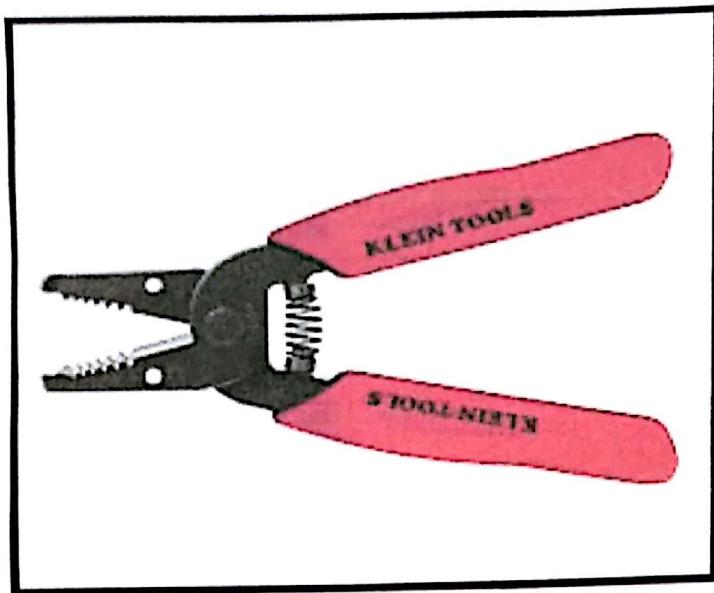


# INTRODUCTION



In this subject, we are taught how to maintain and repair electrical appliances and electrical machine, how to connect electrical circuits and repairing minor or major faults in this circuit or motor rewinding both theoretically and practically. So it is necessary for engineering students to know about electrical work.

In electrical workshop, knowledge is given about the electricity, field of its applications, electrical instruments, domestic and industrial wiring, electrical goods used, symbols and precautions to be kept in mind. Electrical workshop is a basic subject offered to the under graduate engineering students it gives a fair knowledge about the various electrical gadgets used in day to day life and troubleshoot them.



→ WIRE STRIPPER



PLIER →



← Non contact  
voltage tester

# TOOLS USED

Wire Stripper : These are used to cut the insulation off the wire. They are equipped with different sized cutting techniques for various sized cutting wires.

Pliers : These are the do-it-all pliers. They are used to cut twist wires together and grip wires for pulling.

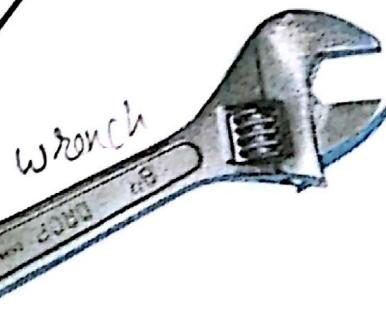
Non Contact Voltage Detector :- These are the voltage detector used for a quick safety check to see if there is voltage or current flow present.

Hammer : A hammer is used to screw boxes equipped with nail-on brackets to studs in home.

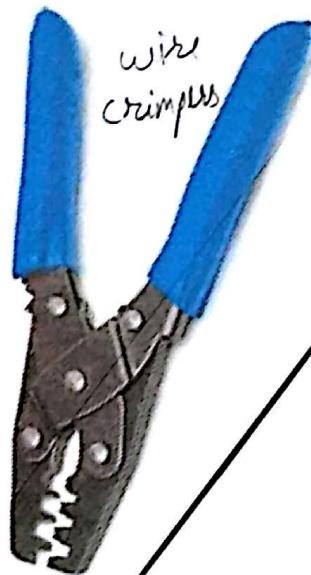
Flashlight : A light comes in a handy way in those places where light is limited. A flashlight is portable hand held device.

Screw Driver : A screw driver is a tool, used for turning (driving) screws. A typical screw drivers has a handle and a tip that the user inserts into the screw.

Bulb



wire  
crimper



Electrician's  
knife

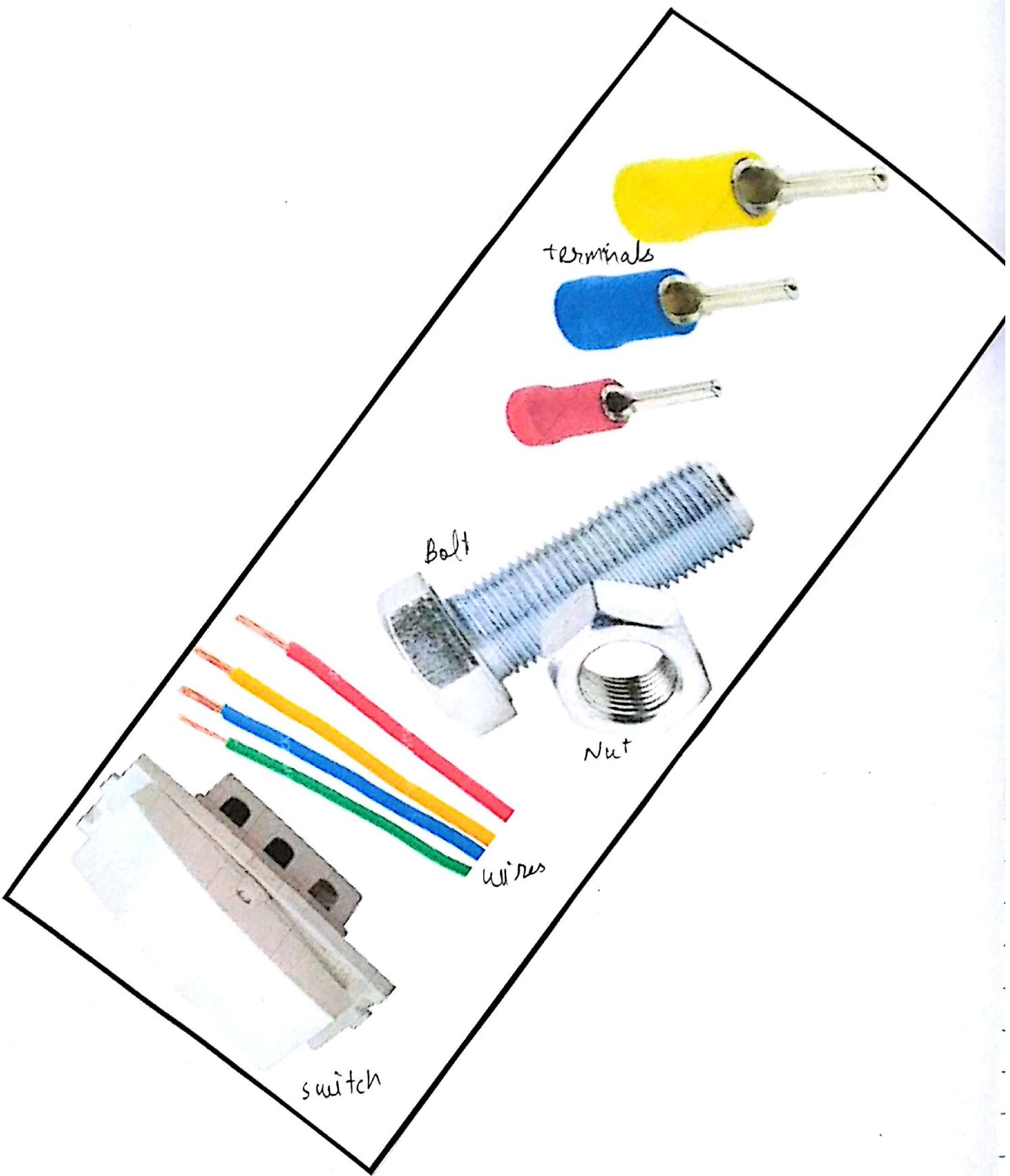


**Electrician's Knife :** The knife is needed to cut the insulation off of Romex wiring.

**Wrench :** A wrench is a tool used to provide grip and mechanical advantage applying torque to turn object.

**Wire Crimpers :** This tool strips the wire and also crimps lugs onto the wire. They are used to connect two wires together.

**Test Bulb :** A test light or mains tester is a simple piece of bulb, mounted on a holder with two polarity wires and is usually used to check presence of voltage.



# MATERIALS USED

Terminals Used : These are used for transmission and connection to the others. A single way terminal block is used for differentiating the line for neutral wire.

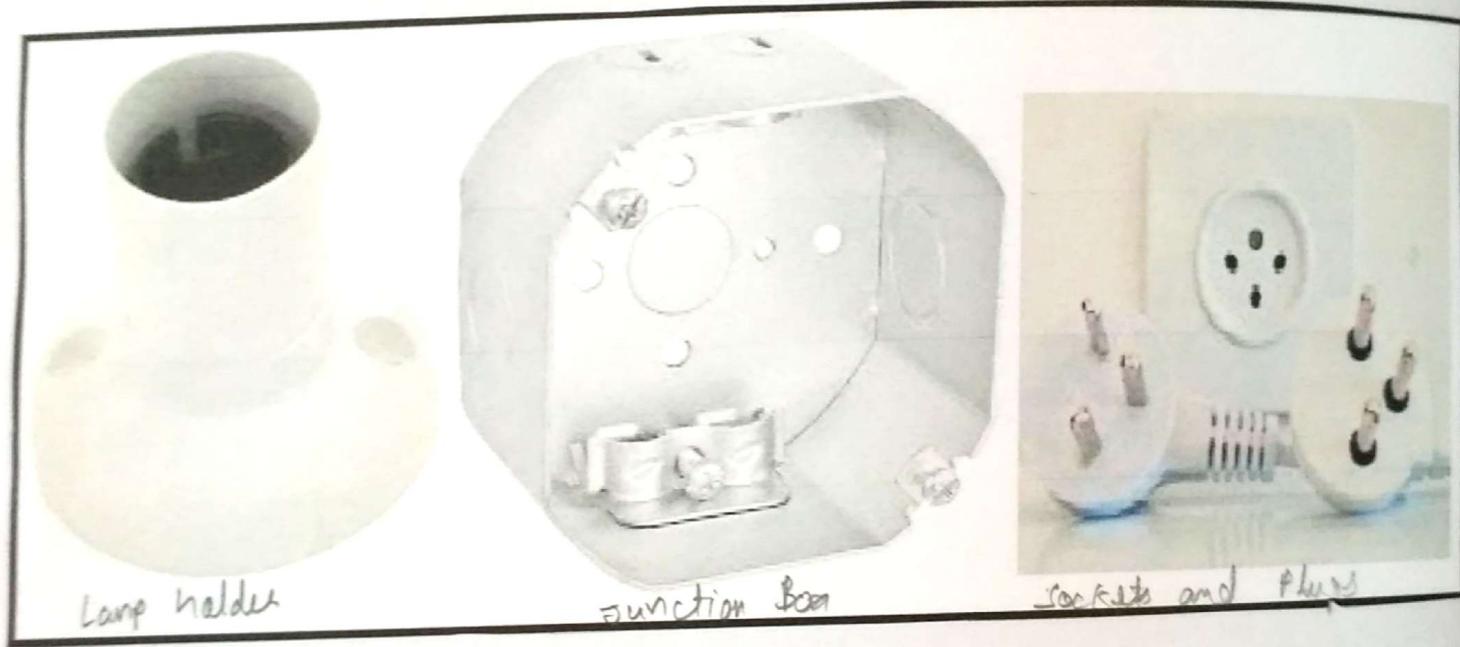
Nut Bolts : A nut is a type of fastener from a threaded hole. nuts are almost always used in conjunction with a mating bolt to fasten two or more parts together

Connecting wires : A wire is a single, usually cylindrical flexible strand or rod of metal wires  
these are of 3 types

- live wire :- these are red in colour
- Neutral wire :- these are black in colour
- Earth wire :- these are green in colour.

Switches : A switch is used to make or break the electrical circuits. The switches may either be placed in the lines or both of them. These are of two types.

- Single way switch
- two way switch



Lamp Holder : It is used to hold the lamp required for lightening. It has porcelain molded internal and plastic outer body.

Bakelite sheet : It is the mounted sheet made up of Bakelite which is water as well as heat insulated. Cavities can be made in this sheet and then the components could be inserted.

Electrical insulating tape : It is used to insulate the ends of open wires and joints, so as to prevent direct contact from body. They are made up of sticky insulating material.

Junction boxes : An electrical junction box is a container for electrical connector, usually intended to conceal wirings. They may be made up of metal and plastics.

PVC buttons and pipes : pipes made up of pvc are used for internal wiring in houses and PVC buttons are required to conceal external wires

Sockets and Plugs : The sockets are the outlet for making temporary connections. For high power and pin plugs are used

**DANGER**



**Electrical  
shock  
hazard**

# ELECTRIC SHOCK & MANAGEMENT

**Electric Shock :** An electric shock is received when electric current's passed through the body. We get an electric shock if the part of our body completes an electric circuit by:-

- (a) Touching a live wire and electrical ground
- (b) Touching a live wire and another wire at a different voltage.

Severity of shock depends on:-

- \* path of the current through the body.
- \* Amount of current flowing through the body.
- \* Duration of current flow through the body.

**Management :**

- Stay away from all the wires if there are no sparks
- get help right away
- Do not touch anything or anyone that is touching a drowned wire.
- If you are inside a vehicle, wait inside for help
- If you want to get out, jump without touching the ground and vehicle at the same time.
- If you are a witness, stay clear and call for help.

## Precautions :

- The floor of workshop or workspace must be free from oil grease and water. These material can cause the worker to slip while working.
- Equipments used must be in good and perfect condition
- Wear suitable clothing, not too tight and not too loose
- Wear shoes having thick soles while working with wires
- Make sure the appliances used are having proper insulation.
- All connections should be tight

## Preventions :

- Never allow children to play with electrical appliances
- Always use outlet covers for electrical outlets and grounded systems to prevent harm
- Replace any old, ungrounded electrical outlets to grounded systems.
- Replace outlet present near any water sinks and tubs etc.

## Treatment :-

- For severe burns, surgery with skin grafting may be required.
- If the patients have severe burns on arms, hands, legs, then surgery is done to remove the damaged muscles, dispositions may also be needed.
- If there are any broken bones, then the patient requires splinting, casting or surgery.
- Antibiotic, ointments and dressings are applied for minor burns.

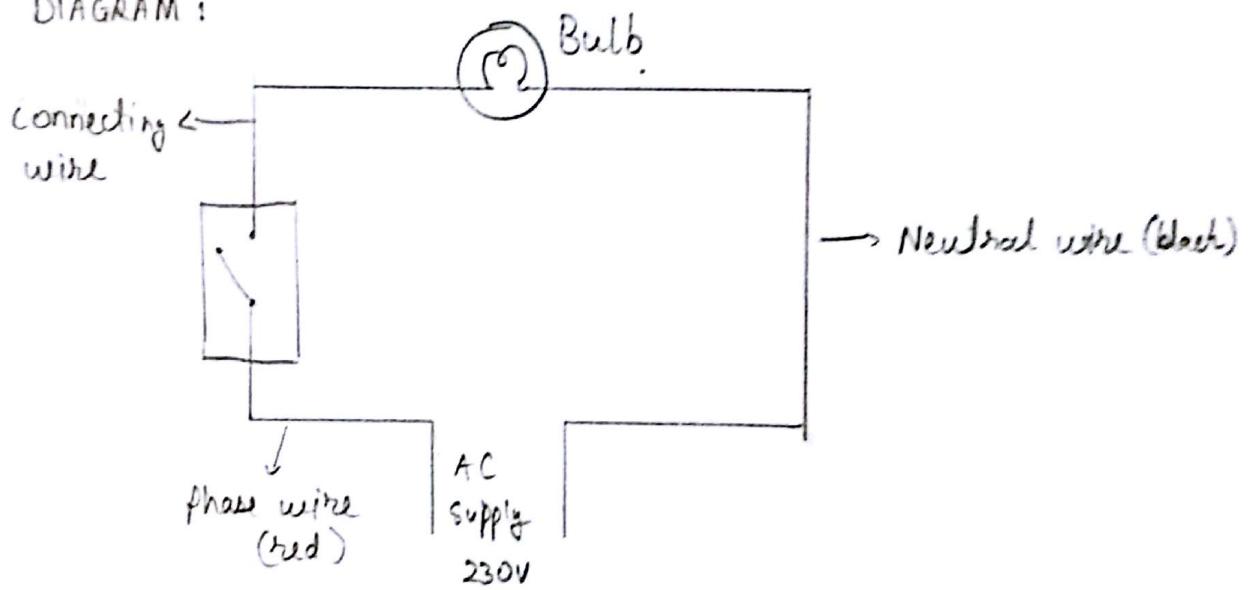
# JOB 1

AIM: To operate a lamp with single way switch

TOOLS: Plier, screw driver, pliers, Tester, stripper.

MATERIALS: Single way switch, wire, lamp, bakelite sheet, was  
nut, bolts, lamp holder

CIRCUIT DIAGRAM:



RESULT: Wired up a circuit in conduct system  
one lamp is controlled by one switch.

# Job 1

Aim : To operate a lamp using single way switch.

Tools : Tester, screw driver, poker, plier, stripper

Materials Used : Lamp holder, lamp, single way switch, Bakelite sheet, pieces of wire, screws, nuts, bolts

## Procedure :

- 1) Take a bakelite sheet and cut it so that a switch could fit in, make two holes using poker to fit bulb holder.
- 2) Make connections of wire with the help switch on take the wires out from the back side of bakelite sheet
- 3) Then using connecting wires, make connections
- 4) Make a stand of whole set up using four long screws
- 5) Test your circuit using AC supply

## Precautions :

- 1) Connections must be neat and clean and tight

- 2) Remove insulation only as required
- 3) No extra power supply must be given to the external circuit other than the normal supply
- 4) Take precautions while using pokers and cutters.

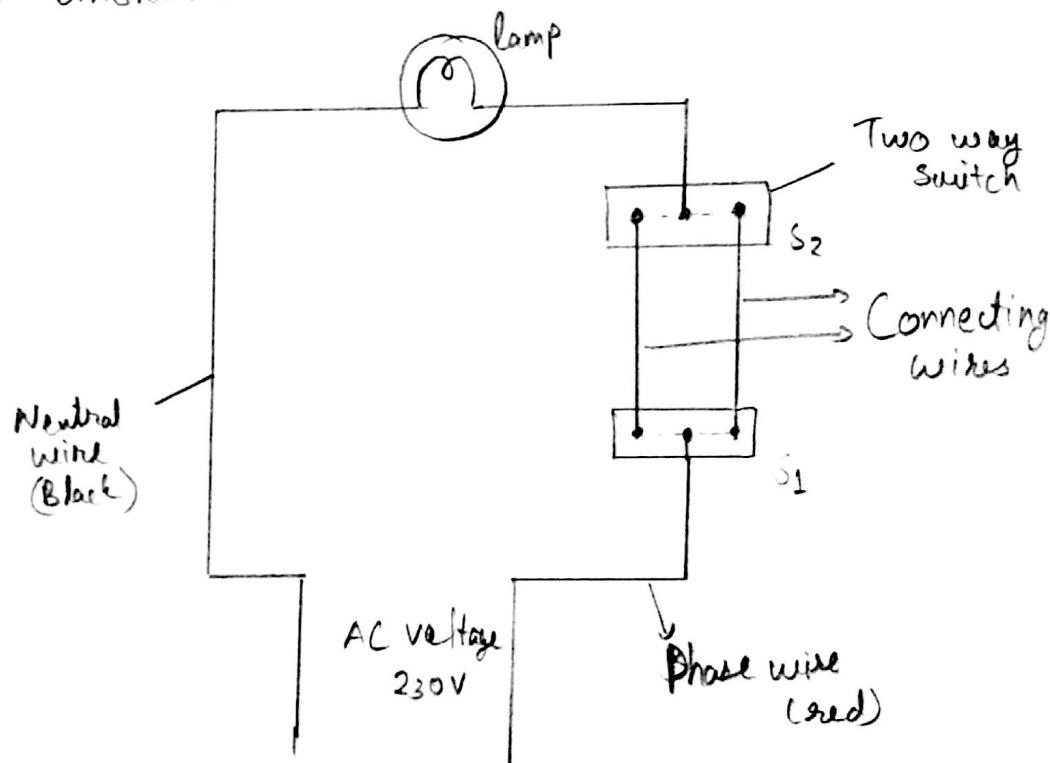
# JOB 2

AIM: To control a lamp from two different places

TOOLS: Pliers, test pen, screw drivers

MATERIALS: Bakelite sheet, lamp holder, two way switch, wire, lamp, screw, nuts.

CIRCUIT DIAGRAM:



RESULT: wired up a circuit in conduct system  
one lamp is controlled by two switches

# JOB 2

Aim: To control a lamp from two different places

Tools: Pliers, test pen, screw drivers

Materials: Bakelite sheet, lamp holder, two way switch, wire, lamp, screw, nuts.

Procedure:

- 1) Connect one terminal of lamp holder, with neutral wire and other with connecting wire
- 2) Put the lamp holder and two way switches on bakelite sheet.
- 3) Connect the connecting wires of lamp holder to the extreme terminals of switches
- 4) Connect the middle terminal of one switches with live wire
- 5) Now the lamp can be made to glow through wires of the switches.

## Precautions :

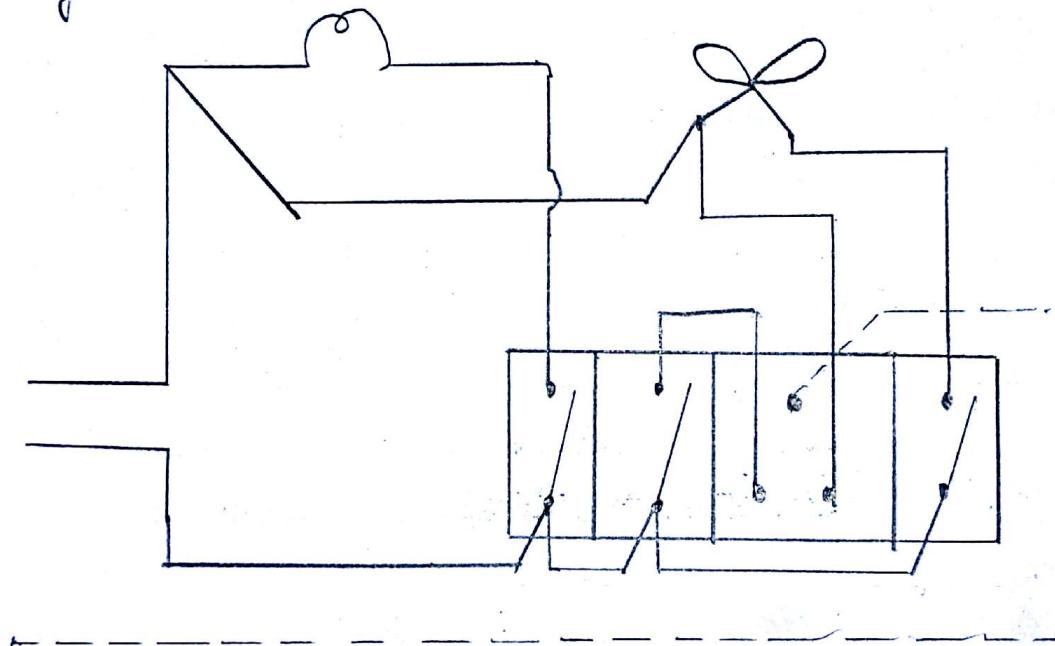
- 1) Never use water to extinguish fire caused in any case. Always use sand.
- 2) All the connections should be tight and clean.

Aim: To control a lamp, a fan and 3-pin socket with single way switch in parallel connections.

Tools: Pliers, screw driver.

Materials: Bakelite sheet, lamp holder, one way switch, lamp, nuts and bolts, terminal screws, connecting wires, fan connectors.

Circuit Diagram:



# Job-3

Aim: To control a lamp, fan and three pin socket with single way switch in parallel connections

Tools: Pliers, tester, screwdriver

Materials: Bakelite sheet, lamp holder, one way switches, lamps, nuts, terminals, screws, connecting wires, fan connectors

## Procedure :-

- 1) Take a bakelite sheet of proper dimensions
- 2) Use of poker to make holes
- 3) Insert lamp holders after connecting wires of appropriate colours to it (neutral wire directly)
- 4) Similarly, connect fan connector
- 5) Connect the switches according to the circuit diagram
- 6) Further, make other connectings and connect wires.

## Precautions :-

- 1) Connections should be neat clean and tight
- 2) Use wires of proper length.
- 3) All connections should be done with care.
- 4) Wires must be properly insulated
- 5) For proper identification, use colour specific wires.

Teacher's Signature.....

Aim :- To Assemble a Fluorescent tube light with accessories

Tools :- Plier, plier, tester, screw driver

Materials :- Fluorescent tube fitting, Fluorescent tube, connecting wires supply connections, nuts and bolts, choke copper blast, two way connections

# Job -4

Aim : To assemble a fluorescent tube light with accessories.

Tools: Pliers, plier, tester, screw driver.

Materials: Fluorescent tube fitting, fluorescent tube, connecting wires, supply connections, nuts and bolts, choke/copper blast, two way connectors.

## Procedure :

- 1) Take the fluorescent tubelight fitting and make appropriate holes.
- 2) Connect the wires with two way connections and attached them to the fitting using nuts and bolts.
- 3) Attach the choke and starter and make connections
- 4) Connect all the accessories according to the circuit
- 5) Connect supply pin and attach power.
- 6) Required setup is obtained.

Teacher's Signature.....