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<i>Completed all Experiments</i> <i>NatD</i> <i>27/11/19</i>				

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NaI 22/11/19~~

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27/11/19

Exp.No. 1

06 08 2019

2

SAFETY PRECAUTIONS

1. Wear light dress for maximum safety in practical classes
2. Use good quality footwear as shoes to provide maximum resistance
3. Understand the procedure completely before starting the work.
4. Use specific tools for a specific works and follow the actual step to complete the work.
5. Take utmost care while levelling lampholders, switches etc
6. Do not touch switch boards, main switches, holders etc with wet hands.
7. Do not touch any apparatus which was, were wet before putting plug pins off.
8. Do not operate any electrical appliances at low voltage.
9. Give electrical supply to the wiring system only after checking the connections properly.

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Date
06/09/19.

Exp.No. 2

06 08 2019

3

BAISIC ELECTRICAL ENGINEERING OVERVIEW

Electric current :

Electrical current can be termed as a continuous flow of electrons through a conductor.

EMF :

EMF is known as electromotive force. It is the potential difference between the two points in a circuit. Potential difference may be termed as volt. Voltage of a torch battery is 1.5V and that of an automatic battery is 12V. KSEB supply voltage for domestic installation is 240V.

Electrical Power :

Electrical Power $P = V \times I \times \text{Power factor}$.

Unit of electrical power is watt (W).

Electrical Energy :

Unit of electrical energy is kWh.

1 unit energy = 1 kWh

KSEB provides 1kWh meter at every installation for the

measuring consuming energy

Resistance :

It is the property of a substance used to which it opposes the flow of current through it.

Unit of resistance is ohm (Ω)

$$R = \frac{\rho l}{A}, \text{ where } \rho = \text{Resistivity}$$

l = length of the conductor

A = area of the conductor



Effect of temperature on resistance :

When temperature increases, resistance of pure metal ions and alloys increases. When temperature decreases resistance of electrolyte insulator increases.

Resistance in Series :

Consider 3 resistors connected in series, then total resistance of the circuit, will be the sum of three resistors.

Ohm's Law :

Ohm's law states that "the ratio of potential difference between any two points in a conductor to the current through them is a constant."

Voltage & Current

$$R = \frac{V}{I}, \text{ temperature constant.}$$

Exp.No. 3

06 08 2019

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ELECTRIC SYMBOLS

1. Positive Polarity



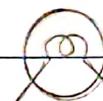
2. Negative Polarity



3. Earth



4. Lamp



5. Switch (SPST)



6. Switch (SPDT)



7. Fixed resistance



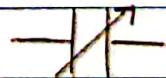
8. Variable resistance



9. Fixed capacitor



10. Variable capacitor



11. Intermediate switch



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6

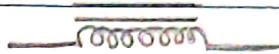
12. Generator



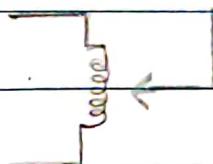
13. Alternator



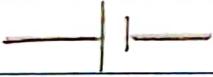
14. Choke



15. Auto transformer



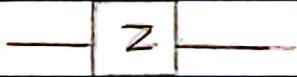
16. Cell



17. Battery



18. Impedance



19. Fault



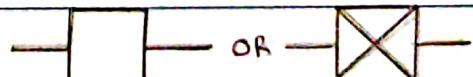
20. A.C motor



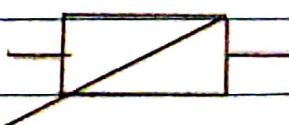
21. D.C motor



22. Neutral lamp



23. Tube light



Exp.No.

7

24. Aerial



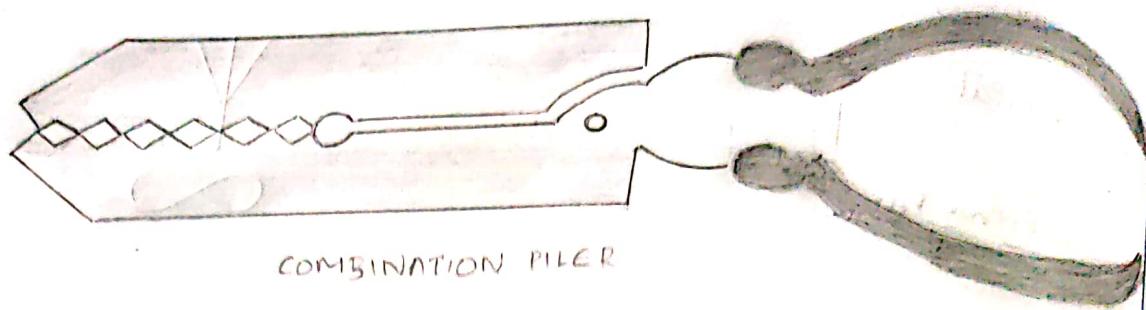
25. Ceiling Fan



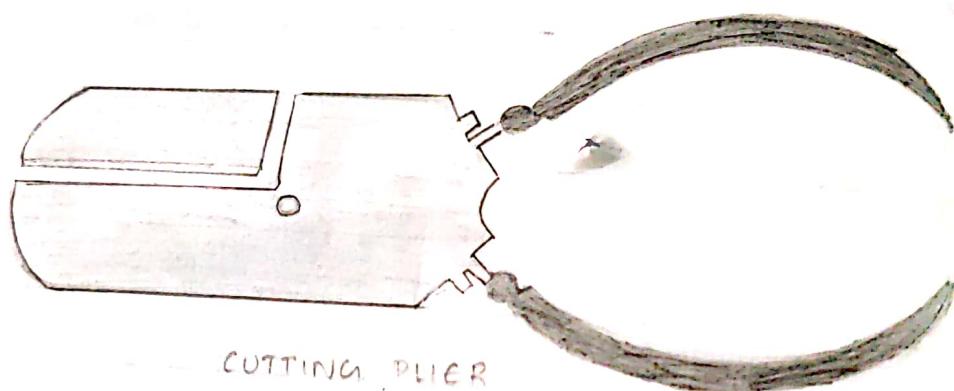
Result:

Electrical Symbols are studied.

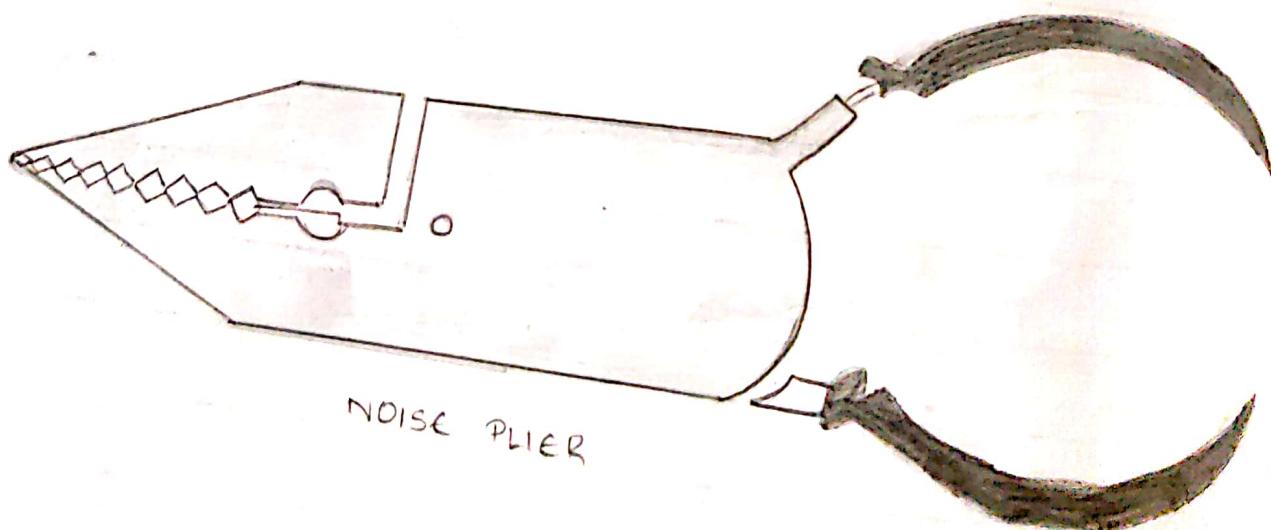
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2/1091A.



COMBINATION PLIER



CUTTING PLIER



NOISE PLIER

FAMILIARISATION OF TOOLS

Aim:

Familiarisation of tools in use in electrical workshop and their uses.

Combination Plier:

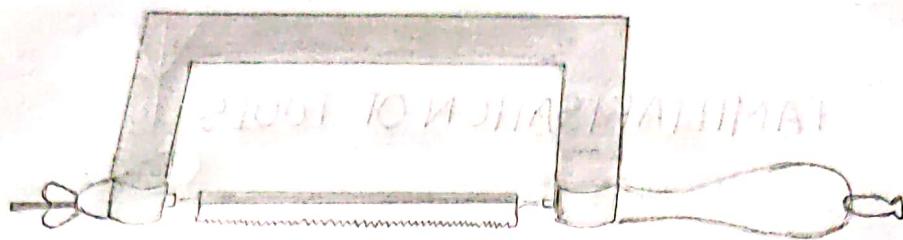
It is used for making purposes like holding, twisting, cutting of wires etc. It is available in different sizes according to use. Pliers basically consist of plain or steel arms. Each having a jaw at one end. Usually 7 inches and 8 inches are used.

Cutting Plier:

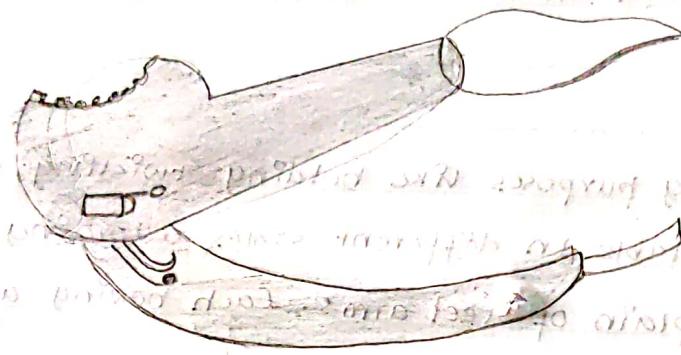
It is used in cutting wire. It can also be used to remove insulation of a wire. It has a good cutting edge specifications may be 6 inches or 7 inches.

Nose Plier:

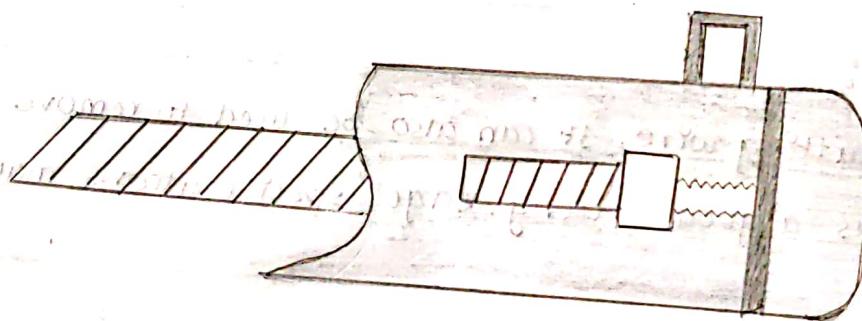
It has a pointing end. As the pointing end is very small, it is used to hold and twist small wires. It is also available in different size, the specification may be 6 inches, 7 inches.



HACK SAW BLADE



WIRE STRIPPER



ELECTRICIAN'S KNIFE



POCKET KNIFE

Hark Saw Blade :

It is used for cutting metals such as conduits, cables etc. Hark saw is usually of 12 inches or 14 inches.

Wire Stripper :

It is used to remove insulation of the wire specification may be 5 inches, 6 inches etc.

Electricals knife :

It is used to remove insulation of wire and clean the conductor.

Pokers

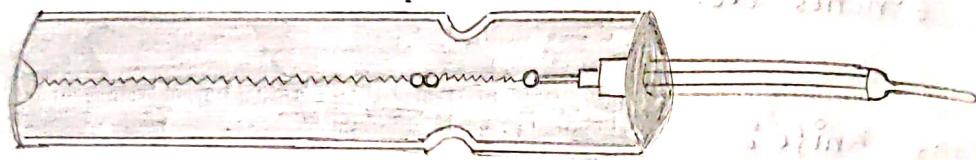
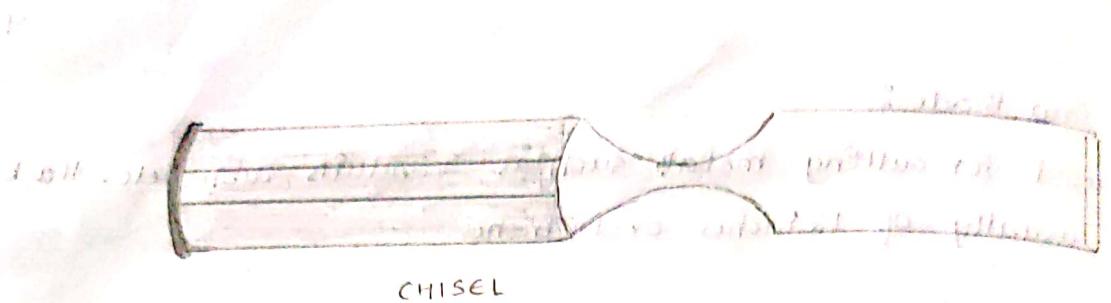
It is used for making holes on wood and for fitting screws pokers are available in different sizes. Specification may be of 7 inches or 8 inches.

Exp.No.

Chisel
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SCREW DRIVER



Chisel :

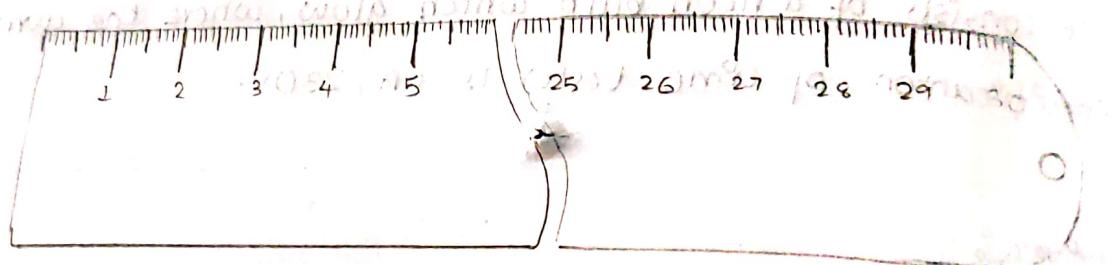
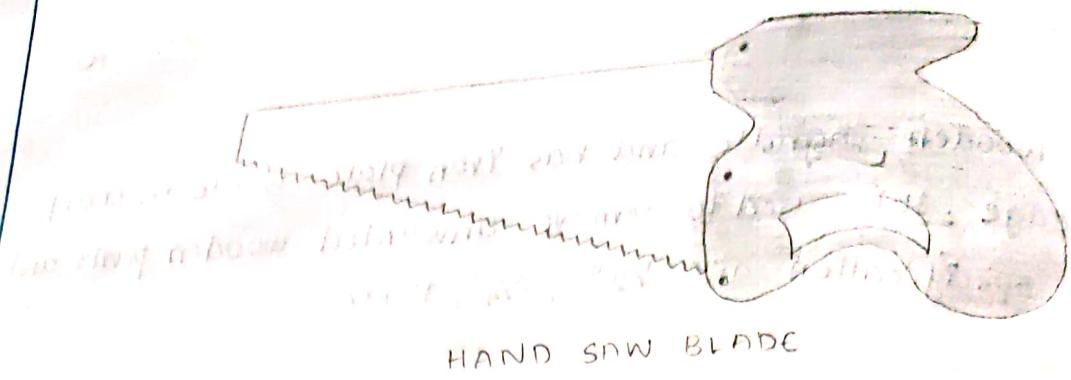
It has got a wooden handle and has iron plate. Blade is sharp at blocking edge. It is used to remove unwanted wooden parts and for chipping. Specification are $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1" etc.

Line tester :

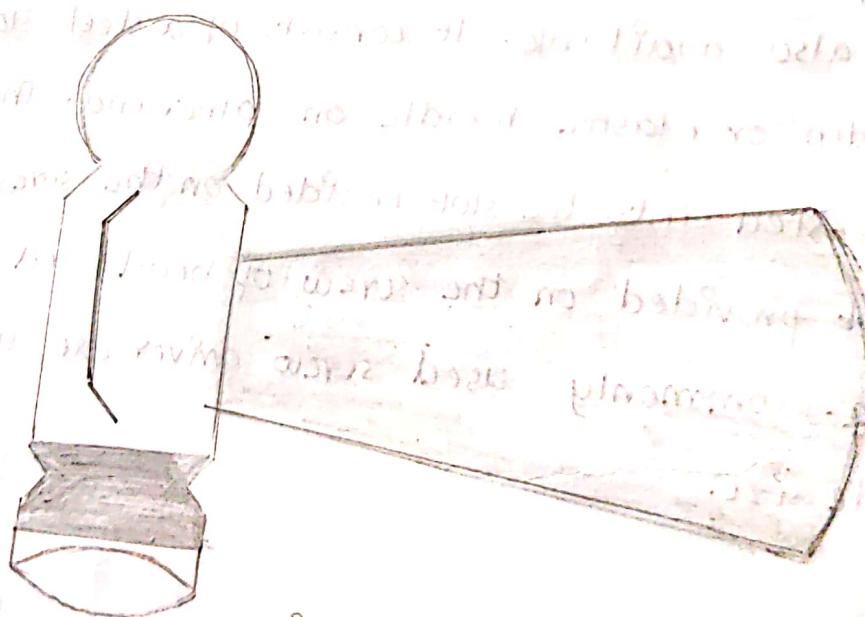
It is used to check whether current is flowing through the circuit. It consists of a neon bulb which glows, where the current flows. Specification of line tester is 6A, 230V.

Screw driver :

It is used for loosening or tightening screws. It is available in different sizes of screws. Specially shaped screw drivers like star type are also available. It consists of a steel flattened at one end of a wooden or plastic handle on other end. The flat end of the tool is inserted into the slot provided on the screw of head and into the slot provided on the screw of head and rotated to loosen or tighten. Commonly used screw driver are usually of 5", 6", 7" blade size.



at 100% af 100% STEEL RULER to precision
0.01 mm. which can be bought at any hardware store. It is
to be used like a normal ruler but then help see 300
mm with all the markings no need to use a magnifying glass to
see the markings.



BALL PEN HAMMER

Hand-Saw Blade

The wooden saw is used in the house for wiring, for cutting the wire wiring or supplying specification may be of 10° or 12".

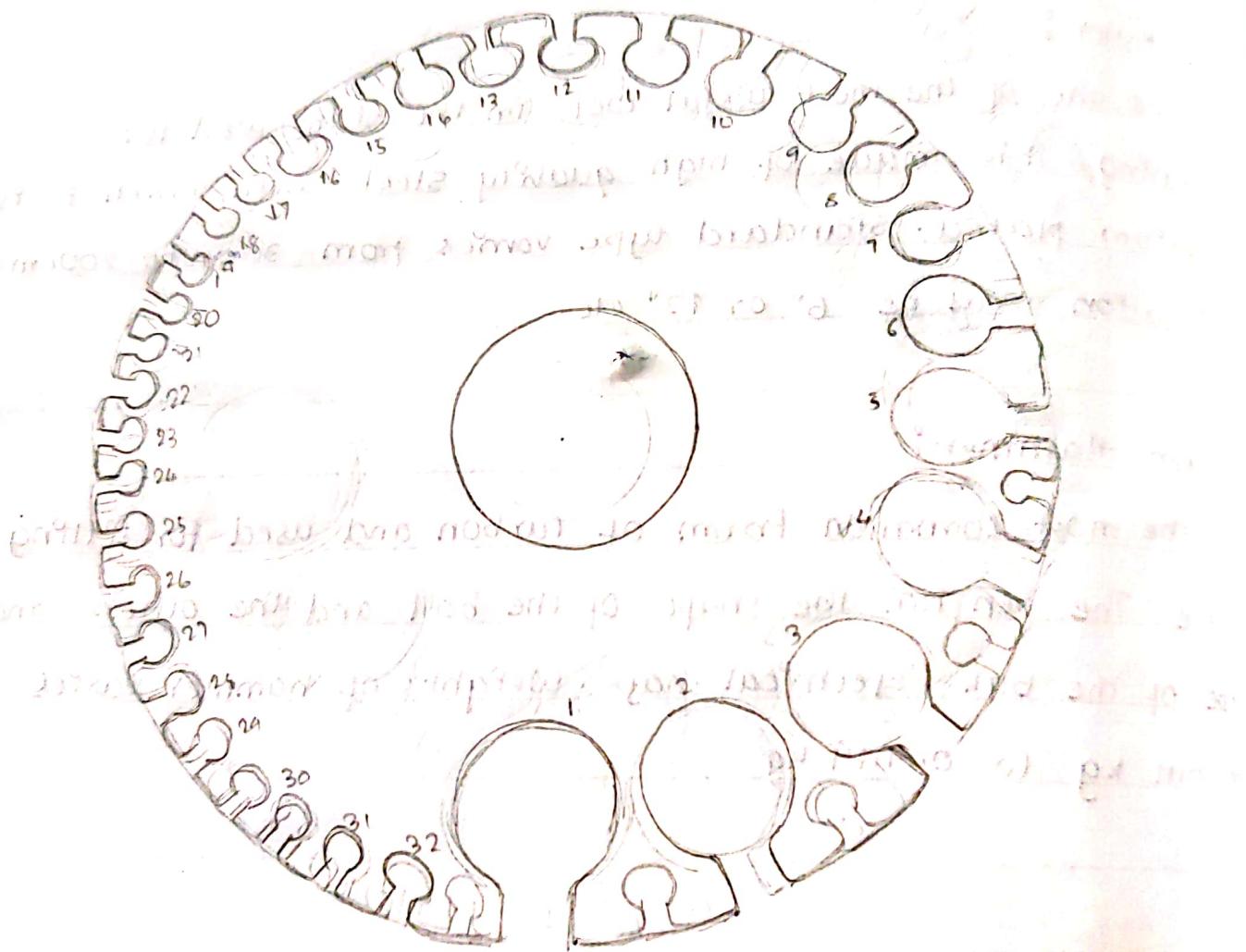
Steel Ruler:

It is the one of the most useful tool in the labs used for measuring. It is made of high quality steel with which it is chromium plated. Standard type varies from 30cm to 200cm. Specification may be 6" or 12" etc.



Ball Pen Hammer:

It is the most common form of carbon and used for fitting purpose. The pen has the shape of the ball and the others and has shape of the ball, electrical shape. Weights of hammer varies from 0.11 kg to 0.9119 kg



STANDARD WIRE GAUGE



Standard Wire Gauge

Wire gauge has slots with which the thickness of sheet metal is numbered. The sheet metal or wire has the same number of thickness as the slot in which it fits the number is called the gauge number.

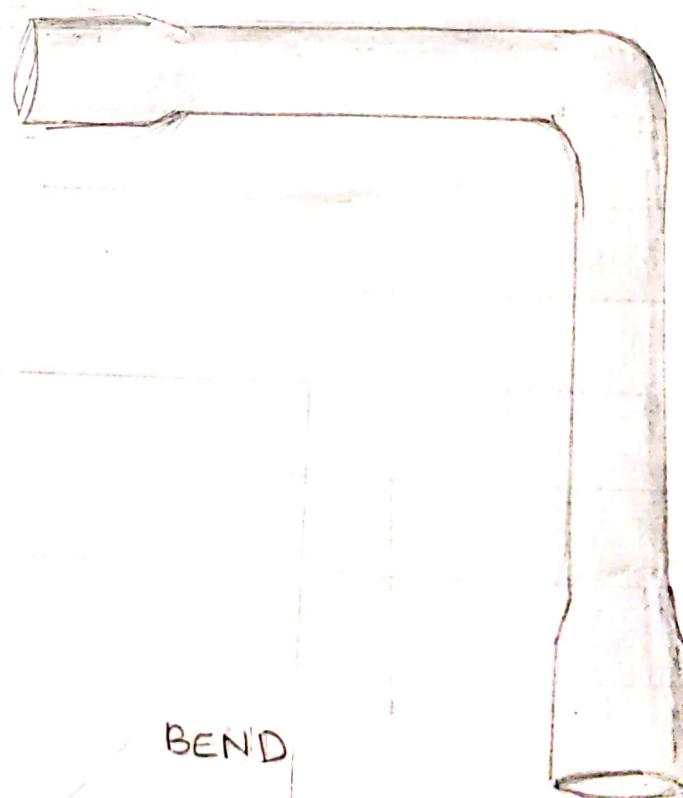
Result:

All tools are familiarised.

~~1.135
24/09/19.~~



CONDUIT



BEND

Exp.No. 5

26 08 2019

13

ELECTRICAL WIRING MATERIALS

Cable:

According to conductor materials used in the cables they may be divided into two as copper conducting wires or cables and aluminum conducting cables. Generally used wires or cables are as follows:

1. VIR cables
2. TRS or CTS cables
3. Lead sheet ed cables
4. Weather proof cables
5. Flexible cables

Conduits:

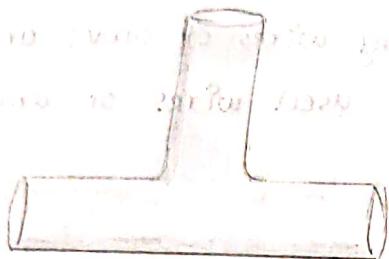
Conduits are special through which cables are drawn for wiring specification may be 30mm, 20mm, 25mm, 90mm... etc. PVC conduits are generally used domestic wiring.

Bends:

PVC bends are available in the size, 30mm, 20mm, 25mm, 90mm... etc and it is used for changing the direction



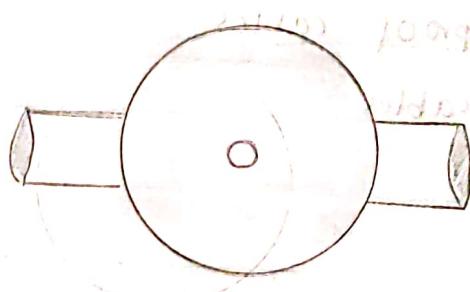
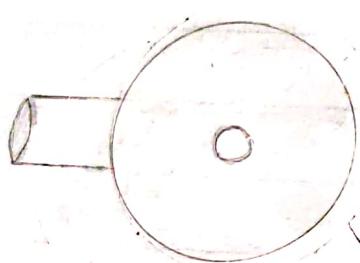
ELBOW



TEE

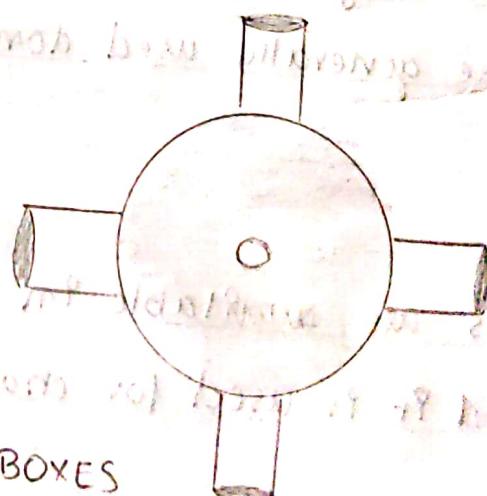
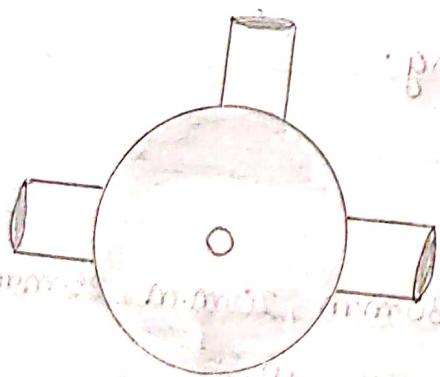


CLAMP



pairing of two base plates with a plain top

- 267.35 - mmOP, min 32, mmOL, mmOS, 51pm



JUNCTION BOXES

Exp. No.

14

Elbow:

Elbows are specified as 30mm, 90mm, 20mm, 25mm... etc. They are used for sudden turn of 90°

Tee:

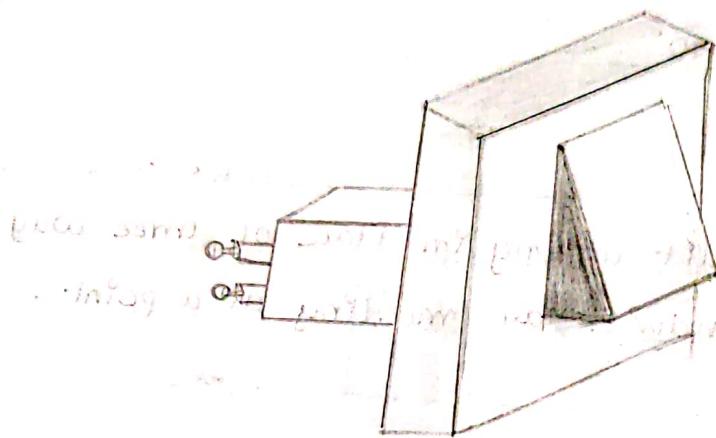
Tee can be used in PVC conduit wiring in place of three way junction boxes where three conduits are meeting at a point.

Junction boxes:

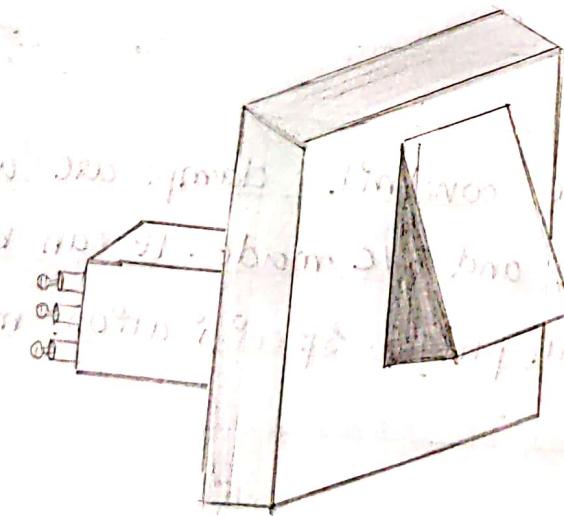
Junction boxes are available in 3 way, 4 way or 2 way forms these junction boxes can be used where 3, 4, 2. conduits are meeting at a point.

Clamp:

Clamps are used for fitting PVC conduits. clamps are available in two forms as metal made and PVC made. It can be screwed on the wall through PVC wall plugs. Specifications may be 20mm, 30mm ...etc.



ONE WAY SWITCH



TWO WAY SWITCH

Switches :

Switches are used in circuits for making and breaking the electrical contact in circuit. There are so many types of switches as flash switches, pull switches, tumbler switches, grid switches and push frame switches etc. Specification may be 6A - 230V and 16A - 230V... etc.

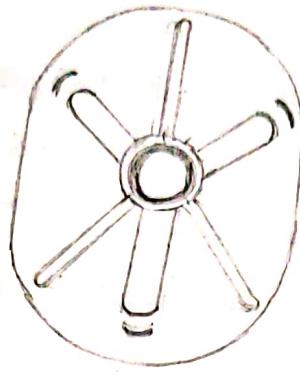
One-way switches :

This type of switches consist of 2 terminals which can be easily seen from backside. This switch is always connected in series with the load and phase wire. Specification of one way switch is 6A - 250V and 16A - 250V

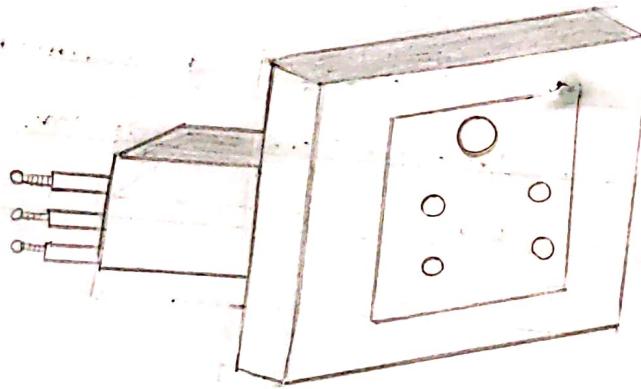
Two-way switches :

This type of switch consist of 3 terminals.

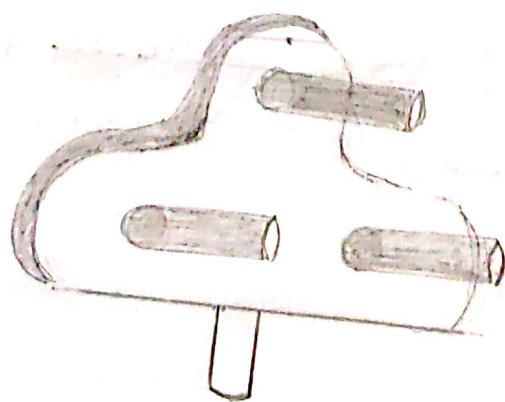
One at the top, one at middle and the other at bottom. From these three terminals middle one is common. When switch is one position, middle point get contact with top point and when it is in other position middle point gets contact.



CEILING ROSE



PLUG SOCKET



PLUG TOP

Ceiling Rose :

The ceiling rose is used to connect the pendant lamps, fans and fluorescent tubes to the insulation through flexible wires cords. This may be specified as 6A - 230V.

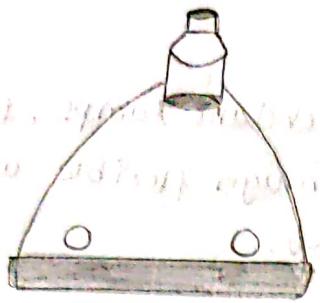
Plug Socket :

Plug socket are used to supply electric connection whenever required for appliances such as table fans, radio and iron box etc. Plug socket are available in two types as two pin type and three pin types. There are 3 terminals one in phase and second one in neutral. The third one with larger diameter is earth. Specification of plug socket is 6A - 230V

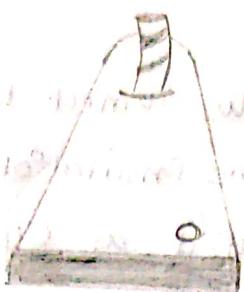
Plug Top :

Plug tops are used to take supply from the plug sockets for electrical appliances such as radio, TV, table fans, iron box...etc

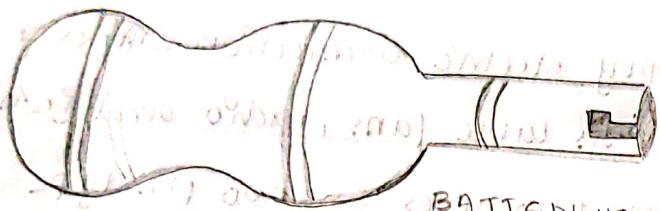
Plug tops are available in size 6A - 230V or 16A - 230V.



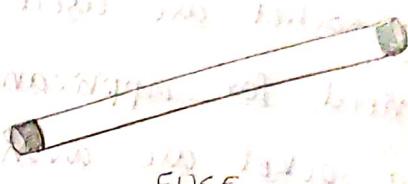
LAMP HOLDER



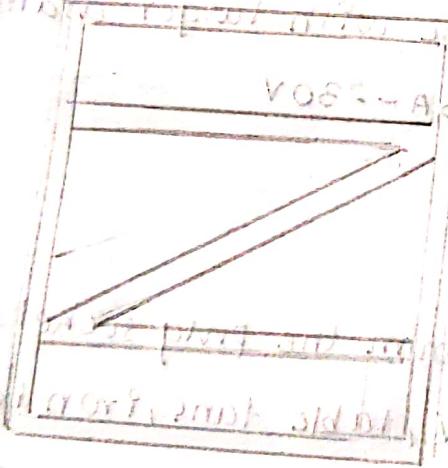
ANGLE HOLDER



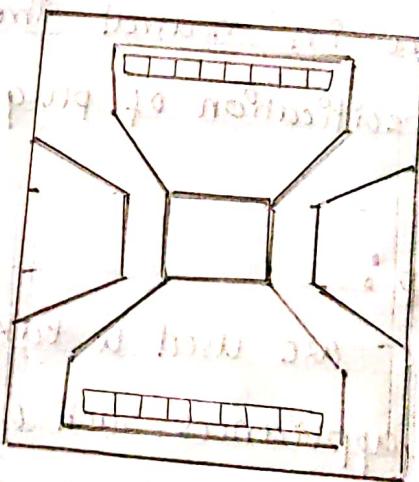
BATTEN HOLDER



FUSE



VOLEX-ADJ



ROUND BLOCK

Lamp Holders:

As the name indicates the lamp holder is a support for lamps and also to connect it.

1. Batten lamp holders
2. Pendant lamp holder
3. Angle holders
4. Bracket holders

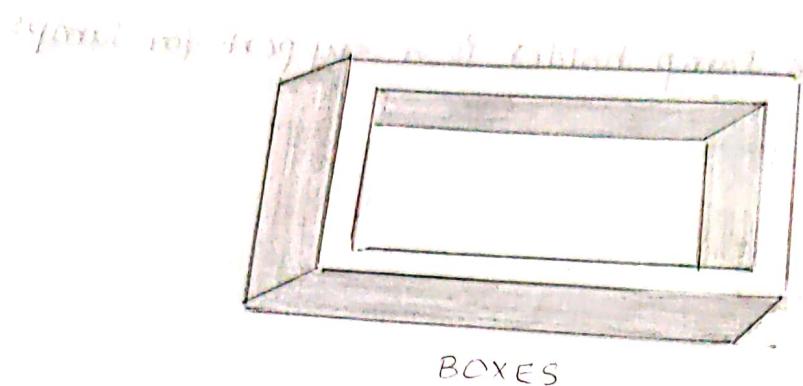
Fuses:

Fuse is a wire of short length having low melting point which gives protection against excessive current. Excessive current may occur due to the overload or short circuit. Under normal condition, the current exceeds the limit value the fuse wire gets heated and melts down. This will break the circuit. Specifications may be 6A - 230V or 16A - 230V

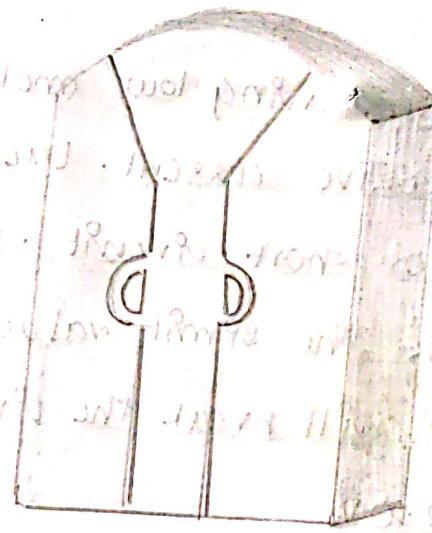
Round block:

Round Blocks are used for fixing lamp holders. The round block can be fixed on walls or boards by using screws.

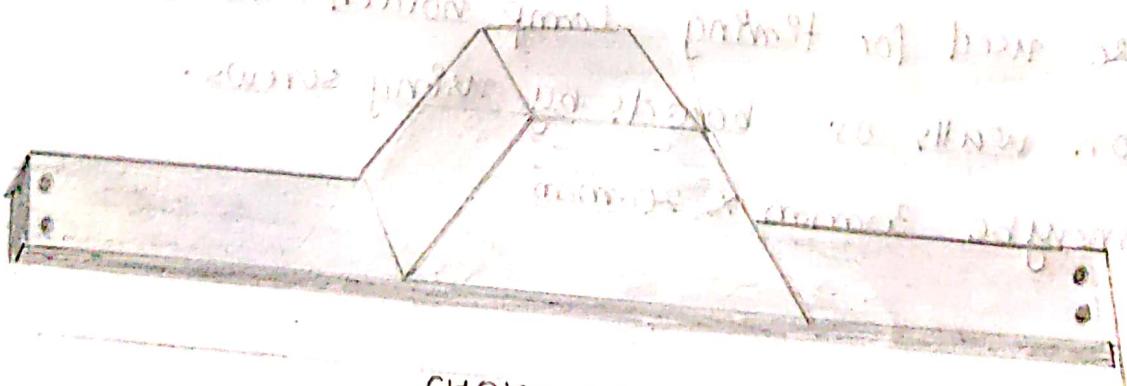
Specifications may be 30mm x 20mm



BOXES



TUBE HOLDER



CHOKE COIL

Boxes:

Bones can be used for fixing flush type switches. Bones are available in different types as one way, two way types and some other form such as for fixing numbers of switch and flush socket. Now a days wooden bones and PVC bones are used for fixing flush type switches incorporated with wooden mats. This system is mainly used in conduct wire.

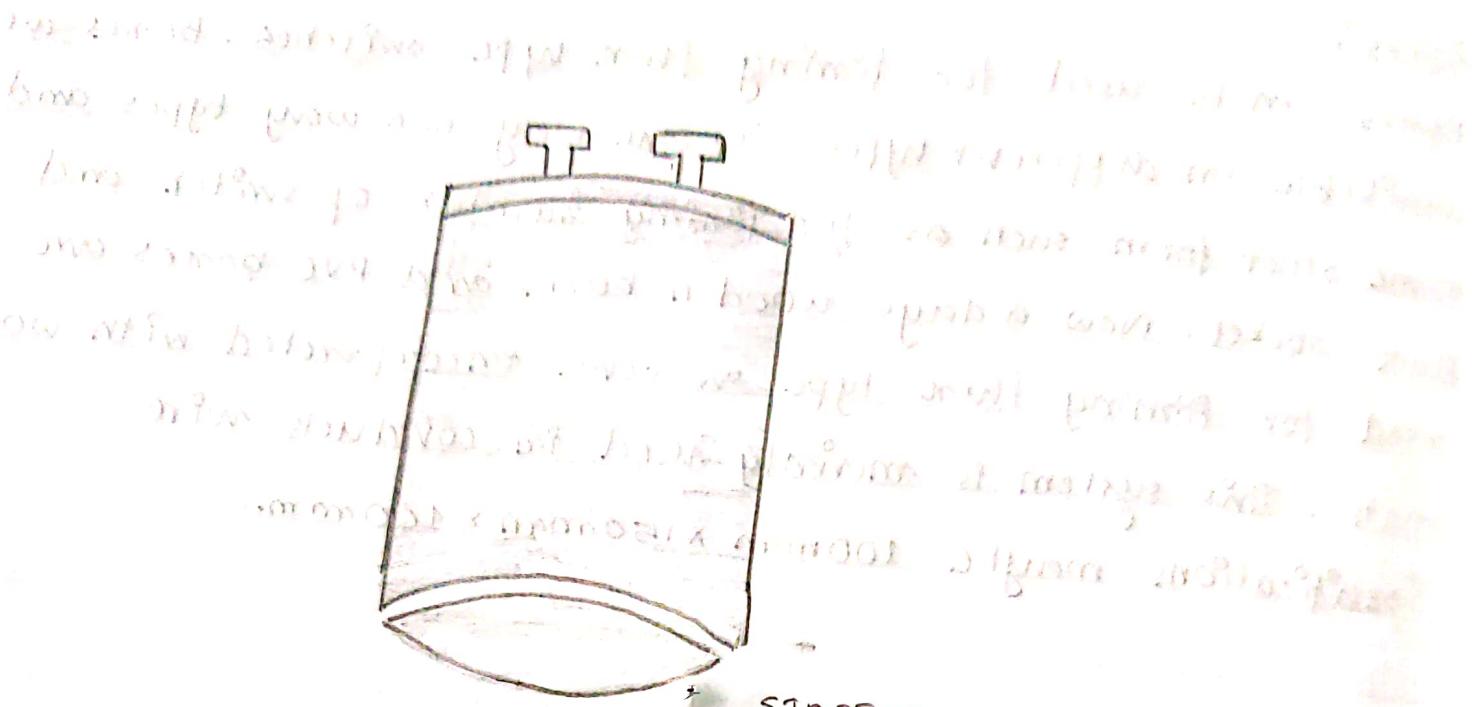
Specifications may be 100mm x 150mm x 100mm.

Tube holder:

They are designed for carrying size of lamps.

Choke coils:

Choke coil is a conductor used for reaching AC passing through a circuit without much loss of energy. It is made up of thick insulated wire around closely in a large no. of turns over a soft iron laminated core. It offers large reactance. The main function is to blast the starting of tube



1921-04-14. Off road back country road 10 miles
out of town of Dodge. Open to road 200 miles
from town of Dodge. April 10th. Found house with broken
windows and doors. House was built by
local people. No windows or doors. House
was built by local people. No windows or doors.

Starter :

It consists of two bimetallic strip and a coil. When two bimetallic strips make contact with each other when the tube is switched on. It allows the passage of current through the choke and bulb is glowing of the tube.

Result :

An electrical wiring materials are studied

1.85
84109119.

ELECTRIC POWER SUPPLY SYSTEM

AC and DC

DC or direct current is steady current. It never changes its direction while A.C. is alternating in nature. AC voltage can be increased or decreased with the help of a transformer. By using high voltage AC, we can drastically reduce the transmission transmission losses. AC can be converted to DC easily, but the reverse is not easy. In India, the state electricity boards are authorised to generate electric power at a voltage of 11kV. This power is transmitted by increasing the voltage at different levels as 33 kV, 66 kV, 110 kV, 220 kV or 400 kV from different substation. At load centres, this voltage is again stepped down to 11 kV and two feeder networks are created. The feeder line energises the 11 kV/415 V stepdown transformer and from these transformers, electric supply can be given to consumers. Consumers get electric energy from the distribution network of concerned electricity boards. Based on the power requirements of consumer, electricity boards, may give 3 phase connection (for high power) or single phase connection (for low power). In these three phase connection 4 wires are provided to consumers. Phase to neutral voltage in our country is 230 V and phase voltage 400 of frequency of 50 Hz. Most of applicances work on single phase supply 4 kwn.

meter is provided at the consumers and for measuring the electrical energy consumed. KSEB introduces different tariff for different consumers as per their connected load and the nature of connection.

WIRES

For estimating the cost of wiring, it is necessary to know the type of wire in use. These wires should be specified and size of conductor according to the type of conductors or the type of insulator and size of conductor. As far as the type of conductor is concerned, the subject has been explained with the adoption of use of aluminium as conductor, the use of copper as conducting material has been stopped and therefore the usual way to specify the wire is with the reference to the insulation size and no. of cores.

Knowing only the type of wire will not help the execution for this purpose, it is important for the person to know the splitting termination and joining, which has also been illustrated.

Size of Wires:

It has been mentioned earlier that for conduction of electric power, insulated aluminium conductor are used. There is a limit to the carrying conduction the current through a wire causes heat which is proportional to the square of the current. Again, there is a limit to the degree of heat which particular insulation can withstand safely. According to the standard laid down there is a particular value of maximum current which can be safely carried by the wire of different size with different insulation and of the

1. Fitted

With your left hand, hold the upper arch, palatine process, and pterygoid process.

Press the two wings of the pterygoid process against the sides of the upper arch.

Press the arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

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Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

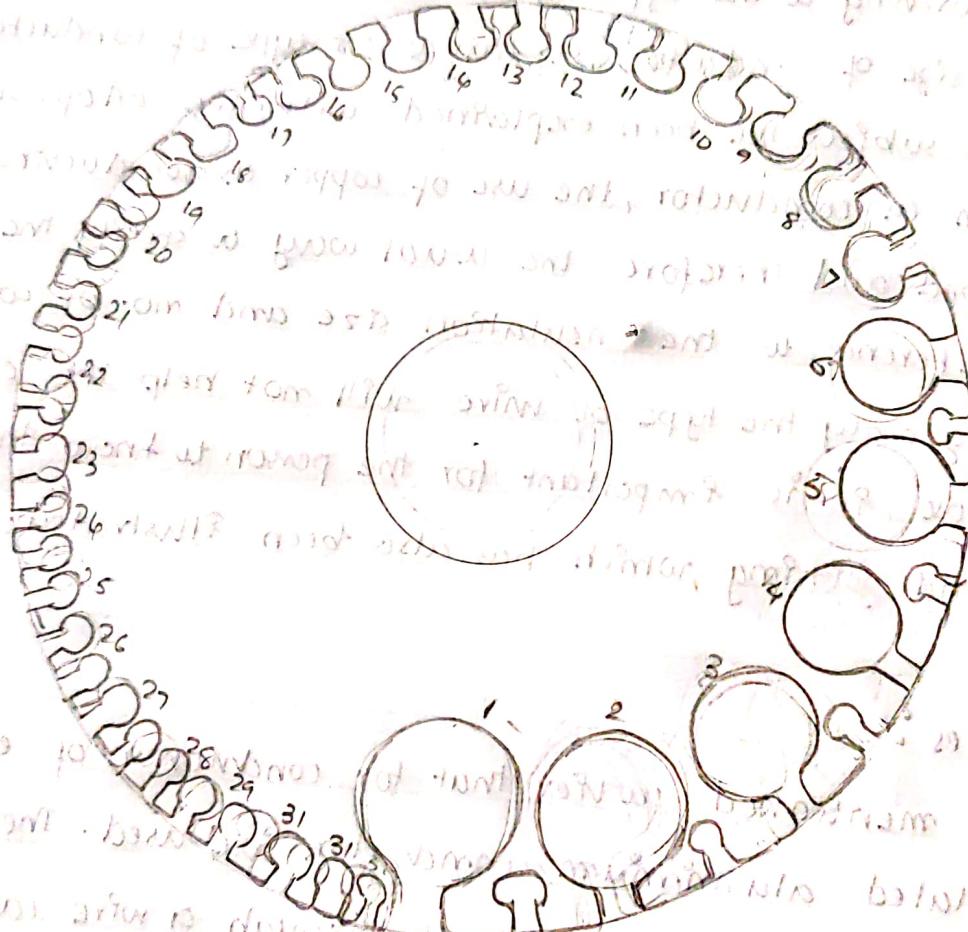
Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.

Press the upper arch to maintain its right side at the pterygoid process.

Retain the right side of the upper arch.



rules are not adhered to there is a possibility of damage to the insulation which may cause fire. The size of the is arranged intelligently with aluminum wires are referred according to the area but in case of copper conductor, number have been assigned to the British standard wire gauge.

Wire Gauge:

It has slots connected with holes on its face. This hole is just like key holes. This is used in shops for detecting diameters of wires and thickness of sheets. This is generally called standard wire gauge

~~Arun
duoallia~~

STUDY OF SAFETY DEVICES

Importance of Safety Devices :

The safety feature are inbuilt with electric distribution. The current is to follow through if it is expected to pass. Conductors made of copper and aluminium are provided across the path for carrying the current and insulation like PVC, paper or rubber are provided. Isolate the faulty circuits from the rest of the supply. The very high current caused by short circuit situation can cause a lot damage to electrical insulation. Protective devices are needed to break short circuit and overload current.

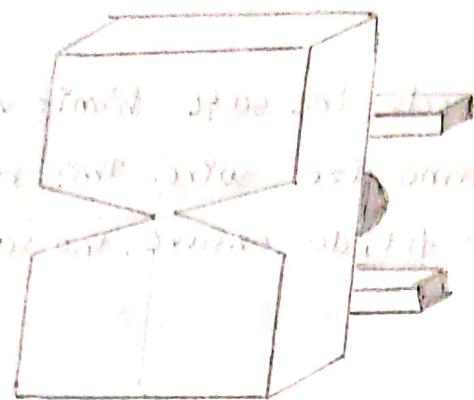
Types of Safety Devices :

- ⇒ Fuses
- ⇒ Circuit breakers (MCB, MCCB, and ELCB)

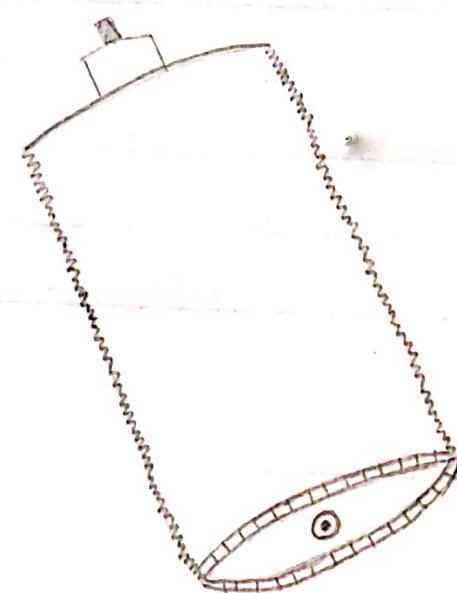
Fuses :

Fuse is a wire of short length having low melting point which gives protection against excessive current. This excessive current may be due to overload or short circuit. Under normal working conditions the current flowing through the circuit is within safe limits. But when some fault such as shorts circuits

occurs the current exceeds the safe limit value, the fuse wire gets heated with the same size wire. This basic guide will help you decide which to fit, do ensure the safe use of your household appliances



ORDINARY FUSE



SCREW-PLUG TYPE FUSE



KNIFE BLADE CARTRIDGE FUSE

TYPES OF FUSES AND THEIR DESCRIPTIONS

Fuse can be built in various form but the most common types are described below.

1. The Ordinary Fuse :

The ordinary fuse or single link fuse is simply a strip of metal usually lead. The strip of metal called the fuse link in the part of the fuse through which electricity flows. This metal, when more electricity flows, breaks the connection and stop the flow of electricity.

2. The Screw - Plug Type Fuse :

It is used in the electric machinery circuits of 220 volt. This type of fuse can be had in size from 3 to 30 ampere and is constructed with either a porcelain or a glass body which encloses the fuse link.

3. A knife Blade Cartridge Fuse :

This type of fuse is usually used most on heavy power lines of 60 to 600 Ampere and 250 v and more. They are constructed with heavy filter, body fitted with brass ferrules at

11.11000A 250V 10 A FUSE

240V 110°C 10A



FERRULE TYPE CARTRIDGE FUSE
WITH FUSE LINK

10 A fuse is required to protect the circuit from overcurrent. The fuse is connected in series with the load. When the current exceeds the rated value, the fuse will blow, disconnecting the load from the power source. This protects the equipment and prevents damage to it. The fuse is also used to protect the circuit from short circuits.

11.11000A 250V 110°C 10A FUSE
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each end and a heavy copper blade for meeting contact with the circuit. The fuse link can be easily renewed by removing the end ferrules and connecting the new link.

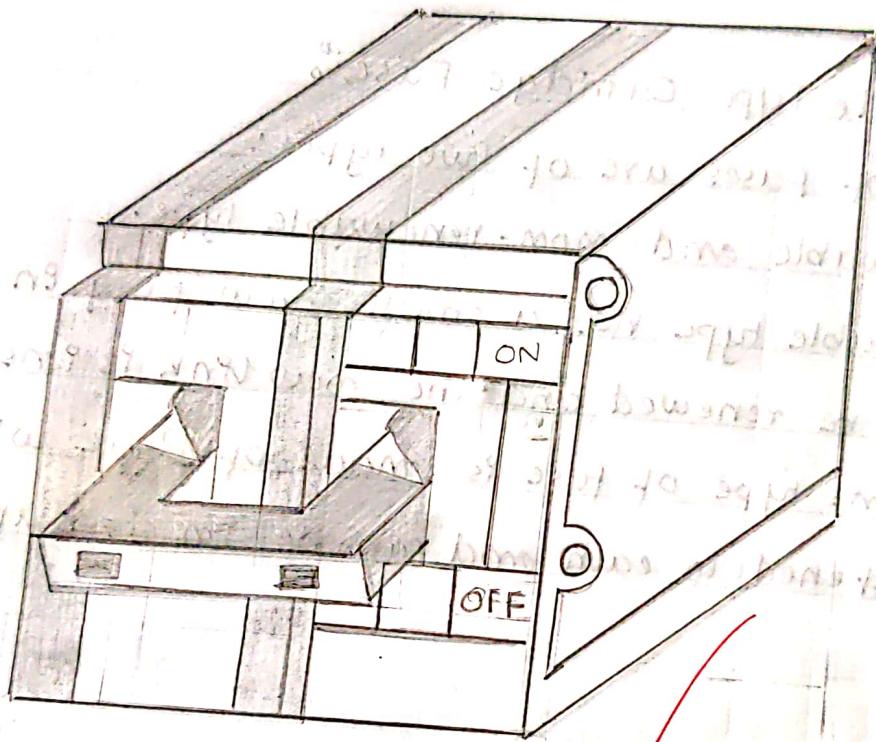
4. The Ferrule Type Cartridge Fuse:

This type of fuses are of two types:

The renewable and non-renewable type.

The renewable type has a small screw plug in each type which can be renewed and the new link is inserted. The body part of this type of fuse is made of fibre which brass ferrul, fastened to each end and can be in size upto 100A and 250

number partitioning short circuit present in bus bar due to
bus bar fault at main bus bar will affect all the other bus
bar and partition due to short circuit



CIRCUIT BREAKER

CIRCUIT BREAKERS

A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Its basic function is to detect a fault condition and interpret current flow. Unlike a fuse, which operates once and then must be replaced, a circuit breaker can be reset (either manually or automatically) to resume normal operation. Circuit breakers are made in varying size form.

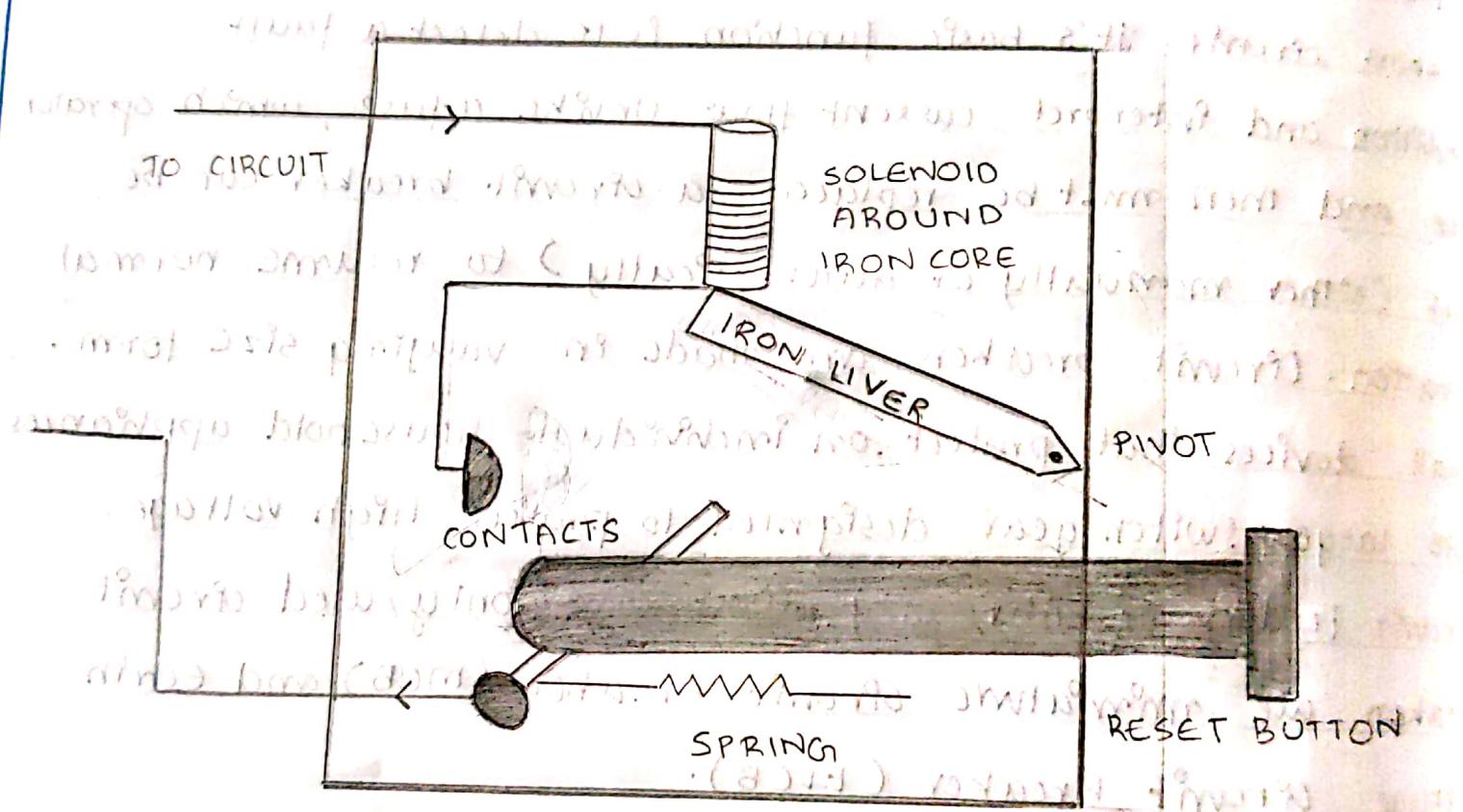
Small devices that protect individual household appliances upto large switch gear designed to protect high voltage circuit feeders or entire city. Most commonly used circuit breakers are miniature circuit breaker (MCB) and Earth Leakage Circuit Breaker (ELCB).

Miniature Circuit Breaker

Miniature circuit breaker (MCB) are electrochemical device which protect an electrical circuit, may result from short circuit, overload or fault design. An MCB is a better alternate to a fuse since here at fuse does not require replacement, once an overload is detected. Unlike fuse, MCB can be easily reset and then offers improved operation safety and greater convenience without incurring larger operational cost.

CIRCUIT BREAKER

Temperature sensitive bimetallic strip which automatically opens circuit when temperature reaches certain limit.



WORKING OF CIRCUIT BREAKER

When current passes through the coil, it creates a magnetic field. This magnetic field attracts the iron lever, causing it to pivot and close the contacts. Once the contacts are closed, the circuit is complete, and current begins to flow through the load. If the current exceeds a certain threshold, the heat generated by the coil increases. This heat causes the bimetallic strip to bend downwards, which trips the switch and opens the circuit. The reset button allows the user to manually reset the circuit breaker after it has tripped.

Working Principle of a Miniature Circuit Breaker

There are 2 arrangement operation of miniature circuit breaker. One due to thermal effect of over current and other due to electromagnetic effect of over current. The thermal operation of miniature circuit breaker is achieved with a bimetallic strip whenever continuous over current flows through MCB, the bimetallic strip is heated with deflection by bending. This deflection of bimetallic strip releases mechanical latch. As this mechanical latch is attached with operating mechanism, it causes to open the miniature circuit breakers contacts. But during short circuit conditions, sudden rising of current causes electromagnetic displacement of plunger associated with tripping out of solenoid of MCB. The plunger strike this strip level causing immediate release of latch mechanism, consequently open the circuit-breakers contacts. This was a simple explanation of miniature breaker working principle.

Earth Leakage Circuit Breaker (or ELCB)

If any current leaks from any electrical installation, there must be any insulation failures in the electrical current circuit. It must be properly detected and prevented otherwise there may be higher chance of electric shock if anyone touches the insulation. An earth leakage circuit breaker does it effectively.

Means of defect, the earth leakage current and makes the power supply off by opening the associated circuit breaker.

There are 2 types of earth leakage circuit breaker one in voltage ELCB and other in current ELCB

What is Earthing or Grounding?

Earthing or grounding is the term used for electrical connection to the general mass of the earth. Equipment or a system is said to be 'earthed' when it is effectively connected to the ground with a conducting object. Earthing provide protection to personal and equipment by ensuring operation of the protective gear and isolation of facility.

Circuit drawing:

- ⇒ Insulation Failure
- ⇒ Accidental contact
- ⇒ Lightning strike

Importance of Earthing:

Earthing is necessary for proper functioning of certain equipments. Earthing is done also for preventing the operating personal from hazardous shocks caused by the damage of the heating appliance consider an electric heater connected to the supply using 2 pin plug and socket

If by some chance the heater elements comes in contact with the metallic body of the heater. The body of the heater being a conducting material will be at the same potential as the heating coil, if a person comes and touches the body of the heater current will flow through his body, which will result to an electric shock.

System Earthing:

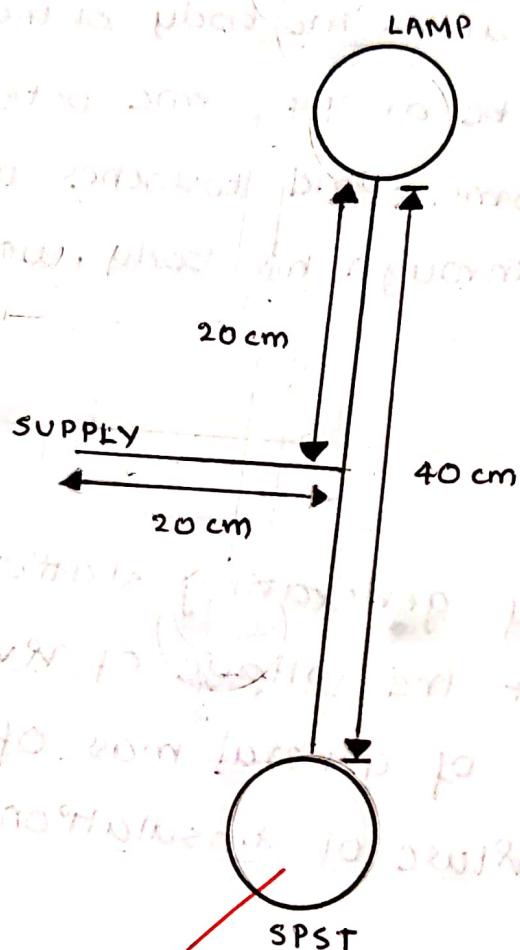
It is earthing of neutral of generating station and substation. It is employed to limit the voltage of live conductor with respect to potential of general mass of earth. This is necessary to prevent failure of insulation.

Equipment Earthing:

It is the earthing of non-current carrying metal parts of electrical equipments. As per rules 3.3461 of Indian electricity rule 1956. Non-current carrying metal parts must be earthed with 2 separate and distinct earth conductivity conductor to the effluent earth electrode. However equipment with double insulation need to earthed.

Argo
24/09/19

LAYOUT DIAGRAM



ONE LAMP CONTROLLED BY ONE SWITCH

AIM:

To wire a circuit to obtain one lamp by one switch

DESIGN OF THE CIRCUIT:

$$\text{Power of the lamp} = P = 60 \text{ W}$$

$$\text{Supply Voltage} = V = 230 \text{ V}$$

$$\text{Current} = I = P/V = 60/230 = 0.26 \text{ A}$$

$$\text{Fuse wire rating} = 1.6 \times \text{load current}$$

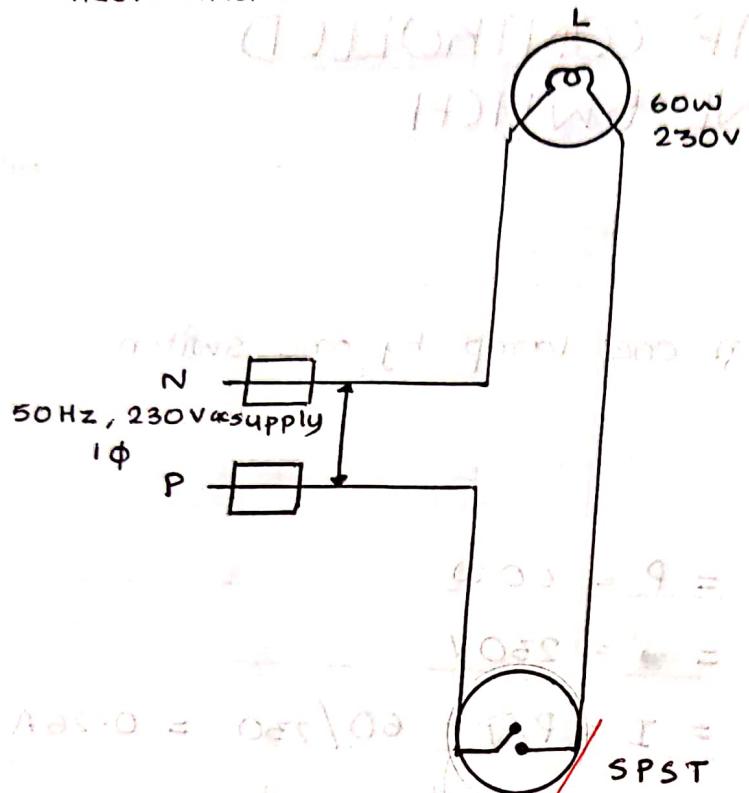
$$= 1.6 \times 0.26$$

$$= 0.416 \text{ A.}$$

MATERIALS REQUIRED:

SL.NO	ITEMS	SPECIFICATIONS	RATING	QUANTITY
1.	Switch	SPST	5A	1
2.	Lamp Holder	Straight Button	5A, 230V	1
3	Lamp	Incandescent	60W, 230V	1
4	Wire	1mm ²	5A	1
5	conduit	3/4" PVC	-	-
6	Junction Box	3/4" PVC	-	-

CIRCUIT DIAGRAM



SL.NO	ITEMS	SPECIFICATION	RATING	QUANTITY
7	Round box	3" PVC	-	1
8	Clamp	3/4 "	-	-
9	Switch Board	3" x 2" PVC	-	-
10.	Fuse unit	KPT kat	15A	1
11	Fuse wire	Cu, NP	5A	1
12	Neutral link	Cu	15A	1
13	Screw	1/2' clamp 3/4" Round box 1/4" Holder 1/2" switch board		

PROCEDURE:

1. Draw the largest layout diagram on the wooden board with the help of a chalk, then fix the conduit on the board with the help of a screw as per layout diagram.
2. Draw the sufficient wire through conduits and then fix the round box, junction box and lamp holder, connection are made.
3. Connect the phase wire to the terminal of SPST and from the other wire connected to the lamp, connect the neutral wire to the lamp as per the circuit diagram.
4. Incandescent bulb part put in holder and test the circuit

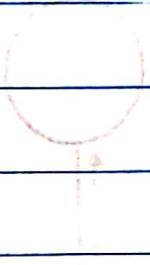
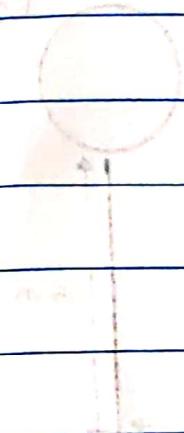
OBSERVATION:

SWITCH	LAMP
ON	Bright
OFF	dark

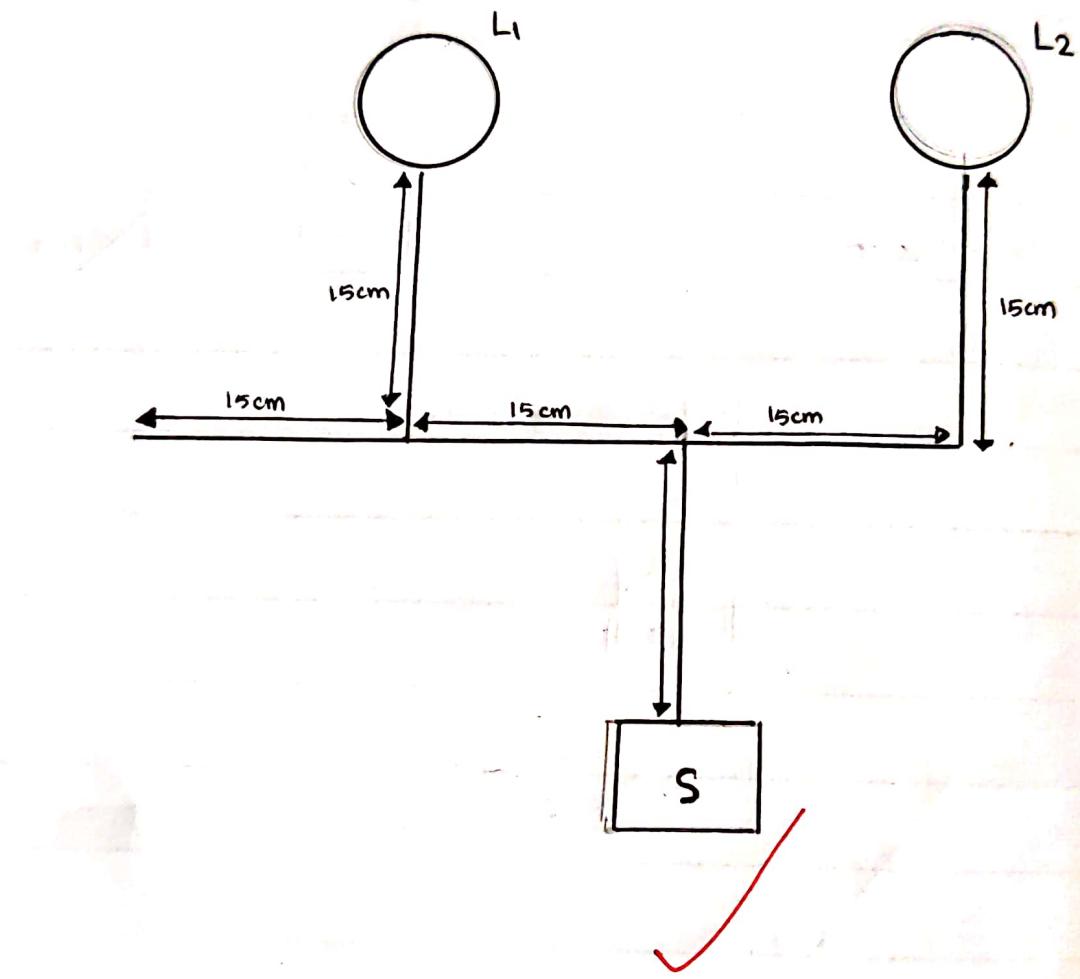
RESULT :

one lamp controlled by one switch is wired and the output is verified.

~~Arya
Date 09/09/19~~



LAYOUT DIAGRAMS



TWO LAMPS CONTROLLED BY ONE SWITCH (PARALLEL COMBINATION)

AIM:

To design and wire up a circuit of two lamps controlled by one switch - parallel combination - as per diagram layout.

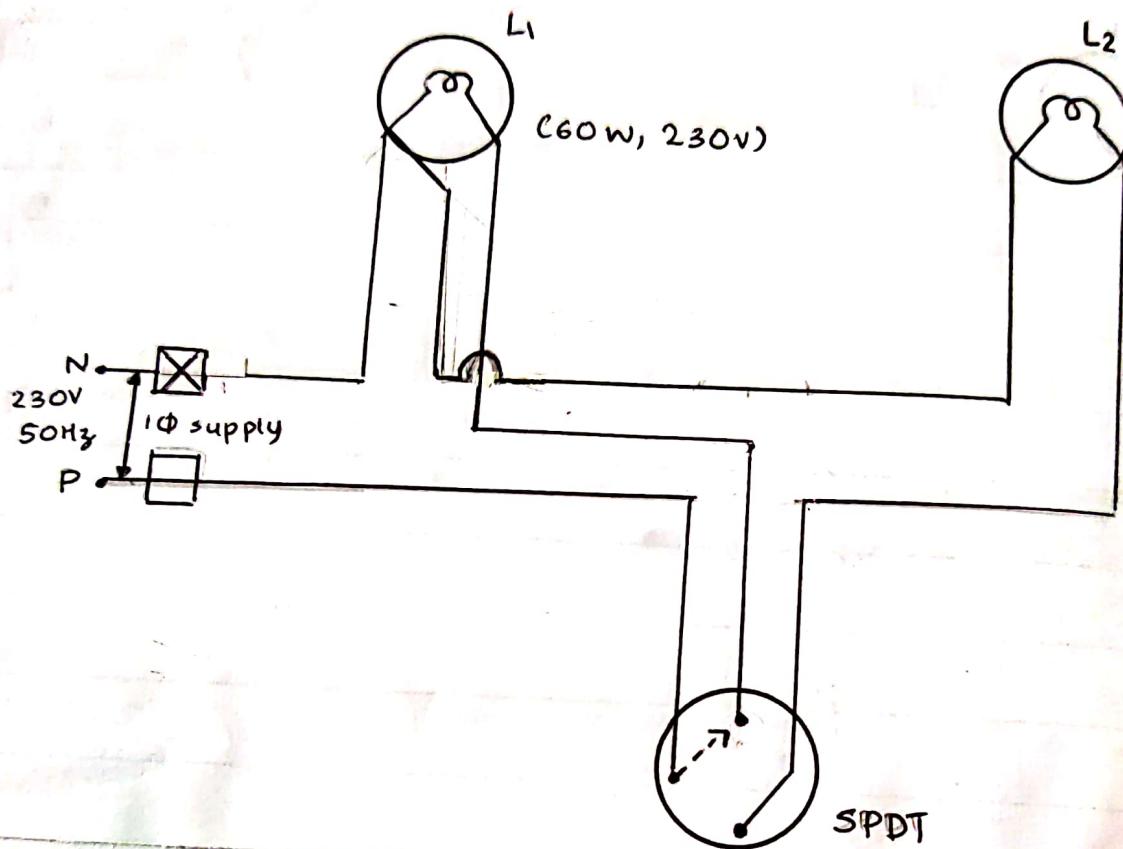
TOOLS REQUIRED:

wire, tester, wire stripper, ball pen hammer, screwdriver, combination plier and mini balance

MATERIALS REQUIRED:

S.N	MATERIALS REQUIRED WITH SPECIFICATIONS	UNIT	QTY	REMARK
1.	PVC conduit 16cm	cm	90	To run wire
2.	PVC insulation cable	cm	150+27	To run phase
	a. R/V/B	-		
	b. Black	-		
3.	PVC switch box of size 10x10	-	1	To fix switch
4.	PVC round box 8cm diameter	-	2	To fix lamp box
5	PVC bent 16mm		1	To connect conductors

CIRCUIT DIAGRAM



S.N	MATERIALS REQUIRED WITH SPECIFICATIONS	UNIT	QTY	REMARK
6	P.V.C elbow 16cm	-	1	To connect conduit
7	240V, 16A, Neutral link	-	1	To give neutral link
8	16A, 240V Kitkat type fuse unit	-	1	To protect circuit
9	6A, steady bottom lampholder	-	2	To hold lamp
10	6A, 240V, SPOT switch	-	1	To connect circuit
11.	G.I. saddler	-	6	To fuse PVC
12	Lamp 240V	-	2	To illuminate surface
13.	Steel screws	-		
	a. 39 x 8mm	-	2	To fix round box
	b. 19 x 6mm	-	16	To fix switch
	c. 14 x 6mm	-	14	To Fix switch box

PROCEDURE:

Draw the layout of the circuit on the board by using a chalk PVC conduits, elbows are fixed at current position. PVC diagram round block for holder and square boxes for the switches. Switch box and round block respectively for the fuse unit and neutral link is connected in series with the phase and neutral respectively. Then incoming wire of a fuse is connected to phase and neutral supply incandescent lamp and put on the holder and the circuit is tested.

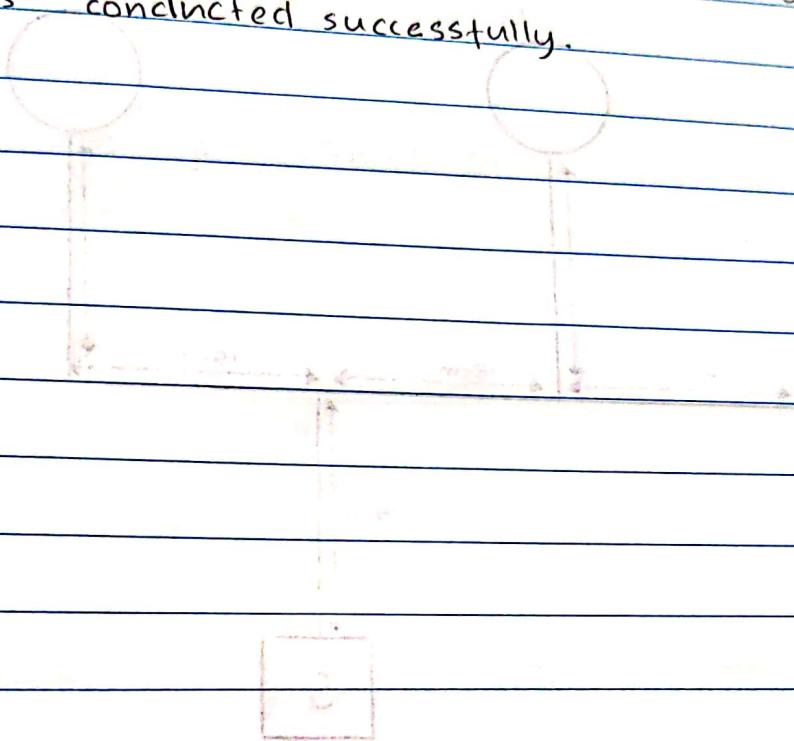
OBSERVATION

SWITCH	L1	L2
OFF	Bright	Dark
ON	Dark	Bright

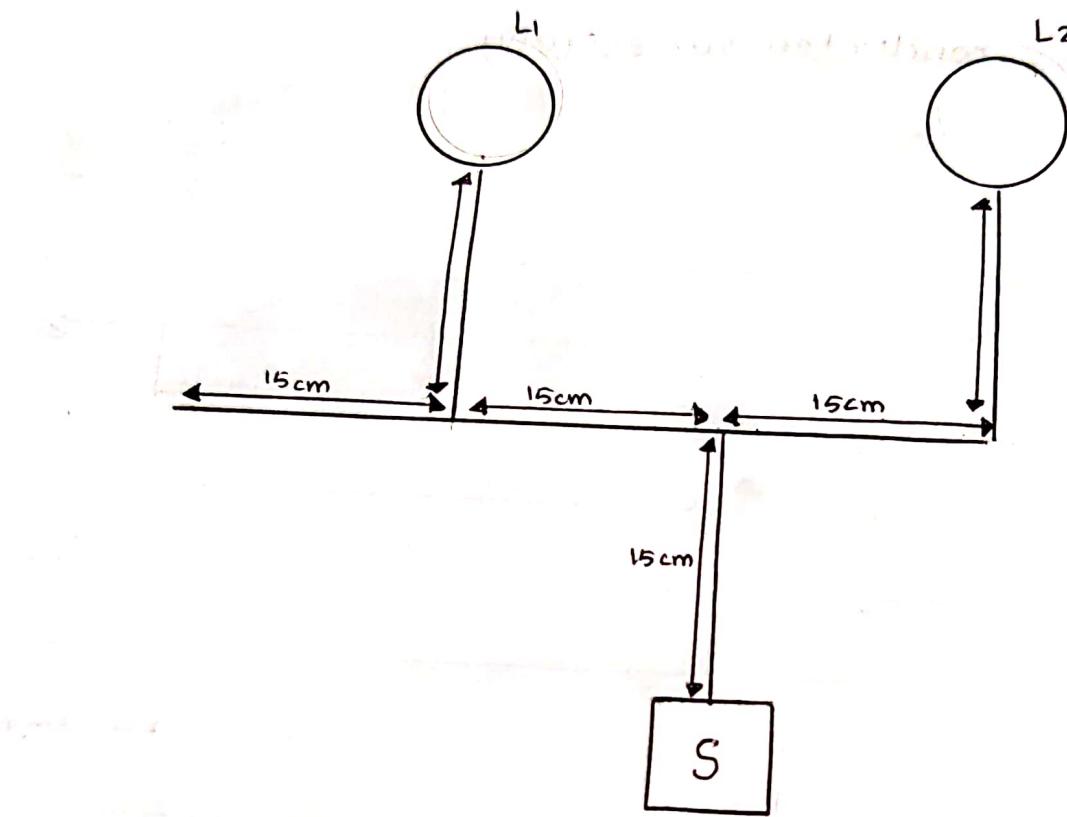
RESULT:

The experiment of "Two lamps controlled by one switch (parallel connection) is wired and output is verified. The experiment is conducted successfully.

~~Mr. A. M. A. H.~~



LAyOUT DIAGRAMS



TWO LAMPS CONTROLLED BY ONE SWITCH (SERIES COMBINATION)

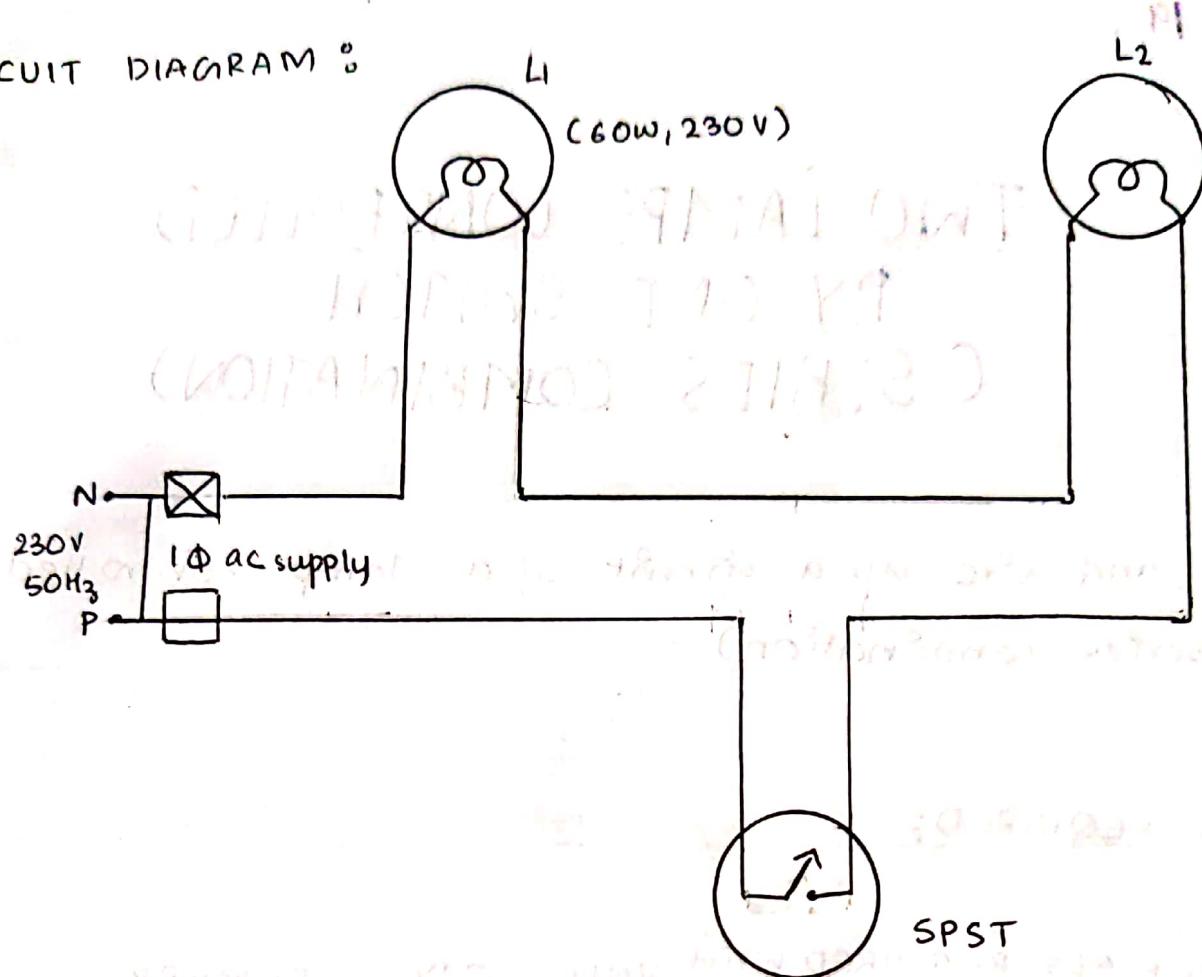
AIM:

To design and wire up a circuit of a lamp controlled by one switch (series combination)

MATERIALS REQUIRED:

S.N	MATERIALS REQUIRED WITH SPECIFICATIONS	UNIT	QTY	REMARK
1.	PVC conduit 16cm	cm	90	To run wire
2.	PVC insulation cable	cm	150+27	To run phase
3.	a. R/V/B	-		
	b. Black	-		
4.	PVC switch box of size 10x10	-	1	To fix switch
5.	PVC round box, 8cm diameter	-	2	To fix lamp box
6.	PVC bent 16cm	-	2	To connect conduit
7.	PVC elbow 16cm	-	1	To connect conduit
8.	240V, 16A, Neutral link	-	1	To give neutral link
9.	16A, 240V kitkat type fuse	-	1	To protect circuit
	unit			
9.	6A, steady bottom lamp holder	-	2	To hold lamp

CIRCUIT DIAGRAM :



OBSERVATION

SWITCH	L ₁ (60W)	L ₂ (60W)
OFF	Dark	Dark
ON	Dim	Dim
SWITCH	L ₁ (60W)	L ₂ (60W)
OFF	Dark	Dark
ON	Bright	Dim

S.N	MATERIALS REQUIRED WITH SPECIFICATION	UNIT	QTY	REMARK
10.	GA, 240V, SPOT switch	-	1	To connect circuit
11.	O.I saddle	-	6	To fuse PVC
12.	Lamp 230V	-	2	To illuminate surface
13.	Steel screws			
a.	39 x 8mm	-	2	To fix round box
b.	19 x 6mm	-	16	To fix switch
c.	14 x 6mm	-	14	To fix switch box

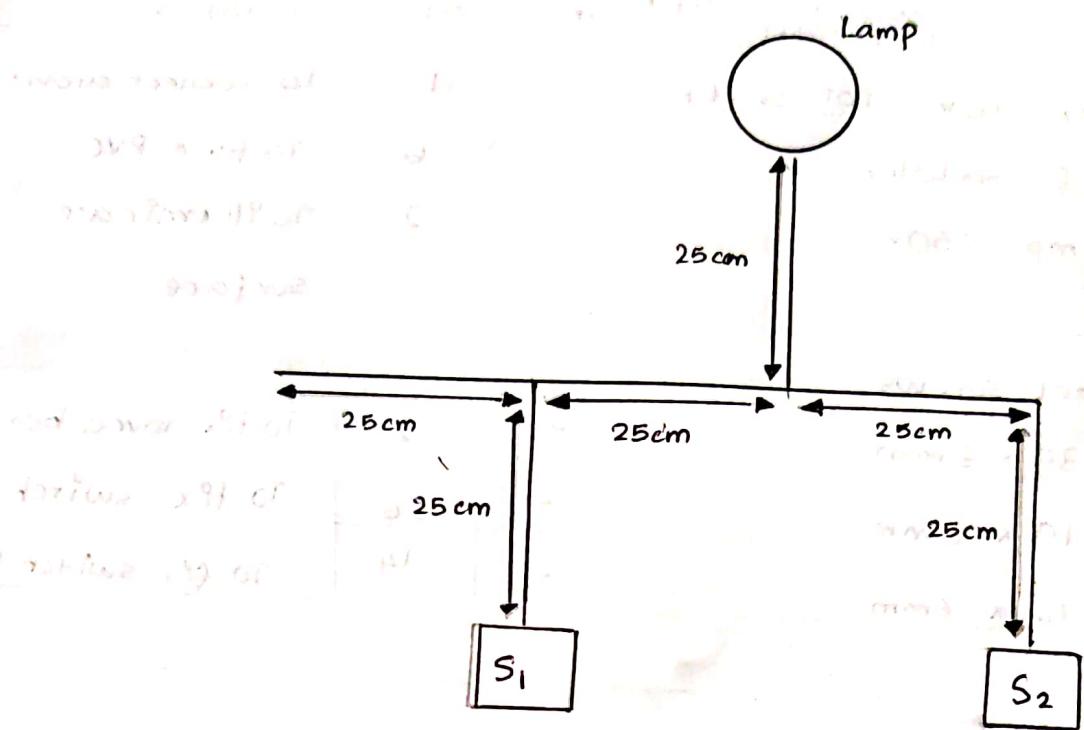
PROCEDURE:

Draw the layout of the circuit on the board by using a chalk. According to the layout diagram, PVC conduits, elbow are fitted at the correct positions. Round block for holder and square boxes and for the switches. Fuse unit and neutral link connected to phase and neutral respectively. Then incoming wires of fuse is connected to phase and neutral supply, we put the bulb on the holder and test the circuit.

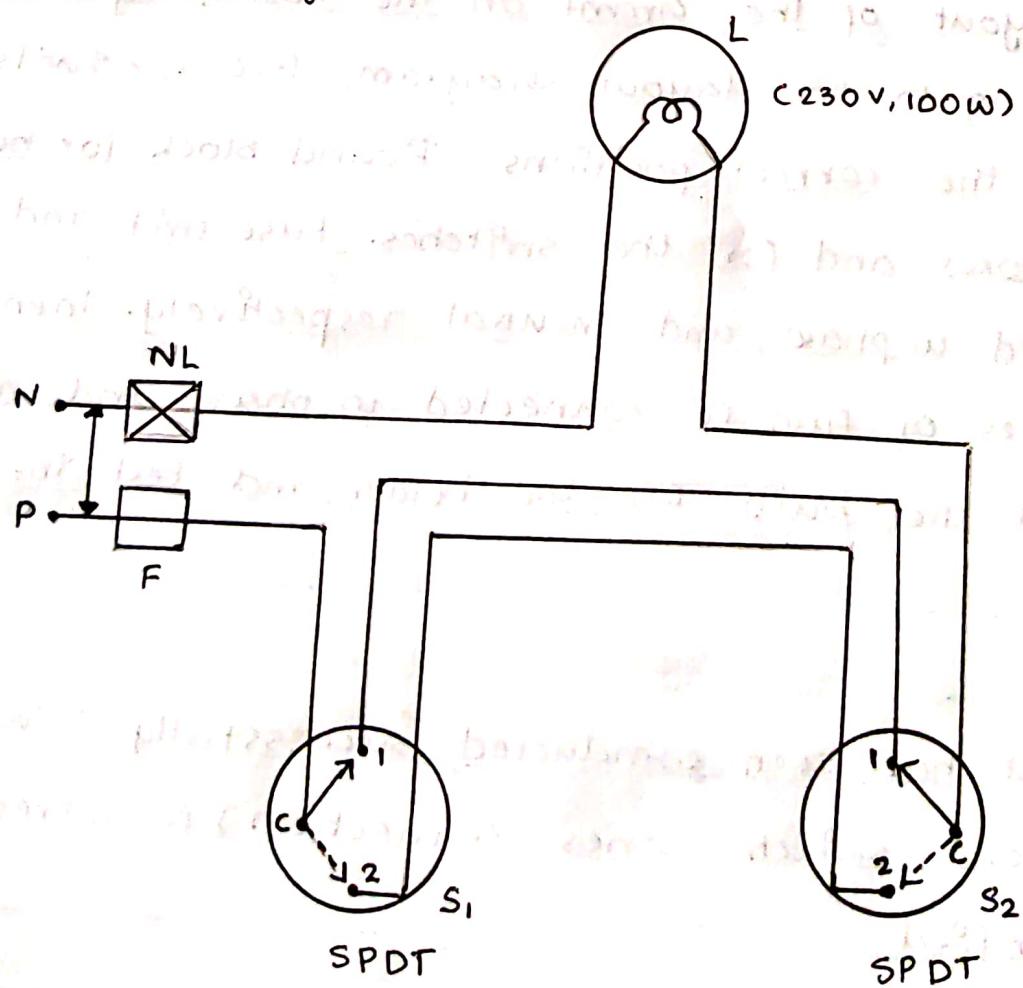
RESULT:

The experiment has been conducted successfully. "TWO lamp controlled by one switch (series connection) is wired and output is verified

LAYOUT DIAGRAM



CIRCUIT DIAGRAM



Exp.No. 14

24 09 2019

40

STAIRCASE WIRING

AIM:

To wire up a circuit using staircase wiring

DESIGN OF THE CIRCUIT:

$$\text{Power } (P) = 100 \text{ W}$$

$$\text{Voltage } (V) = 240 \text{ V}$$

We know,

$$\text{Power} = P = V \cdot I$$

$$I = \frac{P}{V} = \frac{100}{240} = 0.416 \text{ A}$$

$$\text{Fuse wiring rating} = 1.5 \times \text{load current}$$

$$= 1.5 \times 0.416$$

$$= 0.624 \text{ A}$$

MATERIALS REQUIRED:

S.NO	ITEM	SPECIFICATION	RATING	QUANTITY
1.	Switch	SPDT	5A, 240V	2
2.	Lamp holder	straight	5A, 240V	1
3.	Wire	$\frac{1}{8}$ " P.V.C	1100 V	5
4.	Fuse unit	Kpt kat	-	-

OBSERVATION :

S ₁	S ₂	Lamp
C-1	C-1	Bright
C-2	C-2	Bright
C-1	C-2	Dark
C-2	C-1	Dark

S.NO	ITEM	SPECIFICATION	RATING	QUANTITY
5.	Lamp	Incandescent	100W, 240V	1
6.	conduit	3/4" PVC	-	5
7.	Fuse wire	cu / NP / Pt	16A	1
8.	Neutral link	Nichrome	16A	1
9.	clamp	3/4" PVC	-	5
10.	Junction box	3/4" PVC	-	2
11.	Round box	2" PVC	-	1
12.	Screws	1/4" Round box	-	10
13.	Switch box	2" x 4" PVC	-	1
14.	Elbow	3/4"	-	-

PROCEDURE:

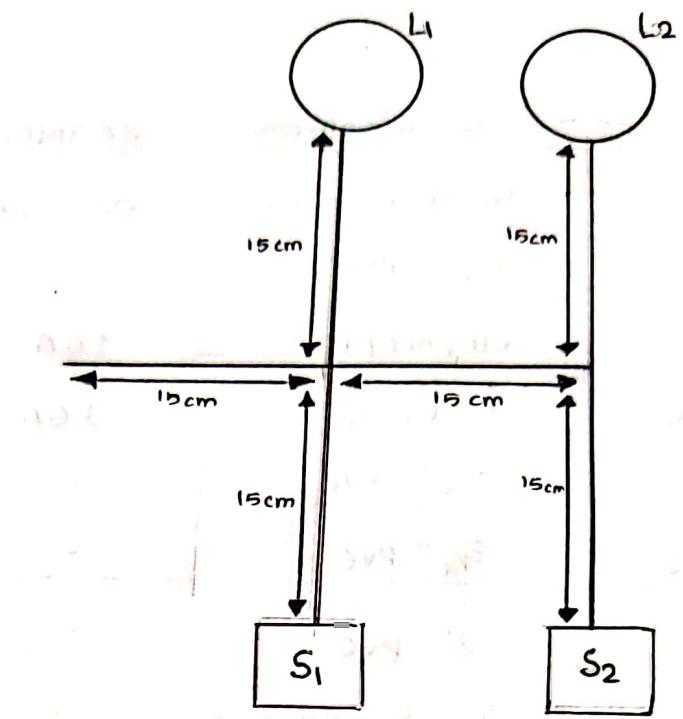
We have assigned the conduit as the layout diagram. Then the wires are drawn and connections are made in the circuit diagram with 230 V, 50 Hz AC supply is given to the circuit, then observations are obtained.

RESULT:

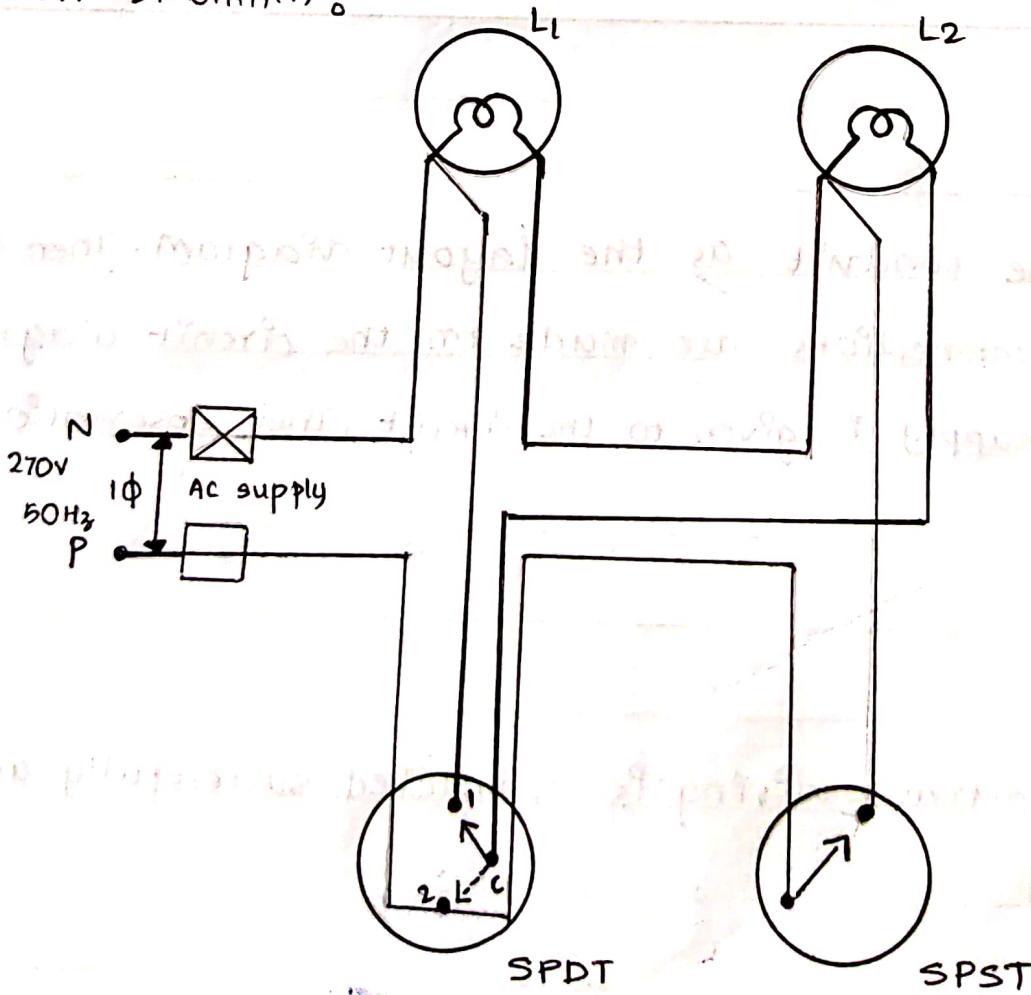
The experiment on staircase wiring is completed successfully and the output is verified

Arya
15/10/11

LAYOUT DIAGRAM:



CIRCUIT DIAGRAM:



HOSPITAL WIRING

AIM:

To control the lamp by two switches to set dim and bright light simultaneously.

TOOLS REQUIRED:

screw driver, combination plier, poker, line tester, ball pen hammer.

MATERIALS REQUIRED:

S.NO	MATERIALS WITH SPECIFICATION	QTY	UNIT	REMARK
1.	PVC conduit	10	cm	To run wire
2.	PVC insulated wire			
a)	R/V/B		cm	To run phase
b)	Black		cm	To run neutral
3.	PVC switch box (10x10)	2	-	To fix switch
4.	PVC round box	2	-	To fix lamp holder
5.	PVC tee	1	-	
6.	16A, 240, Kpt kat type	1	-	To protect circuit
7.	6A, 240V, SPST switch	1	-	To test circuit
8.	6A, steady lamp	2	-	To hold lamp

S.NO	MATERIALS WITH SPECIFICATION	QTY	UNIT	REMARK
9.	GI saddler	6	-	conduits on board
10.	Lamp	2	-	to illuminate surface
11.	Steel screws 39 x 8 mm	3	-	
		2	-	To fpx round box
	19 x 8 mm	24	-	To fpx switch box
	14 x 6 mm	8	-	To fpx switch box
12.	6A, 240V, SPDT switch	1	-	To test circuit.

PROCEDURE:

Draw the layout of the circuit on the board using chalk. Conduits and PVC tee are fixed at the correct position using saddle and steel screw wires are drawn through the pipes as per connection diagram. Round box for holder and switch box for switch. Fix at correct position using steel screws. Switch and holder fitted on switch box and round respectively. A fuse unit and neutral link is connected in series with the phase and neutral link. The series with the phase and neutral link. The incoming wires of the fuse is put in the supply lamp is put in the holder and the circuit is tested.

OBSERVATION:

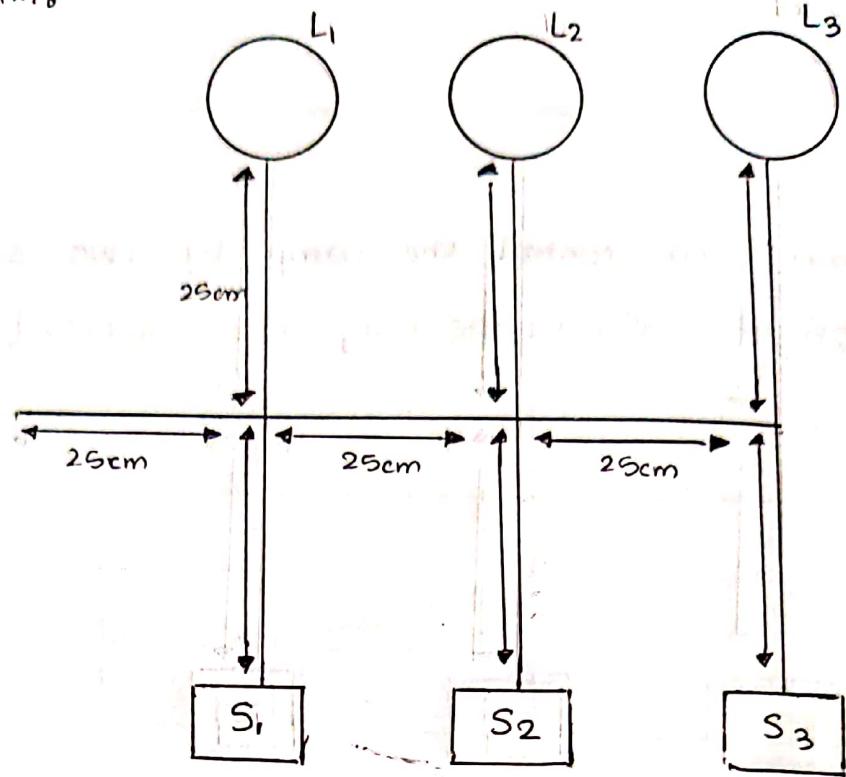
S.NO	S1 [SPDT]	S2 [SPST]	L1	L2
1.	C-2	OFF	Dim	Dim
2.	C-1	OFF	Dark	Dark
3.	C-1	ON	Bright	Bright
4.	C-2	ON	Bright	Dark

RESULT:

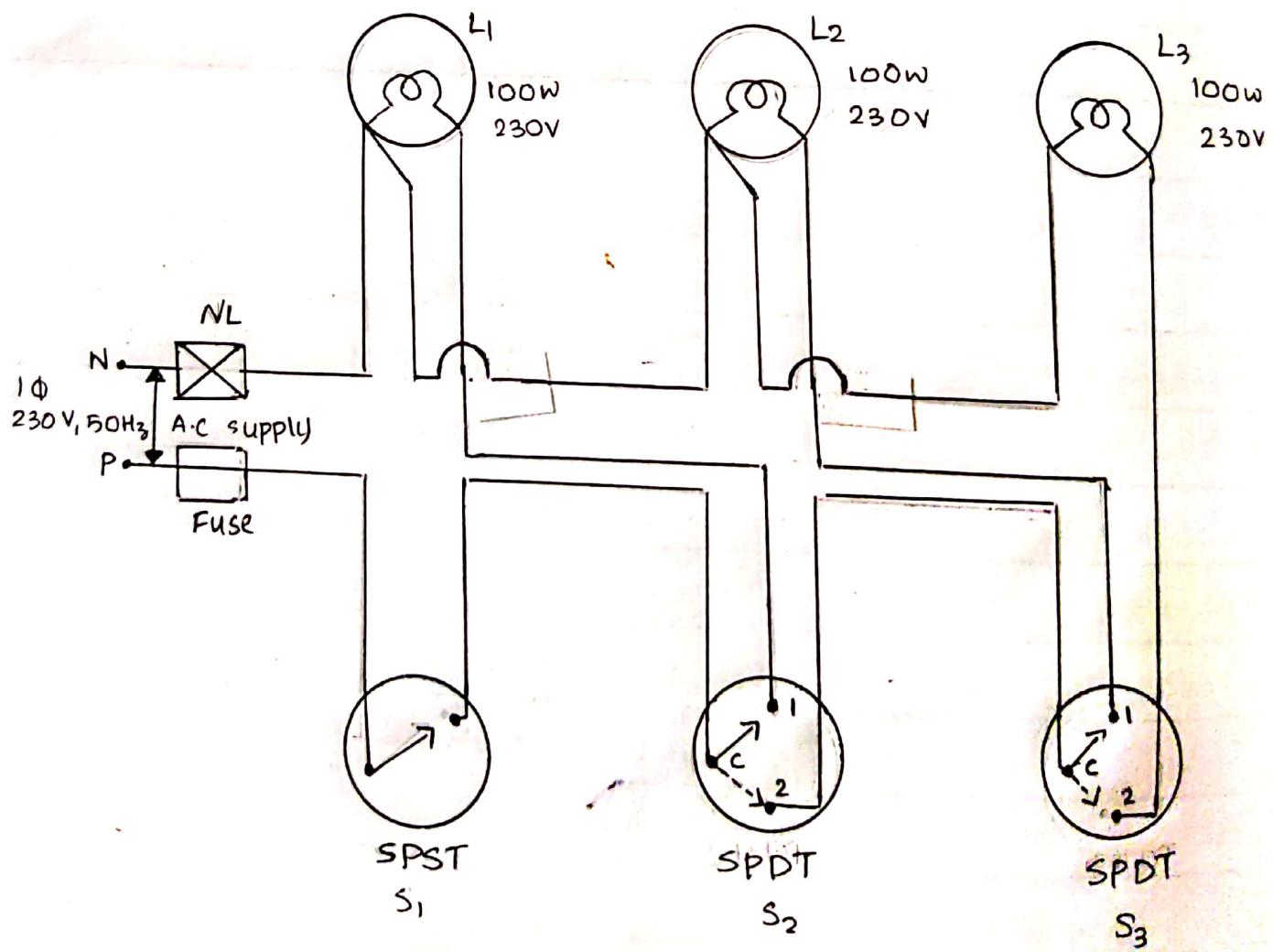
The experiment to control the lamp by two switch to get dim and bright simultaneously has successfully been executed.

~~Day
15/10/19.~~

LAYOUT DIAGRAM:



CIRCUIT DIAGRAM:



GODOWN WIRING

AIM:

To wire up a circuit to obtain godown wiring and purpose on estimation for the same.

DESIGN OF THE CIRCUIT:

$$\text{Power of the lamp} = 100 \times 3 = 300\text{W}$$

$$\text{Voltage supply} = 230\text{V}$$

$$\text{Load current} = P/V = 100/230 = 0.434\text{A}$$

$$\text{Fuse wire, rating} = 1.5 \times 0.434 = 0.659\text{A}$$

MATERIALS REQUIRED:

S.NO	ITEM	SPECIFICATION	RATING	QTY
1.	Switch	SPST	5A, 230V	1
2.	Switch	SPDT	5A, 230V	2
3	Lamp	Incandescent	100W, 230V	3
4	Lamp holder	straight	5A, 230V	3
5.	Wire	$\frac{1}{3}$ " PVC	5A	10
6.	Round Block	3" PVC	5A	13
7.	Conduits	$\frac{3}{4}$ " PVC	-	9

OBSERVATION:

S.NO	S1	S2	S3	L1	L2	L3
1.	OFF	C-1	C-1	Dark	Dark	Dark
2.	ON	C-1	C-1	Bright	Dark	Dark
3.	ON	C-2	C-1	Dark	Bright	Dark
4.	ON	C-2	C-2	Dark	Dark	Bright
5.	OFF	C-2	C-2	Dark	Dark	Dark

S.NO	ITEM	SPECIFICATION	RATING	QTY
8.	Junction Box.	5/4" PVC 4 way	-	3
9.	Clamp	3/4" metal	-	9
10.	Screw	2" x 9" PVC	-	32
11.	Switch box	2" x 4" PVC	-	3

PROCEDURE:

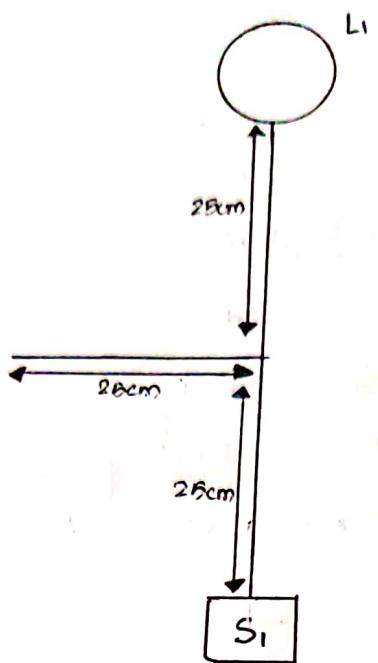
Fix the conduit according to the layout diagram with the lamp and screw. Draw the wire through the circuit and connections are made according to the circuit. The 230V 50Hz, AC supply is given to the circuit.

RESULT:

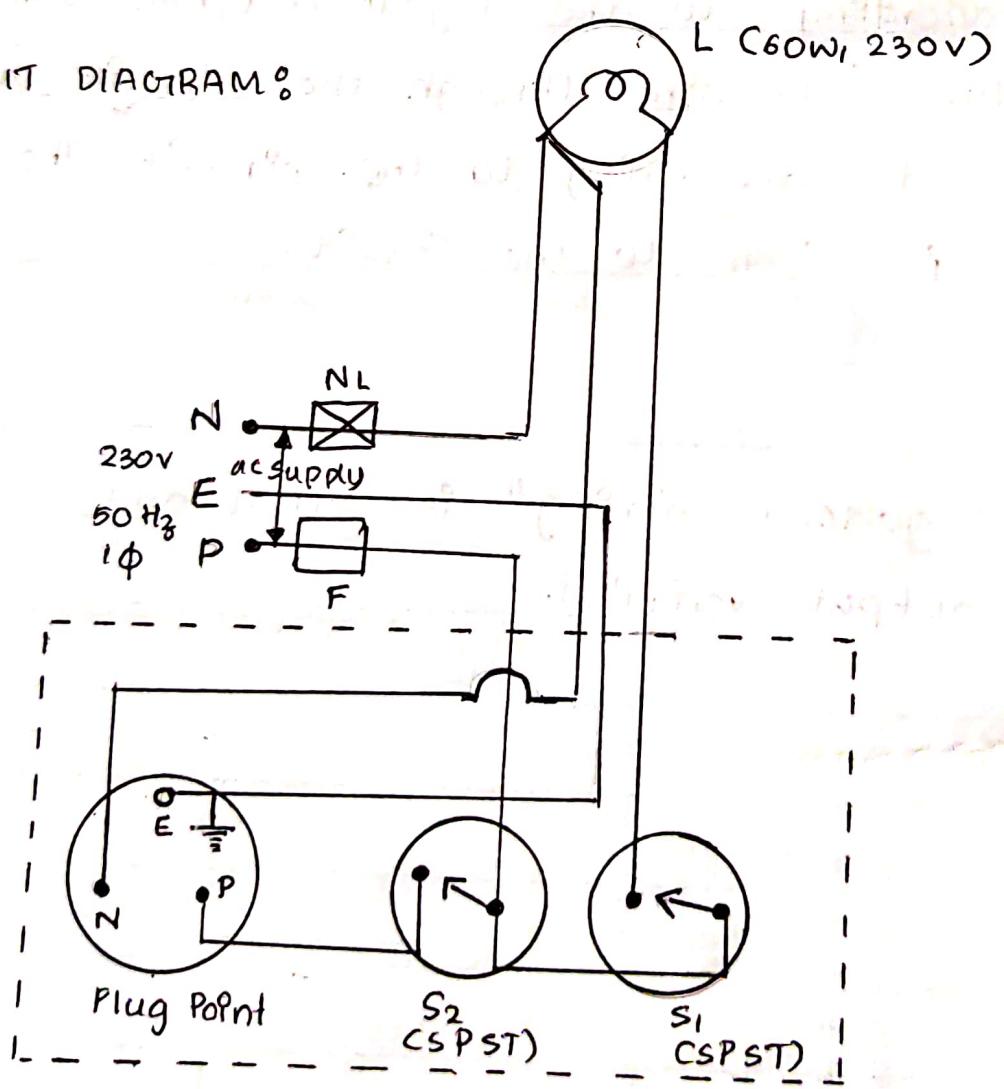
The experiment "godown wiring" is wired and conducted successfully and output verified.

Ans
Total

LAYOUT DIAGRAM:



CIRCUIT DIAGRAM:



PLUG-POINT WIRING

AIM:

To wire up a circuit to obtain plug point and one lamp controlled by independent switch.

DESIGN OF THE CIRCUIT:

Plug point controlled to 500W + 200W

$$\text{Total load} = 600\text{W}$$

$$V = 230\text{V}$$

$$I = P/V$$

$$= 600/230 = 2.608\text{A.}$$

MATERIALS REQUIRED:

S.NO	ITEM	SPECIFICATION	RATING	QTY
1.	Switch (CSPST)	SPST	5A	2
2.	Lamp holder	Straight Button	5A, 230V	1
3.	Wire	1/3" PVC insulated	5A, 230V	5
4.	Round box		5A	1
5.	Junction box	3 way box		1
6.	Clamp	12mm-dia PVC	75 cm	3

OBSERVATION:

S.NO	S1 (Lamp)	S2 (Plug)	Plug	L
1	ON	OFF	Dead	Bright
2	ON	ON	LIVE	Bright
3	OFF	ON	LIVE	Dark
4	OFF	OFF	Dead	Dark.

S.NO	ITEM	SPECIFICATION	RATING	QTY
7.	PPns	12mm - dia PVC	-	1
8.	Bulb	60W / 230V	-	1
9.	Plug sockets	3 pin	5A	1
10.	Screw	$\frac{1}{2}$ " size $\frac{1}{4}$ " size $\frac{3}{4}$ " size		6
11.	Fuse wire	Kit kat	16A	1
12.	Conduit	$\frac{3}{4}$ " PVC		3

PROCEDURE:

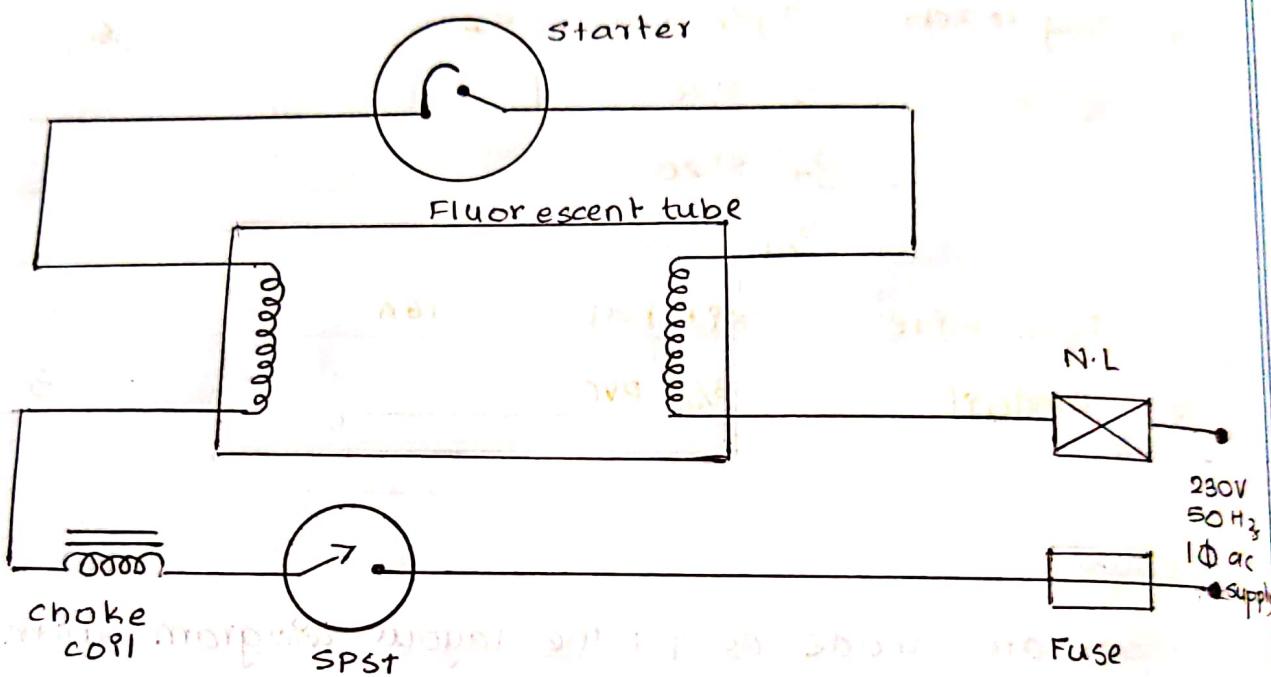
Connections are made as per the layout diagram, with metal wire connections connected according to circuit diagram then, we insert a bulb holder when both switches are on.

RESULT:

The experiment "Plug Point wiring is wired and conducted successfully and output verified.

1/13
d 9/10/19.

CIRCUIT DIAGRAM:



beginning. But because of problems with plant & temperature
of different stages in the process

FLUORESCENT TUBE

AIM :

To make up a circuit which consist of fluorescent tube controlled by one switch.

DESIGN OF THE CIRCUIT:

$$\text{Power} = 40\text{W}$$

$$\text{Voltage rating} = 230\text{V}$$

$$\text{Load current} = P = \frac{40}{230 \times 0.5} = 0.34\text{A.}$$

$$\begin{aligned}\text{Fuse wire rating} &= 1.5 \times \text{load current} \\ &= 1.5 \times 0.34 \\ &= 0.5217\end{aligned}$$

MATERIALS REQUIRED :

S.NO	ITEM	SPECIFICATION	RATING	QTY
1.	switch	SPST	5A, 230V	1
2.	starter	-	40W, 230V	1
3.	Fluorescent tube	-	40W, 230V, 10A	1
4.	choke	-	-	1

OBSERVATION:

Switch	Lamp
ON	Bright
OFF	Dark.

S.NO	MATERIAL	SPECIFICATION	RATING	QTY
5	Neutral Link	-	5A	1
6.	Fuse	Kittal or copper	-	1

PROCEDURE:

We have arranged the conduit in the layout diagram. Then the wires are drawn and connections are made in the circuit diagram. When 230V, 50 Hz AC supply is given to the circuit Then above observations are obtained. Power is supplied when switch is on, bulb glows.

RESULT:

The experiment is conducted successfully and the output is verified.

~~Nano
27/11/19~~

Completed

all

Nano
27/1/19

Experiments

Experiments

Experiments