Ex. No.:1 Date: 7/8/15

Staircase Wiring

Aim

To control the status of a given lamp from 2 different locations by using two – way switches.

Materials Required

S. No.	Name of the apparatus	Range / Type	Quantity
1	Incandescent Lamp	230 V, 25 W	1 No.
2	Lamp holder	230 V, Level	1 No.
3	Switch Box	4" x 4"	2 Nos.
4	2 way switch	230 V, 5 A	2 Nos.
5	P. V. C. casing capping	¼"	As required
6	Wooden Board	4' x 3.5'	1 No.
7	Wires	1/18"	As required

Tools Required

Screw driver, Wire stripper, Hacksaw, combination plier, drilling machine, electrician knife

Theory

In this wiring, a single lamp is controlled from two places. For this purpose two numbers of two way switches are used. This wiring which makes use of 2 switches to operate bulb at the beginning of the stair lights and the bulb gives off by pushing the button in the end. One of the terminals of the bulb is connected to the main line whose power line is connected to middle slot of two-way switch. Remaining first of these slots is connected in parallel as in crossed node.

Procedure

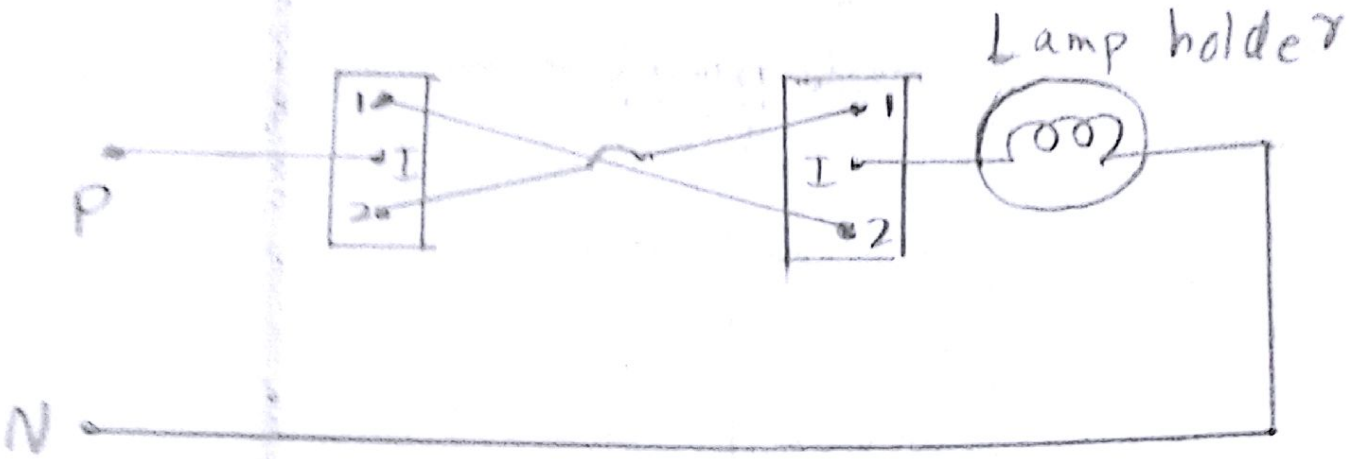
1. Collect the materials required for this experiment.
2. Draw the layout of the given circuit diagram in the circuit board.
3. Fix the necessary materials, by using drilling machine in the layout board.
4. One end of the lamp holder is connected to neutral point and another point is connected at the center of the two-way switch (S2)
5. The center of the switch (S1) is connected to the phase line.
6. The connection of the other two ends of two-way switch is connected as follows. The point 1 of switch S1 is connected to point 1 of switch S2 and point 2 of S1 is connected to point 2 of S2.
7. The given lamp is fixed on the lamp holders.
8. Test the Circuit for all possible combination of switch positions.

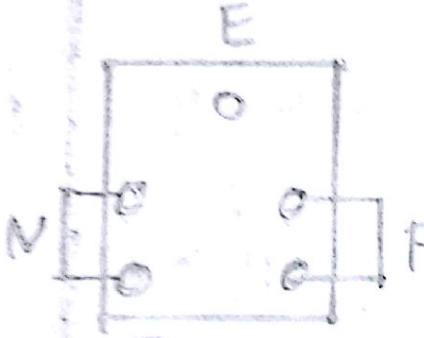
Precautions

1. Energize the circuit with the presence of Lab instructor / Faculty.
2. No part of a live circuit should be touched by the bare hand.
3. Keep the body, or any part of it, out of the circuit.
4. Keep the work area and workbench clear of items not used in the experiment.
5. When disassembling a circuit, first remove the source of power.

Fuse Rating Calculations

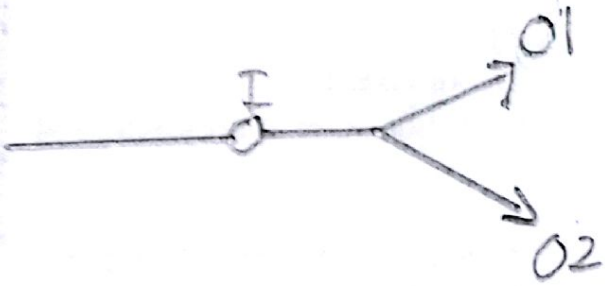
Power drawn by the circuit = 60 watts
Voltage of the circuit = 230 volts






1 way
switch


2 way
switch



P = V I COS Ø

P = V x I x 1 (Assuming COS Ø = 1 for resistive load)

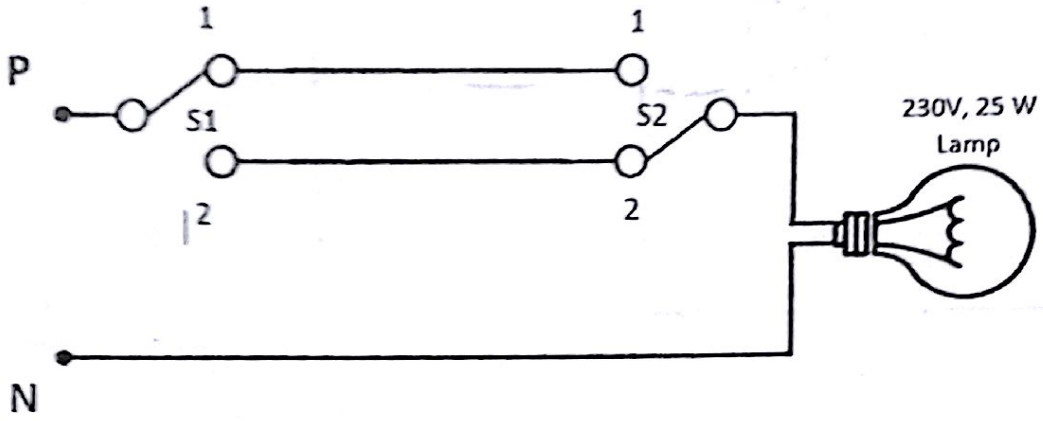
Current in the circuit (I) = power (P) / Voltage (V)

= 60 W / 230 V = 0.260 AMP.

Fuse rating of the circuit= rounding off the current to the nearest 5 = 5A

(Normally fuses are available in the ratings of 5A, 10A and etc.)

Circuit Diagram



S1, S2 are 2-way switches.

Observation

Condition No	Expected			Observed		
	S1	S2	Lamp	S1	S2	Lamp
1	1	1	ON	1	1	ON
2	1	2	OFF	1	2	OFF
3	2	1	OFF	2	1	OFF
4	2	2	ON	2	2	ON

Result

Thus stair case wiring is made and the required conditions are verified.