DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY, Kattankulathur – 603 203

Title of Experiment **(b) Stair case wiring**	:**6.Types of wiring (a)Fluorescent Lamp wiring,**
Name of the candidate	:H.MADAR HUSSAIN KHAN
Register Number	: RA2011030010109
Date of Experiment	:18.11.2020

Sl. No.	Marks Split up	Maximum marks (50)	Marks obtained
1	Pre Lab questions	5	
2	Preparation of observation	15	
3	Execution of experiment	15	
4	Calculation / Evaluation of Result	10	
5	Post Lab questions	5	
Total		**50**	

Staff Signature

PRE LAB QUESTIONS

1. **How does fluorescent lamp work?**

A fluorescent lamp, or fluorescent tube, is a low-pressure mercury-vapor gas-discharge lamp that uses fluorescence to produce visible light. An electric current in the gas excites mercury vapor, which produces short-wave ultraviolet light that then causes a phosphor coating on the inside of the lamp to glow.

2. **What is the difference between fluorescent lamp and incandescent lamp?**
   Incandescent light is a glowing white light produced by heat. ... An incandescent light bulb works by heating a filament in the bulb. Fluorescent light is a bright light produced by electricity flowing through a tube filled with ionized gas. Fluorescent light bulbs are more energy-efficient than incandescent bulbs.
3. **What are the advantages of fluorescent light bulbs?**
   Fluorescent lights have a variety of great advantages over old lighting technology, like incandescents. They're much more efficient, so they use less energy. They also have a longer lifespan—about 13x longer—so they don't need to be replaced as often.

4. **What is the voltage required to start a fluorescent lamp?**

Fluorescent tubes and electroluminescent panels typically require 200 to 600 V for starting and running illumination." A fluorescent light is a type of gas discharge tube, which contains an inert gas (such as argon, neon, or krypton) and mercury vapor.

5. **What is the function of starter in a fluorescent lamp?**

Fluorescent starters or glow starters are used to help fluorescent tubes and lamps ignite in the initial starting stage of their operation. Simply put, fluorescent starters are a timed switch. The switch opens and closes until the fluorescent tube 'strikes' and lights-up.

Experiment No. 6 a) Date :	FLUORESCENT LAMP WIRING

Aim:

To make connections of a fluorescent lamp wiring and to study the accessories of the same.

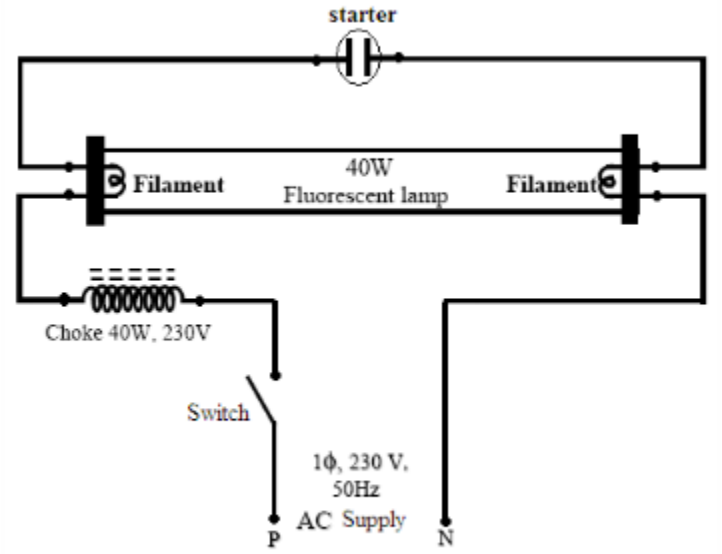
Apparatus Required:

S.No	Components	Range/Type	Quality
1.	Fluorescent Lamp fixture	4 ft	1
2.	Fluorescent lamp	40W	1
3.	Choke	40W, 230V	1
4.	Starter	-	1
5.	Connecting wires	-	As required

Tools Required:

Wire man's tool Kit - 1 No

Circuit diagram:



Theory:

1. The electrode of the starter which is enclosed in a gas bulb filled with argon gas, cause discharge in the argon gas with consequent heating.
2. Due to heating, the bimetallic strip bends and causes in the starter to close. After this, the choke, the filaments (tube ends) to tube and starter becomes connected in series.
3. When the current flows through the tube end filaments the heat is produced. During the process the discharge in the starter tube disappears and the contacts in the starter move apart.
4. When sudden break in the circuit occur due to moving apart of starter terminals, this causes a high value of e.m.f to be induced in the choke.
5. According to Lenz's law, the direction of induced e.m.f in the choke will try to oppose the fall of current in the circuit.
6. The voltage thus acting across the tube ends will be high enough to cause a discharge to occur in the gas inside the tube. Thus the tube starts giving light.
7. The fluorescent lamp is a low pressure mercury lamp and is a long evacuated tube. It contains a small amount of mercury and argon gas at 2.5 mm pressure. At the time of switching in the tube, mercury is in the form of small drops. Therefore, to start the tube, filling up of argon gas is necessary. So, in the beginning, argon gas starts burning at the ends of the tube; the mercury is heated and controls the current and the tube starts giving light. At each end of the tube, there is a tungsten electrode which is coated with fast electron emitting material. Inside of the tube is coated with phosphor according to the type of light.
8. A starter helps to start the start the tube and break the circuit.
9. The choke coil is also called blast. It has a laminated core over which enameled wire is wound. The function of the choke is to increase the voltage to almost 1000V at the time of switching on the tube and when the tube starts working, it reduces the voltage across the tube and keeps the current constant.

Procedure

1. Give the connections as per the circuit diagram.
2. Fix the tube holder and the choke in the tube.
3. The phase wire is connected to the choke and neutral directly to the tube
4. Connect the starter in series with the tube.
5. Switch on the supply and check the fluorescent lamp lighting.

Result

The accessories of the fluorescent lamp is studied .

Experiment No. 6b) Date :18.11.2020	6. b) STAIRCASE WIRING

Aim:

To control a single lamp from two different places.

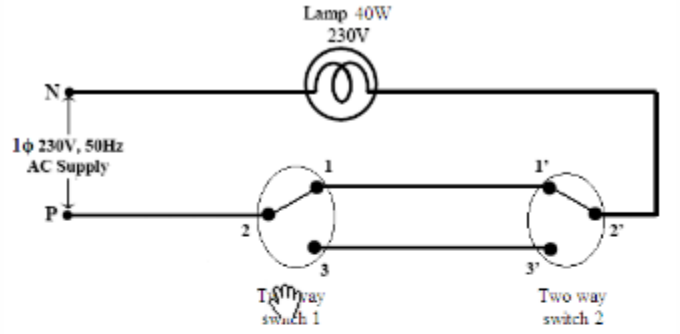
Apparatus Required:

S.No	Components	Quantity/ Range
1	Incandescent Lamp	1(230V,40W)
2	Lamp holder	1
3	Two way switches	2 (230V, 5A)
4	Connecting Wires	As required

Tools Required:

Wire mans tool Kit - 1No.

Circuit Diagram:



Theory:

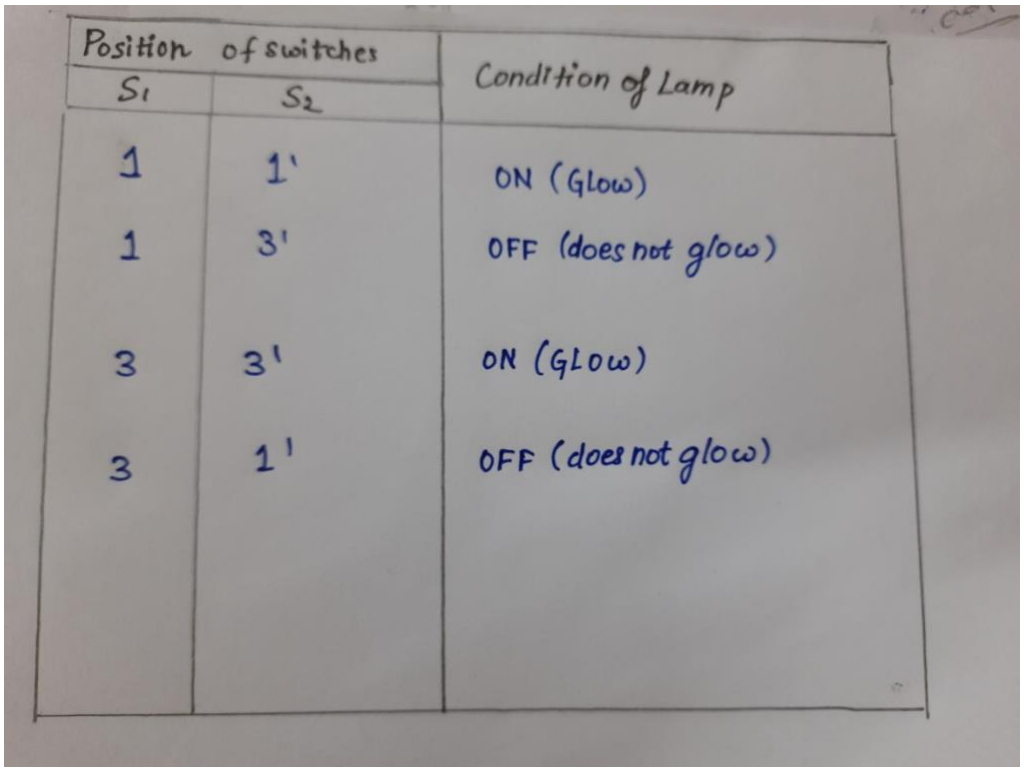
1. A two way switch is installed near the first step of the stairs. The other two way switch is installed at the upper part where the stair ends.
2. The light point is provided between first and last stair at an adequate location and height if the light is switched on by the lower switch. It can be switched off by the switch at the top or vice versa.
3. The circuit can be used at the places like bed room where the person may not have to travel for switching off the light to the place from where the light is switched on.
4. Two numbers of Two-way switches are used for the purpose. The supply is given to the switch at the short circuited terminals.
5. The connection to the light point is taken from the similar short circuited terminal of the second switch. Other two independent terminals of each circuit are connected through cables.

Procedure:

1. Give the connections as per the circuit diagram.
2. Verify the connections.
3. Switch on the supply.
4. Verify the conditions.

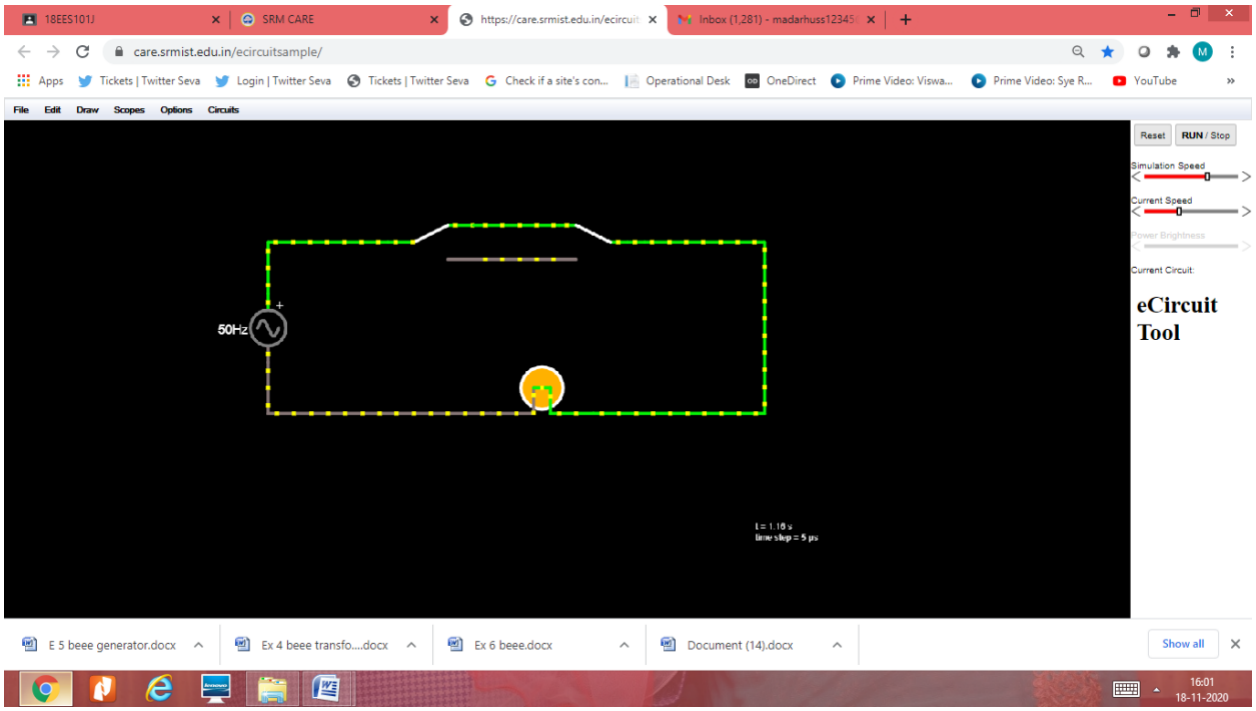
Tabulation:

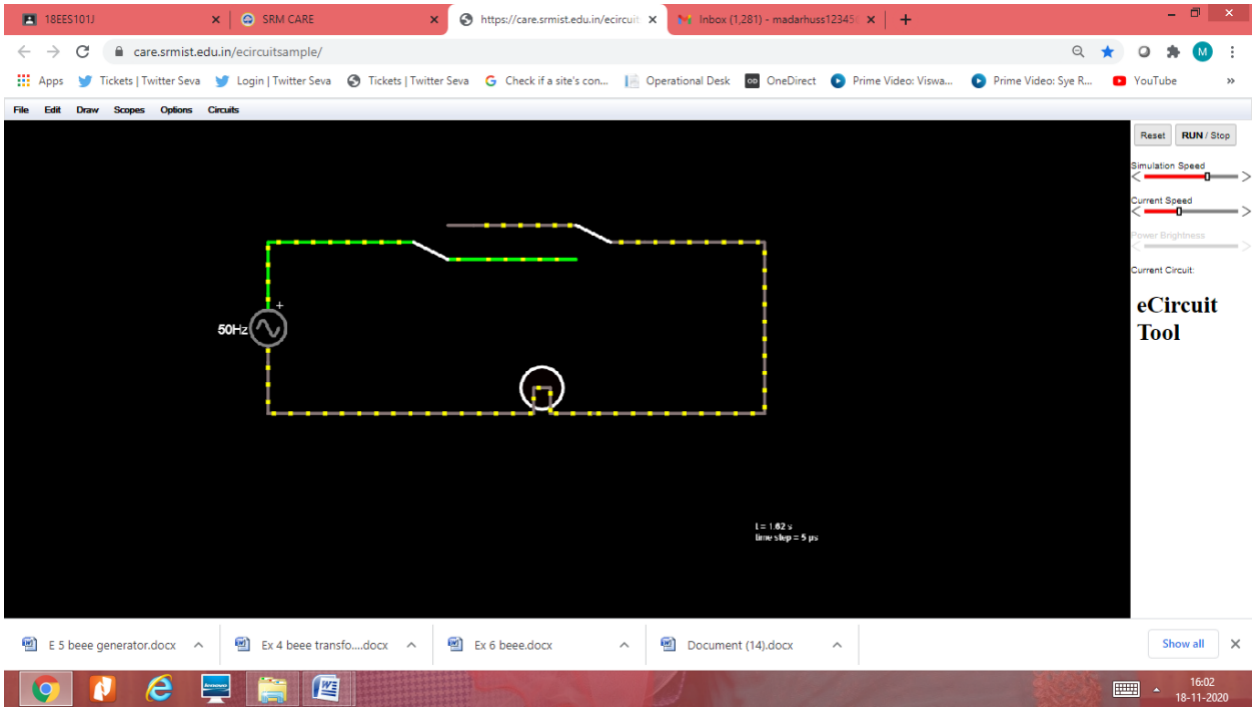
Position of switches		Condition of lamp
S1	S2	

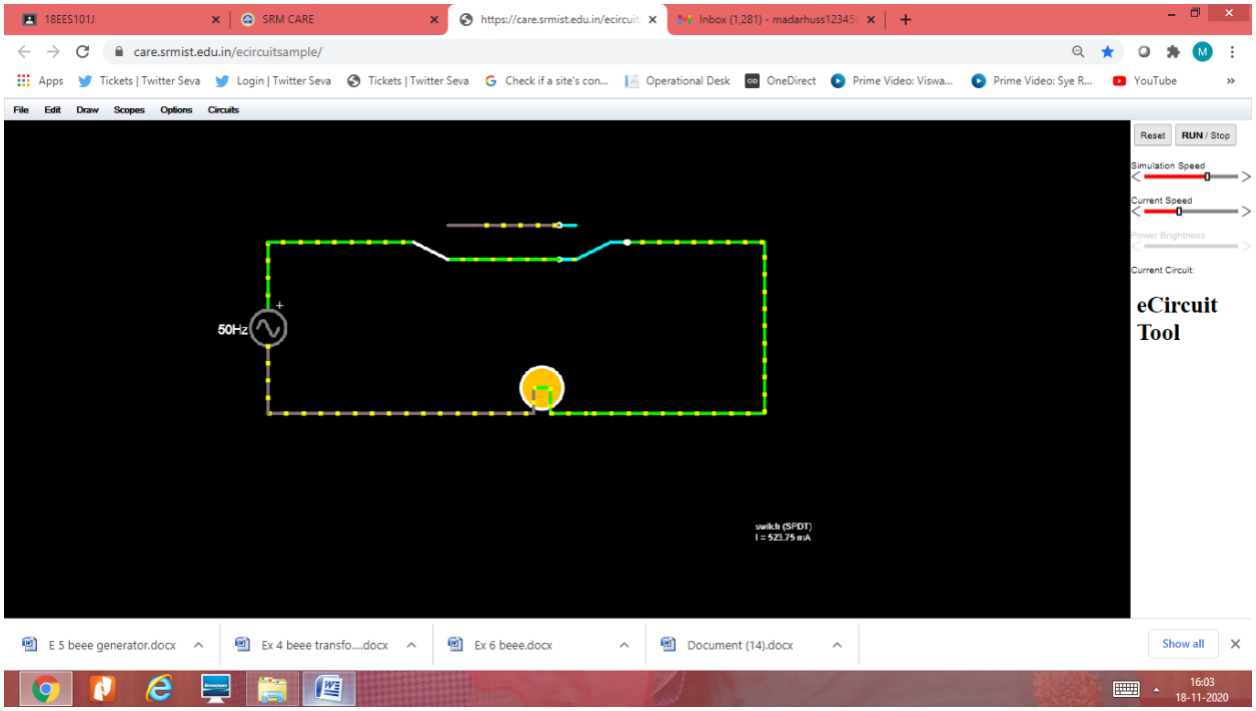


Position of switches		Condition of Lamp
S_1	S_2	
1	1'	ON (Glow)
1	3'	OFF (does not glow)
3	3'	ON (Glow)
3	1'	OFF (does not glow)

Modal diagram



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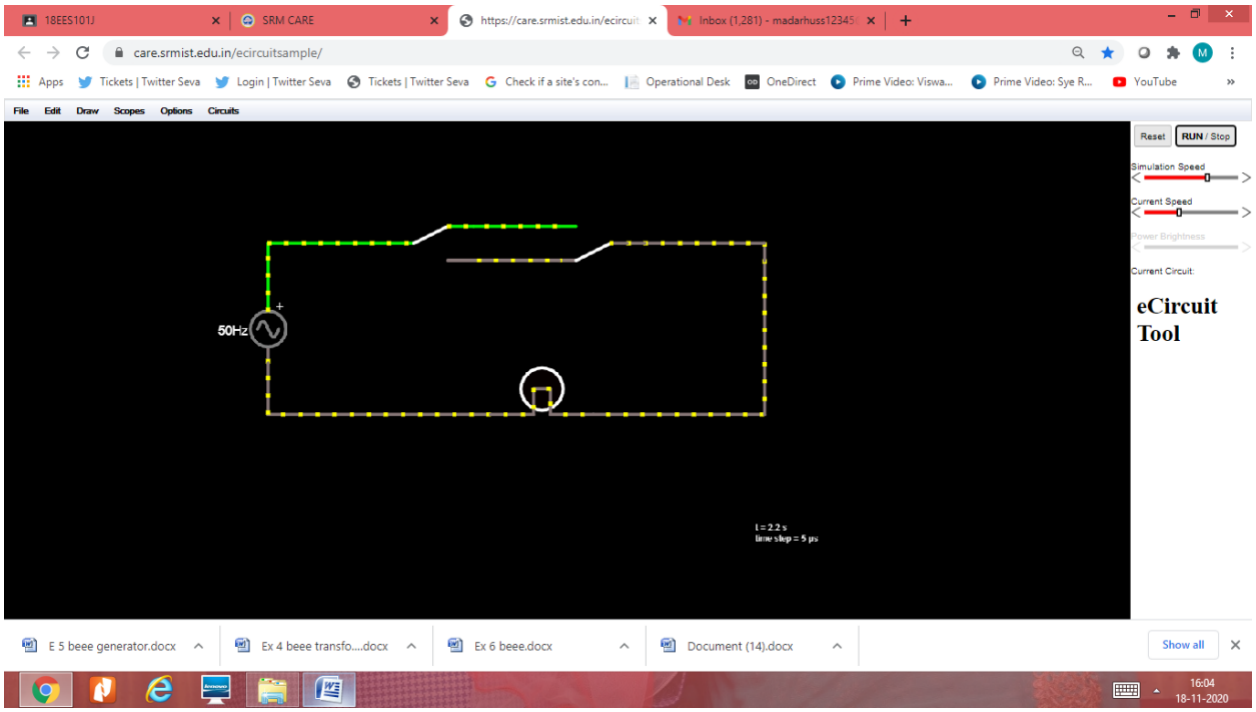
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Result

This proves that in the staircase method we have two ways to turn on and turn off the switch.

POST LAB QUESTIONS

1. **What is the use of staircase wiring?**

The main purpose of two-way switching connection is to connect and control AC appliances and equipment from two separate locations. It is mostly used in staircase wiring where a light bulb can be controlled (Switch ON / Switch OFF) from different places, no matter if you are in the upper or lower portion of the stair**.**

2. **Why choke is used in fluorescent lamp?**

The choke primarily serves to limit current flow to the correct level for the tube. It also can be used during startup to provide an inductive 'kick' forming a momentary higher-voltage pulse to start the lamp.

3. **What is the purpose of magnetic ballast in fluorescent lamp?**

The magnetic ballast uses a magnetic transformer of copper windings around a steel core to convert the input line voltage and current to the voltage and current required to start and operate the fluorescent lamps. Capacitors are added to assist lamp starting and power factor correction.

4. **Compare electronic ballast and magnetic ballast?**

Electronic ballasts alter the flow of electricity in the light bulb by using a series of induction coils that are separated from one another. In contrast, magnetic ballast uses 1 induction coil and not a series.

5. **List out the advantage of staircase wiring**

Advantages of Using Staircase Wiring:

- Easy to control appliances from various points.
- Faster control than a single switch.
- Highly Efficient for larger places.
- Living Comfort can be increased.
- Electricity can be fake.