

DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY, Kattankulathur – 603 203

Title of Experiment	: 6. Types of wiring (a) Fluorescent Lamp wiring, (b) Stair case wiring
Name of the candidate	: Kunal Keshan S
Register Number	: RA2011004010051
Date of Experiment	: 15 th June 2021

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 generates light from collisions in a hot gas of free accelerated electrons with atoms, usually mercury vapor, in which electrons are bumped up to higher energy levels and then fall back while emitting at two UV emission lines.

2. What is the difference between fluorescent lamp and incandescent lamp?

The main difference lies in how they produce light. Incandescent lamps produce light by a heating of a metallic filament until it starts to radiate light. On the other hand, fluorescent lamps produce light by exciting gas and causing it to glow.

3. What are the advantages of fluorescent light bulbs?

They are energy efficient, have low production cost, have a long life, have a good selection of desired color temperature and has diffused light property.

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

The voltage required to start a fluorescent lamp lies between 200 to 600 V.

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

Starters are used to help fluorescent lamps ignite in the initial starting stage of their operation. They are simply, 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.

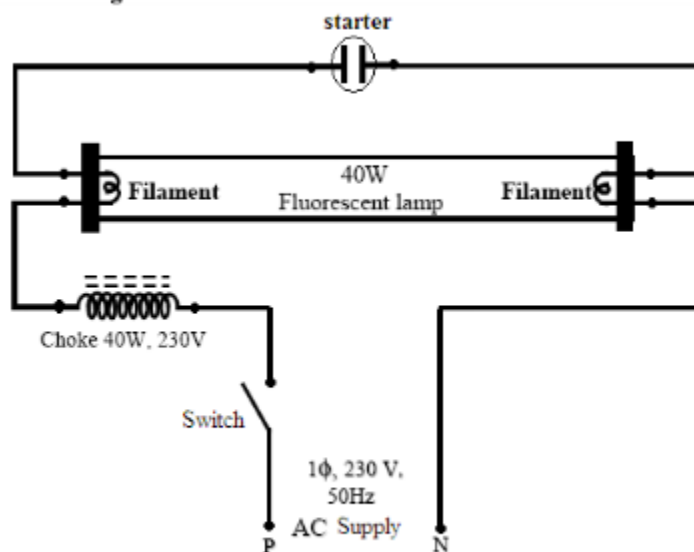
Apparatus Required:

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 tube and break the circuit.
9. The choke coil is also called ballast. 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:

Experiment No. 6 b)**6. b) STAIRCASE WIRING****Date :****Aim:**

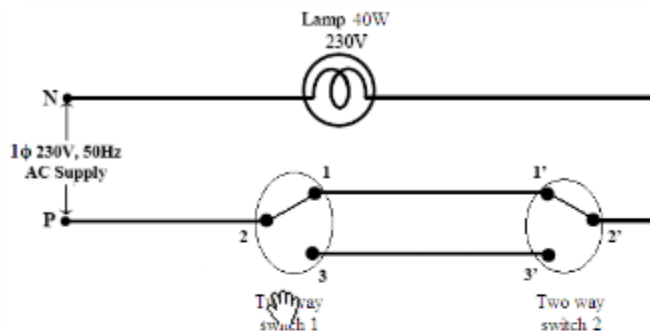
To control a single lamp from two different places.

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.

18EES101J-BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (LABORATORY)

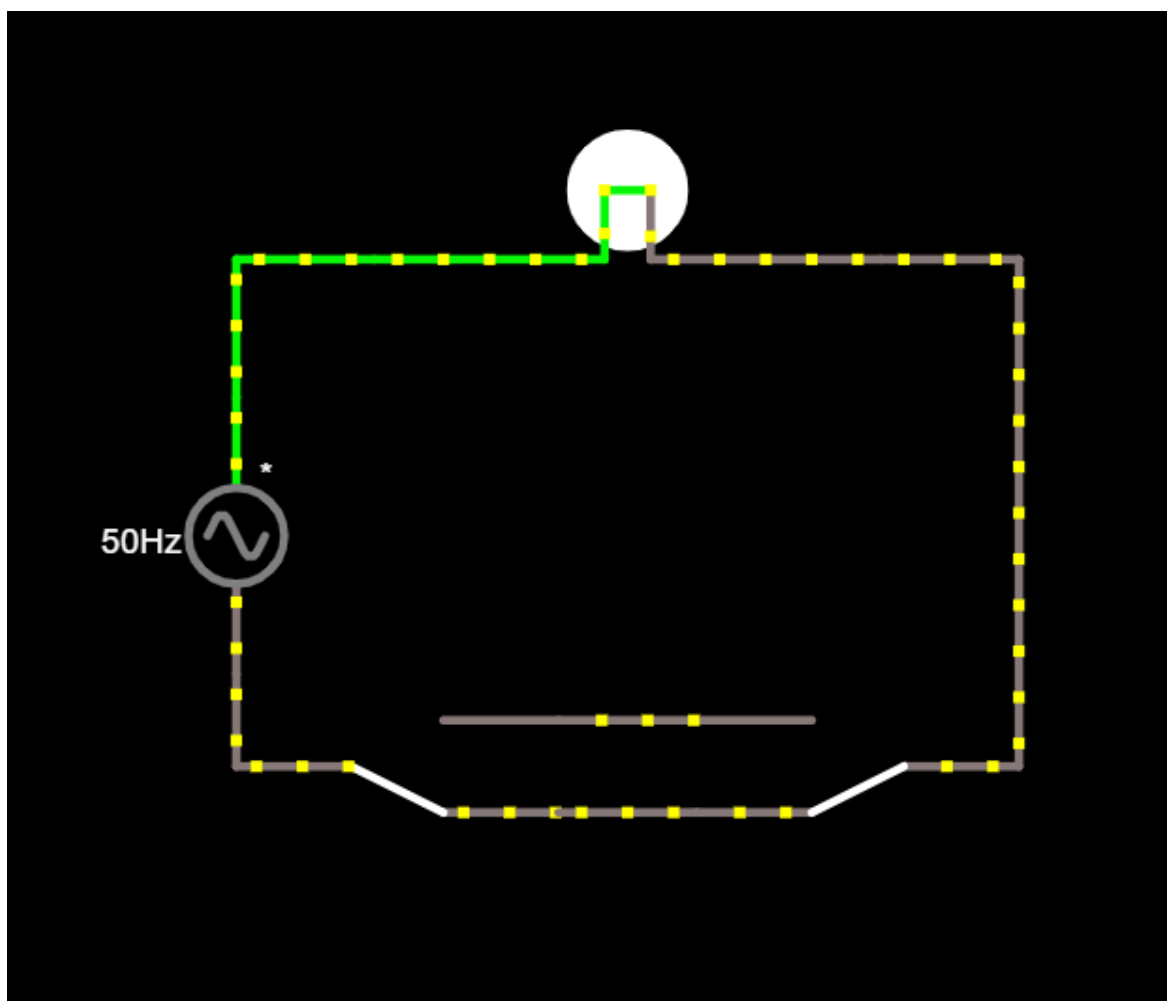
Procedure:

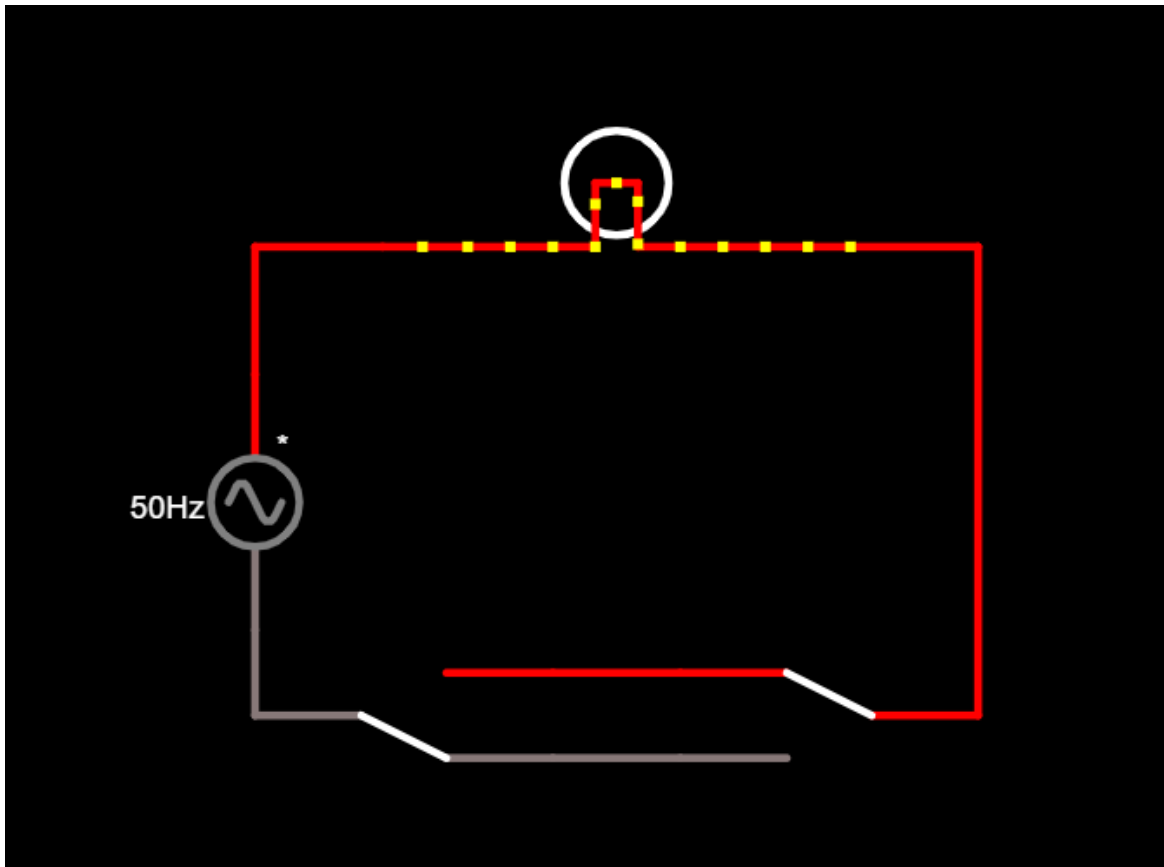
1. Give the connections as per the circuit diagram.
2. Verify the connections.
3. Switch on the supply.
4. Verify the conditions.

Tabulation:

Position of switches		Condition of lamp
S1	S2	
1 2	1' 2'	ON
1 3	1' 2'	OFF
1 3	1' 3'	ON
1 2	1' 3'	OFF

Result:





POST LAB QUESTIONS

1. What is the use of staircase wiring?

The main purpose of staircase wiring is to connect and control AC appliances and equipment's from two separate locations. It is also used where a light bulb can be controlled from different places, no matter you are in the upper or lower portion of a stair.

2. Why choke is used in fluorescent lamp?

The purpose of choke is to provide a very high voltage initially between the filaments. Again once the gas in the tube is ionized the choke provides a low voltage. A choke is nothing but a coil/ballast, it increases the voltage for a brief period of time, and this increased voltage is used to ionize the gases in the starter.

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.

4. Compare electronic ballast and magnetic ballast?

A magnetic ballast uses coiled wire and creates magnetic fields to transform voltage required to start the fluorescent lamp.

An electronic ballast uses solid state components to transform voltage.

5. List out the advantage of staircase wiring.

They help in easy to control appliances from various points, are faster than a single switch, highly effective for larger places, living comfort can be increased and electricity can also be saved by staircase wiring.