EXPERIMENT NO-8

01. AIM OF THE EXPERIMENT: - Power factor measurement for fluorescent lamp.

02. APPARATUS REQUIRED: -

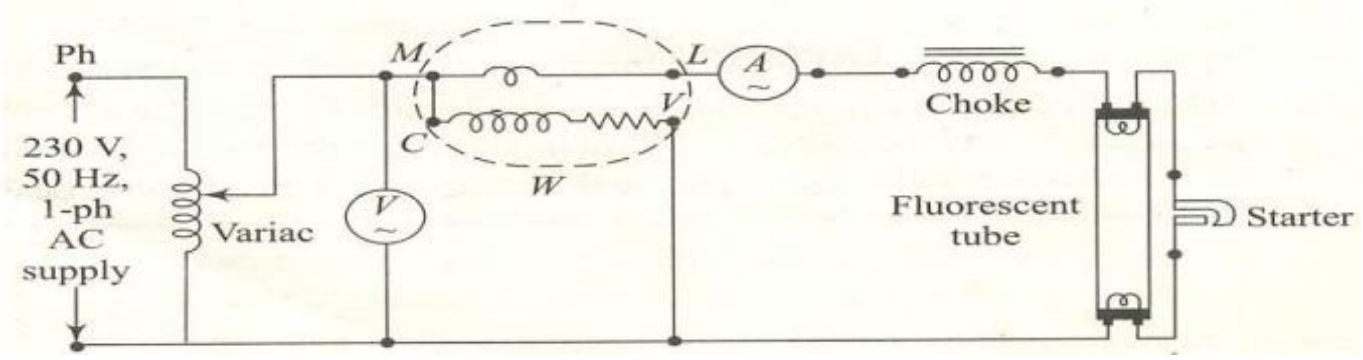
Sl No	Name of the Equipment	Range	Type	Quantity
1	Fluorescent lamp	230 V, 20W	Tube	1
2	Voltmeter	0-1 A	MI	1
3	Ammeter	230V, 20W	MI	1
4	Choke coil	230V, 20W	Inductive	1
5	Starter	230V, 20W	Glow type	1
6	Capacitor	2.5µf	Oil filled	1
7	Wattmeter	1A, 300V	DM	1
8	Connecting wires	230V, 5A, 1/18 SWG	PVC Coated	As per required
9	Variac	0-270V, 8A	WW	1

03. THEORY: -

A fluorescent lamp is a low pressure mercury discharge lamp with inner surface coated with suitable fluorescent materials. This consists of glass tube provided at both ends with caps having two pins an oxide coated tungsten filament tube contains argon or krypton gas to facilitate starting with small quantity of mercury under low pressure. Fluorescent material when subjected to electromagnetic radiations of particular wavelength produced by the discharge through the mercury vapor get excide and in turn gives out radiations at some other wavelength which falls under visible spectrum. Power factor of the lamp is somewhat low and is about 0.5 lagging due to induction of the choke. A condenser, if connected across the supply improves the power factor. When rated supply applied, full supply voltage appears across starter electrode P and Q which are enclosed in a glass bulb filled with argon gas. This voltage causes discharge in the argon gas with consequent heating of electrodes. Due to this heating, the electrodes P which is made of bimetallic strip, bents and closes contact of the starter. At this stage, the choke the filament M1 and M2, of the tube T and the Starter becomes connected in series across the supply. A current flow through filament M1 and M2 and heats them. Meanwhile the argon discharge in the starter tube, the electrodes P and causes a sudden break in the circuit. This causes a high value of induced emf in the choke. The induced emf in the choke is applied across tube light electrodes M1 and M2 and is responsible for initiating a gaseous discharge because initial heating has already created good number of free electrons in the vicinity of electrodes. Thus the starts giving light output.

Once the discharge through the tube high is established, a lower voltage than supply voltage is required maintain. A reduction during running condition is achieved by having voltage drop in the choke.

The capacitor connected the starter terminals P and Q is used to suppress the electromagnetic waves generated at the gap due to sparking, thereby reducing the disturbance causes to nearby radio and tv receivers.



Circuit Diagram

04. PROCEDURE: -

Connect the circuit as per circuit diagram switch on the supply and vary the voltage slowly to the rated voltage.

Note down the voltage, current and power readings.

Calculate the power factor.

05. CALCULATION: -

Actual power = Observed power ×M. F (4)

Power factor = cosØ= actual power/V×I

CosØ= Actual power/V×I

06. OBSERVATION TABLE: -

Sl No	Voltmeter reading in Volts	Ammeter reading in Ampere	Wattmeter reading in watt		Power factor = cosØ	Mean
			Observed	Actual		
1						
2						
3						
4						
5						

07. CONCLUSION: -