SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 23EET01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

I YEAR /II SEMESTER COMPUTER SCIENCE & TECHNOLOGY

Unit 1 – Electrical Circuits and Measurements

Electrodynamometer type wattmeter

PURPOSE OF INSTRUMENTS

Ammeter is used to measure _____

Voltmeter is used to measure _____

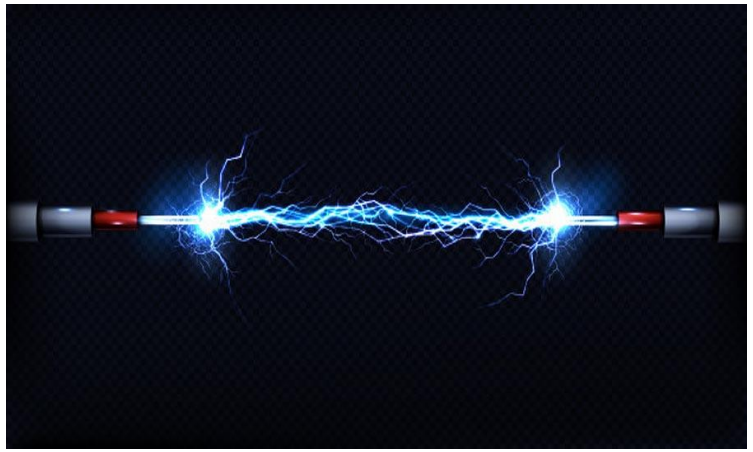
Wattmeter is used to measure _____

POWER

1.In general the Power is defined as an ability or capacity to do something or act in a particular way.

2.In terms of electrical engineering Power = V*I

3.Wattmeter is used to measure the electrical power



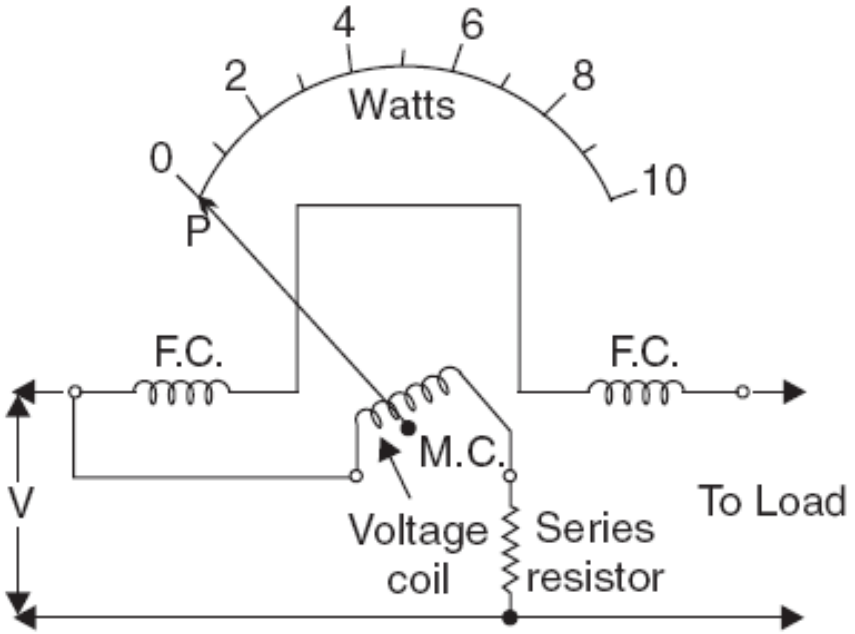
WATTMETERS

A wattmeter is a combination of an ammeter and a voltmeter and, therefore consists of two coils known as current coil and pressure coil. The operating torque is produced due to interaction of fluxes on account of currents in current and pressure coils.

Types of wattmeters

1. Dynamometer wattmeter
2. Induction wattmeter
3. Electrostatic wattmeter

DYNAMOMETER WATTMETER



F.C. = Fixed coils (current coils)

M.C. = Moving coil (voltage coil)

P = Pointer

If the coils are connected so that a value of current proportional to the load voltage flows in one, and a value of current proportional to the load current flows

ASSESSMENT 1

1. Power is _____
   a) rate of doing work
   b) rate of producing voltage
   c) rate of generating current
   d) rate of overcoming friction

2. In D.C. circuits, power is measured using _____
   a) ohmmeter and galvanometer
   b) ohmmeter and voltmeter
   c) ammeter and voltmeter
   d) ammeter and galvanometer

CALIBRATION

Let v = supply voltage,

i = load current, and

R = resistance of the moving coil circuit.

Current through fixed coils, if = i.

Current through the moving coil, im =V/R

Deflecting torque, Td ∝ if × im ∝ iV/R

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ERRORS

1. The error may creep in due to the inductance of the moving or voltage coil. However, the high non-inductive resistance connected in series with coil swamps, to a great extent, the phasing effect of the voltage coil inductance.

2. There may be error in the indicated power due to the following :

(i) Some voltage drop in the current circuit.

(ii) The current taken by the voltage coil.

PROS AND CONS

Advantages

(i) The scale of the instrument is uniform

(ii) High degree of accuracy can be obtained by careful design, hence these are used for calibration purposes.

Disadvantages

(i) The error due to the inductance of pressure coil at low power factor is very serious

(ii) Stray field may effect the reading of the instrument.

Assessment 2

1. A wattmeter consists of a current coil and a potential coil.
   a) True
   b) False
2. In a Dynamometer type wattmeter, the fixed coil is split into _____
   a) 4
   b) 3
   c) 2
   d) 1
3. List the advantages of Dynamometer type wattmeter.

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THANK YOU