NAME FAWAD AHMAD

ID 141231

SUBJECT EMI

DATE 23-06-2020

Q1:- A student has connected two

- - - - - - - - - - - - - -

- - - - 15KΩ respectively:

Ans:- Given data:-

Two voltmeter range = 0-300V

$R_1 = 25K\Omega$

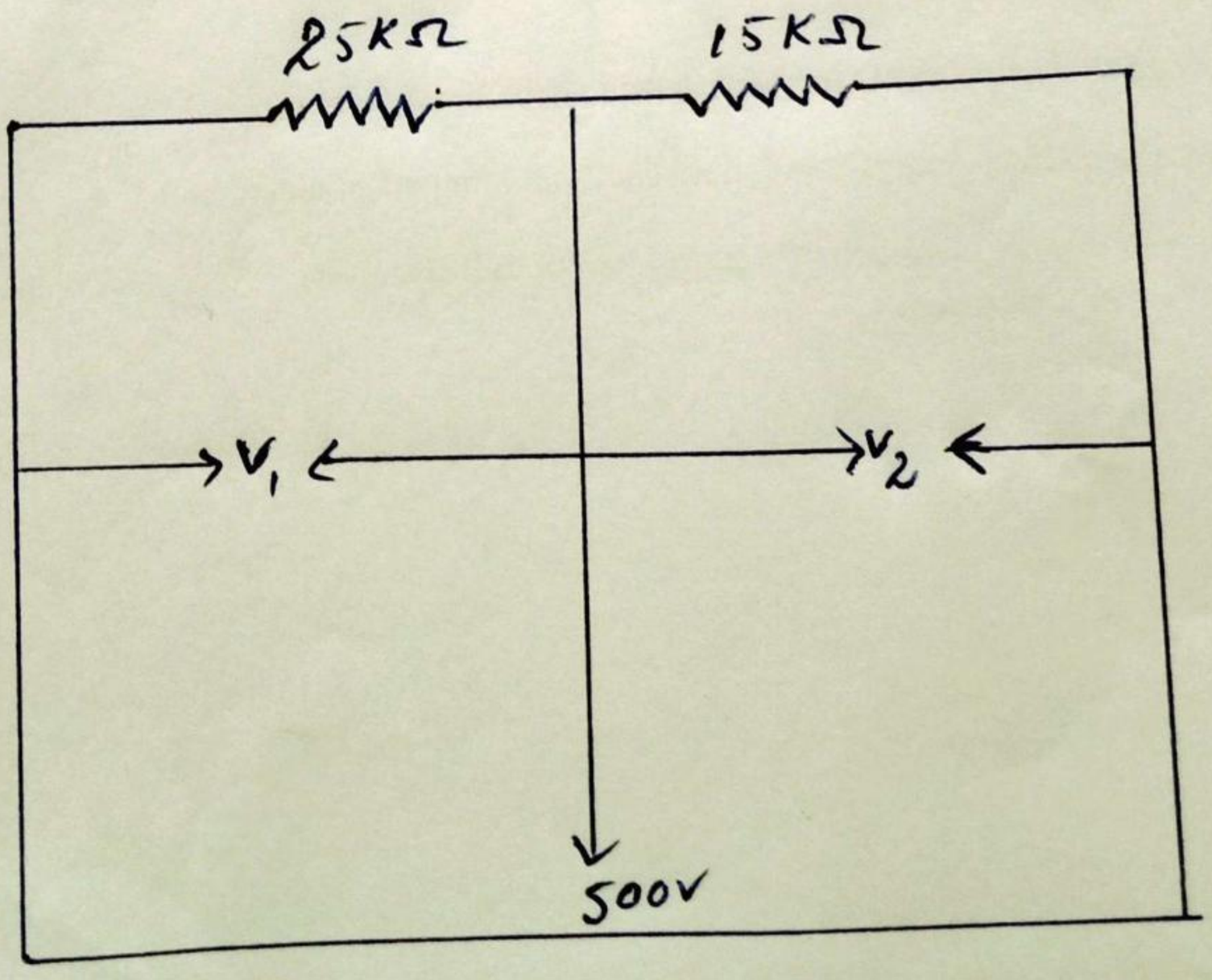
$R_2 = 15K\Omega$

Total voltage VI = 500V

Required:-

$V_1 = ?$

$V_2 = ?$



Solutions.

$$V_1 = \frac{2.5K\Omega}{25K\Omega + 15K\Omega} \times 500V$$

$$V_1 = 312.5V$$

$$V_2 = \frac{15K\Omega}{15K\Omega + 25K\Omega} \times 500V$$

$$V_2 = 187.5V$$

Q2:- A dynamometer type - - - - - - -

- - - - - - - - - - - -

- - - - - - - - - - - - -

c) Percentage error due to the connection of watmeter.

ANS:- Given data:-

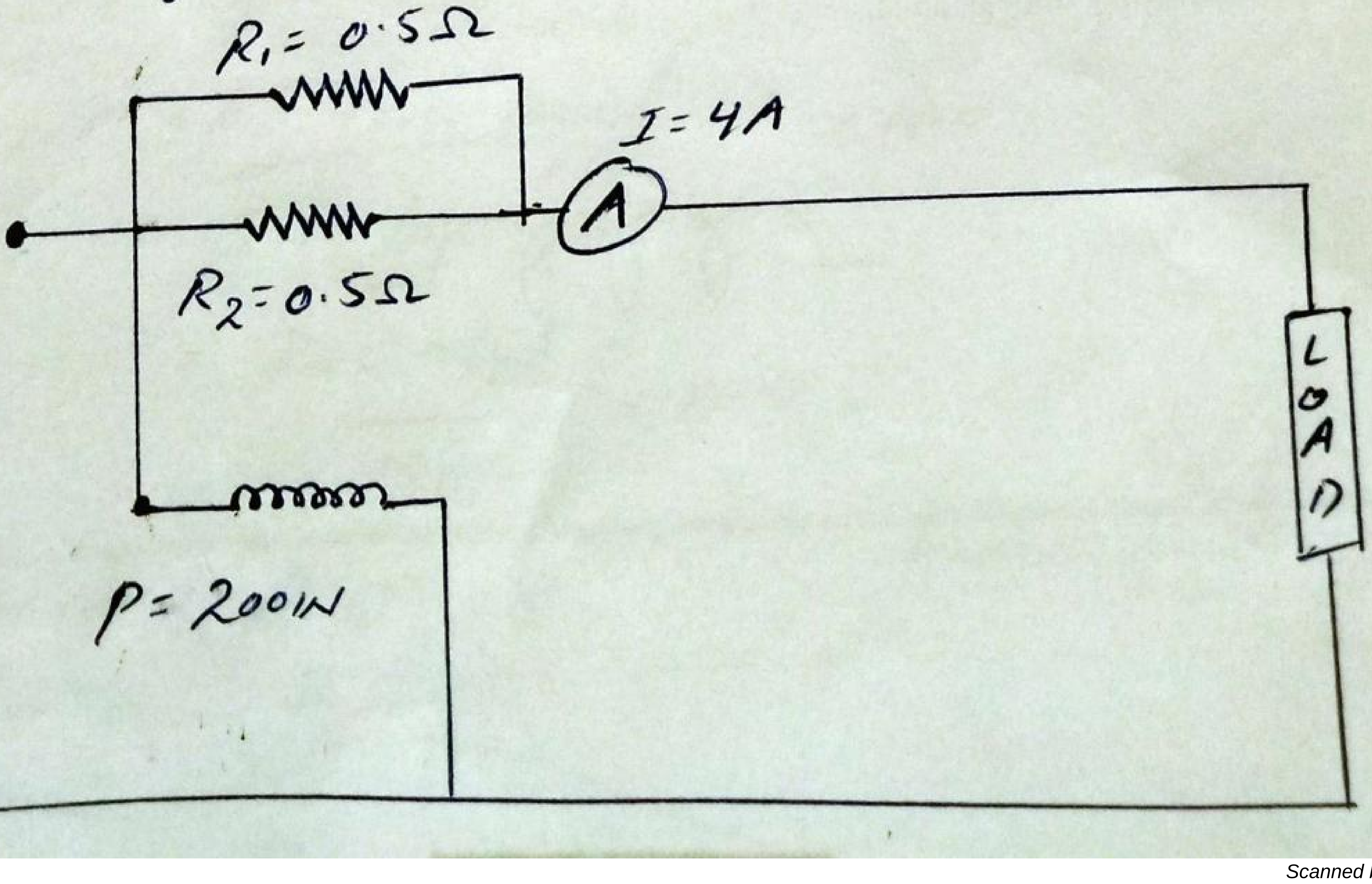
$R_1 = 0.5\,\Omega$

$R_2 = 0.5\,\Omega$

$P = 200W$

$I = 4A$

~~Required~~ Diagram



Solution:-

$$R_c = \frac{R_1 R_2}{R_1 + R_2}$$

$$R_c = \frac{0.5 \times 0.5}{0.5 + 0.5}$$

$$R_c = \frac{0.25}{1} = 0.25\ \Omega$$

(a) Power dissipated in wattmeter $= I^2 R_c$

$$I^2 R_c = ((4)^2 \times 0.25)$$

$$= 16 \times 0.25$$

$$I^2 R_c = 4W$$

(b) True load Power $= 200 - 4$

$= 196W$

(c) % error $= \frac{P - \text{True load}}{\text{True load power}} \times 100$

$$= \frac{200 - 196}{196} \times 100$$

% error $= 2.0408$

Q3(a):- What is the difference between Kelvin's bridge and Wheatstone Bridge? Explain Briefly? (6)

ANS:- A Wheatstone bridge measures electrical resistance by balancing a bridge circuit. The circuit has two legs, of which one contains the unknown resistance of value between 1 ohm to 10 ohm.

Apart from resistance, this setup can also measure impedence, capacitance and inductance

The Kelvin bridge is more advanced and helps in measuring resistance less than 1 ohm. However, it has two more resistors than the Wheatstone bridge.

Q3:- Explain how the potential on - - - -

- - - - - - - - - - - - - -

- - - - node?

ANS:- The element voltage that appears across the terminals of a single element. When we use the term node voltage, we are referring to the potential difference between two nodes of a circuit

We select one of the nodes in our circuit to be the reference node. All the other node voltages are measured with respect to this one reference node. If node c is assigned as the reference node, we establish two node voltages at nodes a and b.

Q4 (a) Why the energy meters designed for DC circuits cannot be used for AC circuits?

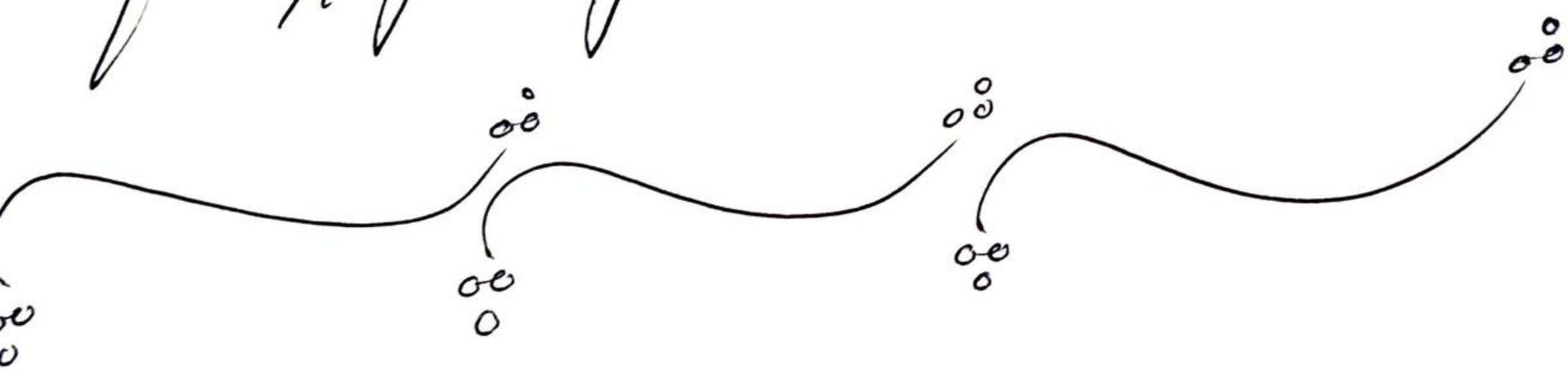
Ans:- It is because AC Energy meter works due to the involvement of two alternating magnetic fields produced by AC quantities that interacts with an aluminium disk causing eddy current to induced in the disk.

Q4(6) What will happens if the phase
- - - - - - - - - - - -
- - - - - energy meter?

ANS:- We know that in induction type energy meters, in order to maintain speed of rotation proportional to power "The phase angle between supply voltage and pressure coil flux should be equal to 90°. However in actual practice, the angle between supply voltage and pressure coil flux is exactly not 90° but few degrees less.

if the phase difference two alternating fluxes in an induction type energy meter is zero degree than it results in improper rotation of disc. Improper phase angle is due to improper

lag adjustment, variation of resistance with temperature or it may be due to abnormal frequency of supply voltage.



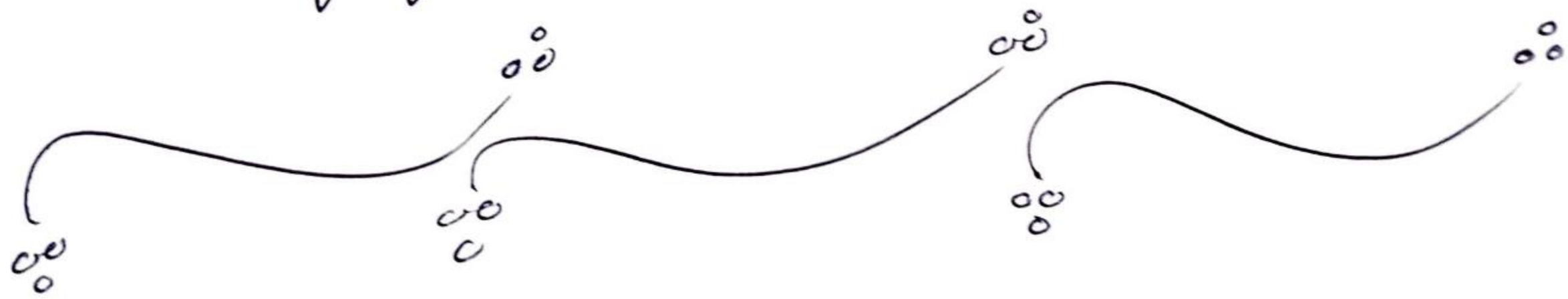
Q5(a):- Why the series magnet is wound (11)
with a wire of - - - - - - - -
- - - energy meter?

Ans:- Series magnet consist of a number of
U-shaped laminations of silicon steel
together to form a core. A coil of
thick wire having a few turns is
wounded in both legs of U-shaped
magnet. the coil is known is current
coil which is conneteel series with load.
produce the magnetic field proportional
and in phase with line current I.

Shunt magnet consist of number of
M-shaped laminations of silicon steel
assembled together to form a core.
A coil of thin wire having large
number of turn in wound on central

limb of the magnet. this coil is connected across the load. thus it is excited by current proportional to the supply voltage and known is potential coil.

The series magnetic is wound with a wire of few turns connected in series with load so that it carries the load current. The coil of this magnetic is highly non-inductive.



Q5(5):- What is the significance of meter constant in an energy meter?

Ans:- Each meter has a flat aluminum disk with a black mark along its edge. This disk turns when energy is being used. Meters also have a meter constant. The constant is shown on the meter nameplate. A constant "Kh = 7.2" means that for each revolution of the disk, 7.2 Kwh - hours has been used (constant will vary with different meters).

$N \propto Energy$

$N = K \times Energy$

Where K is constant called meter constant.

Meter constant $K = N/Energy = \frac{No.\ of\ revolution}{Kwh.}$

Hence the no of revolution made by the disc for 1 Kwh of energy consumption is called meter constant for example if meter constant of energy meter is 1500 rev/Kwh it means that for consumption of 1 Kwh the disc will make 1500 revolution.