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15863

Paper

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L.C.A

Exam

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Summer

Date 20 / 08 / 2020

Q No: 31

What the main different between a Lumped network and distributed Network?
(Part A)

Ans :-> Lumped network :->

A network in which all the ~~circuit~~ network elements are physically separable is known as Lumped network. Most of the electric networks are lumped in nature which consists elements like R, L, C voltage sources etc.

th Distributed Network :->

A network in which the circuit elements like R, L & C cannot be physically separable for analysis purpose is called distributed network.

The best example of a such a network is a transmission line where resistance, inductance

and are its length and capacitance of a TLL distributed all along and cannot be shown as separate elements.

(b) Why do we mostly use parallel electrical connection in house wiring?

When appliances are connected in a parallel arrangement each of them can be put on and off independently. This is a feature that is essential in a house's wiring. Also, if the appliances were wired in series, the potential difference across each appliance would vary depending on the resistance of the appliance.

Q No :-> 2

(A) What is the important of ohm's law for a student's of Electrical Technology Engineering?

Ans :-> Ohm's law is vitally important to describing electric circuits because it relates the voltage to the current with the resistance value moderating the relationship between the two. Because of this, you can use ohm's law to control the amount of current in circuit soldering ~~resistance~~ resistors to reduce the current flow and taking them away to increase the amount of current.

It can also be extended to describe electrical power flow (the rate of energy flow)

per second), because power $P = IV$,
 and so you can use it to
 ensure your circuit provides enough
 energy to, say, a 60 W
 appliance.

For engineering students, the most
 important thing about Ohm's
 is that it allows you to
 analyze circuit diagrams, especially
 when you combine it
 with Kirchoff's laws.

part (B)

Ques: → why the resistance increase
 with temperature in
 conductors?

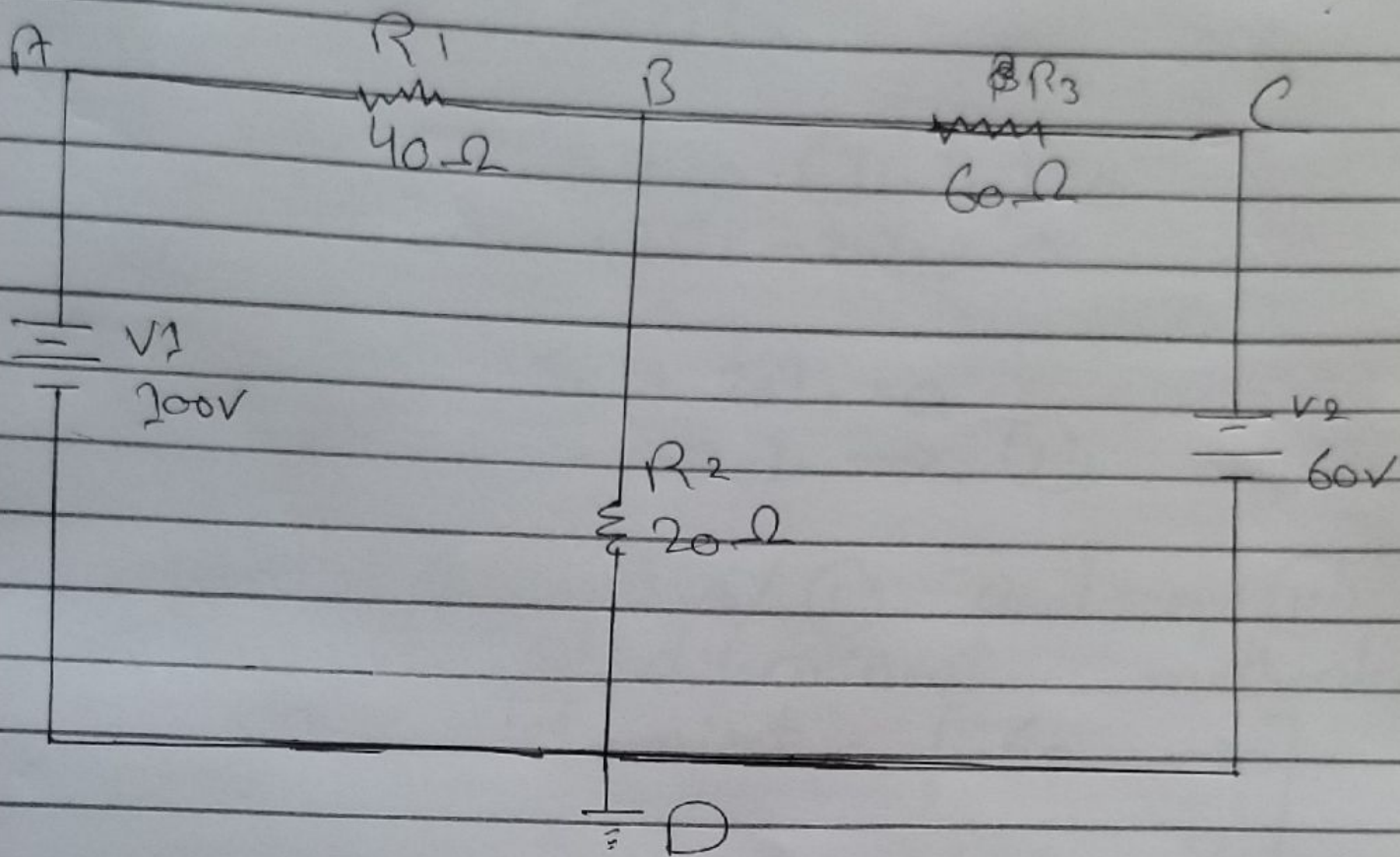
Ans: → Heating a metal conductor
 makes it more difficult
 for electricity to
 flow through it. These
 collisions cause resistance
~~conductor~~ ~~cause~~ ~~atoms~~

and generate heat. Heating the metal conductor cause atoms to vibrate more which in turn make it more difficult for the electrons to flow, increasing resistance.

Resistance increases in case of conductor with increase in temperature and decrease in case of conductor the valance band and conduction band overlap with each other, so there are excess electron in conduction of a conductor.

Q NO: \rightarrow 3

In the network shown below.
Find the magnitude of current by mesh current method?



Solution \Rightarrow

Applying KVL on both mesh ABDA.

$$100 - 40I_1 - 20(I_1 - I_2) = 0$$

$$100 - 40I_1 - 20I_1 + 20I_2 = 0$$

$$100 - 60I_1 + 20I_2 = 0$$

$$100 = 60I_1 - 20I_2 \rightarrow \textcircled{I}$$

Applying KVL on both mesh
BCB.

$$-60I_2 - 60 + 20(I_1 - I_2) = 0$$

$$-60I_2 - 60 + 20I_1 - 20I_2 = 0$$

$$-80I_2 - 60 + 20I_1 = 0$$

$$-60 = 80I_2 - 20I_1 \rightarrow \textcircled{II}$$

Now Solving eq/ \textcircled{I} and eq/ \textcircled{II}
by determinant method:

$$\text{determinant} = \begin{bmatrix} 60 & -20 \\ -20 & 80 \end{bmatrix}$$

$$\Rightarrow 60 \times 80 - (-20 \times -20)$$

$$\Rightarrow 4800 - 400$$

$$\Rightarrow 4800 - 400 = 4400$$

$$\text{Now } I_1 = \frac{\begin{vmatrix} 100 & -20 \\ -60 & 80 \end{vmatrix}}{4400} = \frac{100 \times 80 - (-60 \times -20)}{4400}$$

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$$\Rightarrow \frac{8000 - (+1200)}{4400}$$

$$\Rightarrow \frac{8000 - 1200}{4400} = \frac{6800}{4400} = \frac{68}{44} = (1.54)$$

$$= \boxed{I_1 = 1.54 \text{ A}}$$

$$\text{NOW } I_2 = \begin{vmatrix} 60 & 100 \\ -20 & -60 \\ \hline & 4400 \end{vmatrix}$$

$$\Rightarrow \frac{60 \times -60 - (-20 \times 100)}{4400}$$

$$\Rightarrow \frac{-3600 + 2000}{4400} = \frac{-1600}{4400} = \frac{-16}{44}$$

$$\Rightarrow \boxed{I_2 = -0.36 \text{ A}}$$

Ans