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Section

A

Semester

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Q10 There are two -----
write these two formulae.

Solution

Formula for calculating two
Parallel Resistance.

$$R_{\text{Parallel}} = \frac{R_1 R_2}{R_1 + R_2}$$

Now formula for calculating
any number of Parallel
resistance

$$\frac{1}{R_{\text{total}}} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n}}$$

$$R_{\text{total}} = (R_1^{-1} + R_2^{-1} + R_3^{-1} + \dots + R_n^{-1})^{-1}$$

Q1 : Part (b)

Ans

When successive resistance are connected in parallel, total resistance decreases while total conductance increases.

Thus

$G = \frac{1}{R}$. \S the unit of conductance is Siemen (symbol \S)

So for parallel connected resistance, the equivalent or total conductance, G_T will be equal to the sum of the individual conductance.

For ~~Res~~ Parallel conductance:-

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n}$$

$$G_T = G_1 + G_2 + G_3 + \dots + G_n .$$

Q No 2

Solution

Given data:

$$R_1 = 1\Omega$$

$$R_2 = 2\Omega$$

$$R_3 = 3\Omega$$

$$V = 24V$$

To find:

$$I_1 = ?$$

$$I_2 = ?$$

$$I_3 = ?$$

$$P_1 = ?$$

$$P_2 = ?$$

$$P_3 = ?$$

Solution:

By ohm law we know that.

$$V = IR$$

$$\Rightarrow I = \frac{V}{R}$$

Now

$$I_1 = \frac{V}{R_1}$$

$$I_1 = \frac{24}{1}$$

$$I_1 = 24 \text{ A}$$

Now

$$I_2 = \frac{V}{R_2}$$

$$I_2 = \frac{24}{2}$$

$$I_2 = 12 \text{ A}$$

Now

$$I_3 = \frac{V}{R_3}$$

$$I_3 = \frac{24}{3}$$

$$I_3 = 8 \text{ A}$$

Now Power dissipated by each resistor.

$$P = VI$$

Now

$$P_1 = VI_1$$

$$P_1 = (24)(24)$$

$$P_1 = 576 \text{ W}$$

Now

$$P_2 = VI_2$$

$$P_2 = (24)(12)$$

$$P_2 = 288 \text{ W}$$

Now

$$P_3 = VI_3$$

$$P_3 = (24)(8)$$

$$P_3 = 192 \text{ W}$$

Q3 Differentiate between the following
a Current and voltage

Current (i)	Voltage (v)
<p>Current is the rate at which electric charge flows past a point in a circuit. In other words current is the rate of flow of electric charge.</p>	<p>voltage, also called electromotive force is the potential difference in charge between two point in an electrical field, in other words voltage is the "energy per unit charge".</p>
<p>Unit: A or amps or ampere^e</p>	<p>V or voltage or voltage</p>
<p>Relationship: Current is the effect (voltage being the cause). Current cannot flow without voltage</p>	<p>voltage is the cause and current is the effect. voltage can exist without current.</p>
<p>SI Unit: 1 ampere = 1 coulomb/second</p>	<p>1 volt = 1 joule/coulomb ($v = w/c$)</p>

b Resistance and Conductance.

Resistance

Conductance

(1) The Property of the conductor due to which it oppose a flow of current through it is called resistance	Defined as the measure of ease with which abstract system to another is know as Conductance.
(2) The SI unit of resistance is Ohm Ω	Has unit of liters Per second
(3) The resistance of a Conductor depends on its length and area of cross section.	Is an specific to a Particular geometrical Configuration.

C: Power and Energy

Power :

Definition :

Power is the rate at which work is done or energy is transmitted

Unit :

~~Joules~~ watt = joules/second

Common symbol (s) :

"P"

Energy :

Energy is the capacity to do work. ~~is~~
Energy is Power ^{ted} integrated over time.

joules = watt-seconds

"W"

d: Inductance and capacitance

Inductance

Definition:

In electromagnetism and electronics, Inductance is the tendency of an electrical conductor to oppose a change in the electric current through it.

SI unit

~~Henry~~

henry (H)

capacitance

capacitance is the ratio of the change in electric charge of a system to the corresponding change in its electric Potential.

farad (F)

e

Synchronous motor and Asynchronous motor

Synchronous motor

Definition:
 Synchronous motor is a machine whose rotor speed and the speed of the stator magnetic field is equal

$$N = N_s = 120f/P$$

Slip:

Does not have slip.
 The values of slip is zero.

Slip ring and brushes
 Slip ring and brushes are required

Asynchronous motor.

Asynchronous motor is a machine whose rotor rotates at the speed less than the synchronous motor

$$N < N_s$$

Have slip therefore the value of slip is not equal to zero

Slip ring and brushes are not required.