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Module :- 6th

Subject :- Basic Electro Mech

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MID TEAR EXAM.

Q1) a) There are two well-known formula for Calculating the total Resistance of parallel-Connected resistance - One of these works only for two resistance while the other work. For any number of parallel resistance. Write these two formulas:-

Ans:- "For two numbers:-"

$$\rightarrow \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} -$$

"For any numbers:-"

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

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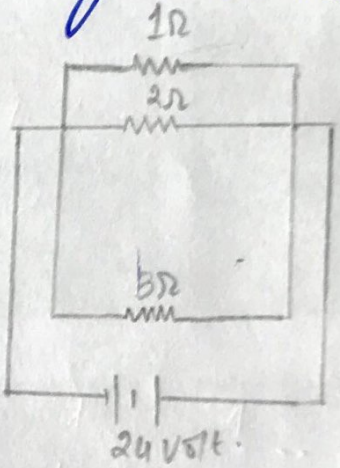
b) With parallel resistors the number of total resistance decreases since the total resistance is in reciprocal form so it divides into intervals as shown below:

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

While the total Conductance will increase because total Conductance is the reciprocal of total resistance so there is smooth or more flow of electrons. $G_T \propto \frac{1}{R}$ -

(Q2) In a given circuit, three resistors recieve the same amount of voltage (24 Volt) from single source. Calculate the amount of current "drawn" by each resistor, as well as the amount of power dissipated by each resistor



Sol: Since R_1 is in parallel so $\therefore V_T = V_1 = V_2 = V_3$

$$= \frac{1}{R_1}$$

Thus $I_1 = \frac{V_1}{R_1}$

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

→ As R_2 is in series so

$$= R$$

Thus $I_2 = \frac{V_2}{R_2}$

$$I_2 = \frac{24}{2} = 12 \text{ amp}$$

→ As R_3 is in parallel series so

$$I_3 = \frac{V_3}{R_3} = \frac{24}{3} = 8 \text{ amp}$$

→ Power dissipated by each resistor

$$P = VI$$

$$P_1 = V_T I_1$$

$$P_1 = 24 \times 24 = 576 \text{ W}$$

$$P_2 = V_T I_2$$

$$P_2 = 24 \times 12 = 288 \text{ W}$$

$$P_3 = V_T I_3$$

$$P_3 = 24 \times 8 = 192 \text{ W}.$$

Q3) Differentiate b/w the following.

a) Current & Voltage.

Current	Voltage
• It is the flow of electrons across the closed circuit.	• It is defined as the effect to push the electron in circuit.
• It is denoted by "I"	• It is denoted by "V"
• Its unit is ampere "A"	• Its unit is Volt "V"

b) Resistance & Conductance.

Resistance	Conductance
• It is blockage to the flow of the current	• Conductance is the reciprocal of the resistance and is the amount of flow of charge.
• It is denoted by "R"	• It is denoted by "G"
• Its unit is "Ohm" Ω	• Its unit is $\frac{1}{\Omega}$

c) Power & Energy -

Power	Energy
• It is rate of change of energy OR	• It is the ability to do work.
• It is product of voltage & current	• Its S.I unit is J (Nm)
• Its unit is Watts.	• It is also defined as the product of power & time as :: W x S = J.
• It is denoted by "W"	

d) Inductance & Capicatance

Inductance	Capicatance
• It is the property of Conductor which causes e.m.f to generate by change in current flowing	• It is the property of Conductor which has the ability to store charge
• Its unit is Henry. "H"	• It is denoted by "C"
• It is denoted by "E"	• Its unit is Farad "F"
	• :: $C = Q/V$

e) Synchronous Motor & Asychronous motor.

Synchronous Motor	Asychronous motor
• It has Complicated Construction.	• Its Construction is Simpler
• Not self starting.	• Self starting.
• Motor is sensitive to sudden load change	• Hunting phenomena is absent.
• Motor is costly & requires frequent maintainee	• Motor is cheap & Cage motor are maintanee fee.