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Semester	Complete Engineering
Exam Type	Improvement for GPA (Summer 2020)
Paper	Basic Electromechanical Engineering
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Q 1 (a)

Part (A)

Since we know that for two resistor

$$R_{eq} = \frac{R_1 \times R_2}{R_1 + R_2}$$

But for more than 2 resistor above formula's does not hold good So for more than two resistor's

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots\ldots + \frac{1}{R_n}$$

Where

R_{eq} = Equivalent Resistance

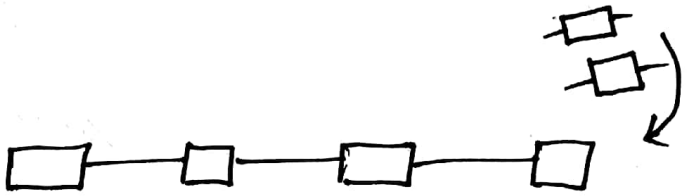
Part (B)

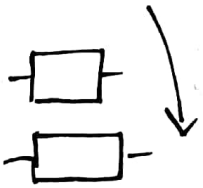
Solution:

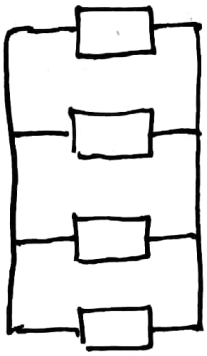
Since we're given that ;

$G = 1/R$

Conductance is reciprocal of Resistance







* When resistor are connected in parallel not in series because if we connect them in series and if one of resistance doesnot work the circuit will become (means circuit breaks)

Whereas in parallel connection if one become opens the other resistor will not be effected.

* total resistance increases as more resistance resistors are connected in series.

* total resistance decreases as more resistors are connected in parallel

* $V = IR$

$I = V/R$

So

total Resistance increase so total current decreases.

Q: 1 Complete,

Q:2

Given

Voltage = 24 Volts

Resistors = $R_1 = 1\Omega$

$R_2 = 2\Omega$

$R_3 = 3\Omega$

Required

i) Current (I) = ?

ii) Power (P) = ?

Solution:

(i) As we know

$V = 24\ V$

$V = IR$

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

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

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

$$I_2 = \frac{V}{R_2} = \frac{24}{2} = 12 \text{ A}$$

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

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

$$I_3 = \frac{24}{3} = 8$$

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

(ii) Power dissipated by each resistor

$P = I^2 R$

So

$P_1 = I_1^2 R_1$

$= (24)^2 \times 1 = 576\ W$

$\boxed{P_1 = 576\ W}$

$P_2 = I_2^2 R_2$

$P_2 = 12^2 \times 2$

$\boxed{P_2 = 288\ W}$

$P_3 = I_3^2 R_3$

$P_3 = 8^2 \times 3$

$\boxed{P_3 = 192\ W}$

$P_1 = V I_1$

$P_1 = 24 \times 24 = 576 W$

$P_2 = V I_2$

$= 24 \times 12 = 288\ W$

$P_3 = V I_3$

$= 24 \times 8 = 192\ W$

Result:

Hence the required result are

$I_1 = 24\ A$ and $P_1 = 576\ W$

$I_2 = 12\ A$ $P_2 = 288\ W$

$I_3 = 8\ A$ $P_3 = 192\ W$

Q:3 Part (a) Difference (B)

Current	Voltage
Current is the rate at which the electric charge flows past a point in a Circuit,	Voltage is the difference in charge potential between two points in an electric field.
The Unit of Current is ampere	The unit of voltage is the Volt.
Current is measured with an ammeter	Voltage is measured with a voltmeter
The current is the effect ...	the cause of which is the Voltage
The Current can create a magnetic field.	Voltage can create an electrostatic field.
Formula $I = \frac{Q}{t}$	formula $V = IR$
$I = \frac{V}{R}$	

Q: 3 Part (b) Difference (9)

Resistance	Conductance
Resistance is a property of a conductor which tells us how much the resistor resists or opposes the Current to pass throughit	Conductance is a property of a conductor which tells us how much the resistor allows the current to pass through it.
Formula $R = \frac{V}{I}$	Formula $G = \frac{I}{V}$
Unit Ohms (Ω)	Unit Siemens (S)
Symbol R	Symbol G
Definition Slows current down	How easily electrons flow

Q: 3 part (c) Difference (10)

Power	Energy
Definition Power is the rate at which work is done, or energy is transmitted	Definition Energy is the capacity to do work. Energy is power integrated over time
Unit Watt = Joules/second	Unit Joules = Watt-seconds
Symbol P	Symbol W
Example My car's battery can provide 500 amps at 12 volts, which equals 6 KW of Power	Example: I left a 60 W light bulb on for 30 days, which raised my electric bill by 43.2 KWh (Kilowatt-hours)
It depends upon time	It has no concern with time

Q:3 Part (d) Difference (11)

Inductance	Capacitance
In electromagnetism and electronics, Inductance is the tendency of an electrical conductor to oppose a change in the electric current flowing through it. The flow of electric current creates a magnetic field around the conductor.	is the ratio of the change in electric charge of a system to the corresponding change in its electric potential. There are two closely related notions of capacitance: self capacitance and mutual capacitance. Any object that can be electrically charged exhibits self capacitance
S.I Unit Henry (H)	S.I Unit Farad
Common Symbols L	Common Symbols C $q = CV$ → Voltage ↓ ↓ Charge Capacitance
Relationship between Voltage, Current, power and energy	Relationship between Current, Voltage, power and energy.
Series-parallel Inductance and	combinations for Capacitance

Q:3 Part (e) Difference (12)

Synchronous Motor	Asynchronous Motor
Speed: Starting from its Name' Synchronous' this motor runs at Synchronous speed whatever the amount of load it may be. The speed of this kind of motor is not dependent on the load	Speed: The Speed of Induction motor is always less than the syehronous speed and it is dependant on the load since the speed decreases with increase in load.
Starting Torque This motor does not have any self starting torque, So some other auxiliary means have to be provided for starting the Synchronous machine	Starting Torque This kind of motor has its own self starting torque
Excitation → Doubly excited machine → Field winding that is rotor is excited using DC Source and its stator that is armature winding is excited using AC source. In addition to that it can be made to operate at leading power factor from lagging	Excitation singly excited machine " " AC source. Contrary to the case of synchronous motor, Asynchronous motor works only under lagging Power factor

Power factor just by changing its excitation

Efficiency

This is comparatively More efficient than Induction motor

Cost

This kind of motor is much costlier that a similar rating Induction motor

Efficiency

It is comparatively less efficient.

Cost

The cost of Induction machine is less ~~than~~ when compared with a Synchronous Motor of same rating.