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Sec :- A

Sem :- Summer

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Subject :- Basic Electromechanical

Q3 Differentiate between the following:

a Current & Voltage:

"Voltage" is the difference in charge between two points. "Current" is rate at which charge is flowing.

"Current" is measure in ampere while

"Voltage" is measure in volts

The symbol of current is I

The symbol of voltage is V

b Resistance & conductance:

"Resistance" is a property of a conductor which tells us how much the resistor resists or opposes the current to pass through it whereas "conductance" is a property of a conductor which tells us

how much the resistor allow the current to pass through it.

The SI unit for Electrical Resistance is the ohm (Ω)

The SI unit for Electrical Conductance is Siemens (S)

Power & Energy:-

"Energy" is the capacity to do work. Energy is power integrated over time.

"Power" is the rate at which work is done, or energy is transmitted.

Energy unit = joules = watt-seconds
or

joule = Newton meter.

Power unit = watt = joules / second

Energy Symbol = W

Power Symbol = P

Inductance & Capacitance

Inductance is a property of a current carrying conductor which generates a magnetic field around the conductor whereas "Capacitance" is a property of a device to hold

and store electric charges.

Inductance is measured by Henry (H) and is symbolized as L

Capacitance is measured in Farads (F) and is symbolized as C .

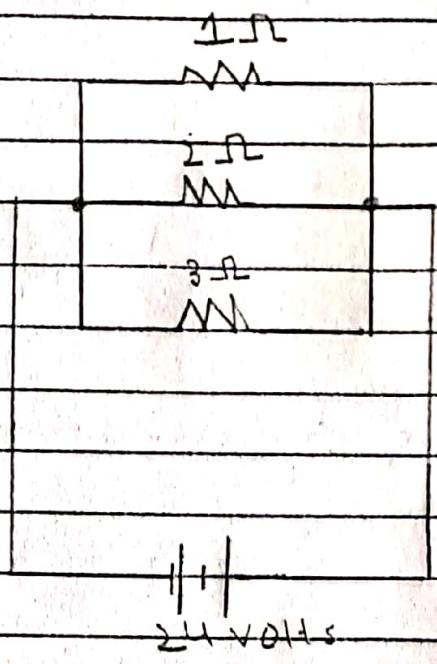
Synchronous motor & Asynchronous motor.

Synchronous Motor

Asynchronous Motor

- | | |
|---------------------------------------------------------------|----------------------------------------------------------------|
| * Not Self starting | * Self starting |
| * Speed control is not possible | * Speed control is possible though difficult |
| * Motor is costly & requires frequent maintenance | * Motor is cheap, especially cage rotors & maintenance free. |
| * Construction complicated | * Construction is simpler, particularly in case of cage rotor. |
| * Motor is sensitive to sudden load changes & hunting results | * Phenomenon of hunting is absent. |

Q2



Given data :

- Voltage, $V = 24$ volts
- Resistance, $R_1 = 1\Omega$
- $R_2 = 2\Omega$
- $R_3 = 3\Omega$

Required :

- Current, $I_1, I_2, I_3 = ?$
- Power, $P_1, P_2, P_3 = ?$

Solution :

Current :

By om's law

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

For $I_1 = \frac{V}{R_1} = \frac{24 \text{ Volts}}{1\Omega}$

$$I_1 = \frac{V}{R_1} = \frac{24}{1}$$

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

$$\text{For } I_2 = V = 24 \text{ Volts, } R_2 = 2\Omega$$

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

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

$$I_3 : V = 24 \text{ Volts, } R_3 = 3\Omega$$

$$I_3 = \frac{V}{R_3} = \frac{24}{3}$$

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

$$\text{Power : } P = I \times V$$

$$\text{For } P_1 = I_1 = 24 \text{ A, } V = 24 \text{ Volts}$$

$$P_1 = I_1 \times V$$

$$= 24 \times 24$$

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

$$\text{For } P_2 : I_2 = 12 \text{ Amperes, } V = 24 \text{ Volts}$$

$$P_2 = I_2 \times V$$

$$= 12 \times 24$$

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

$$\text{for } P_3 : I_3 = 8 \text{ Amperes, } V = 24 \text{ Volts}$$

$$P_3 = I_3 \times V$$

$$P_3 = 196 \text{ watts}$$

Q 1 a :

For Two Resistance :

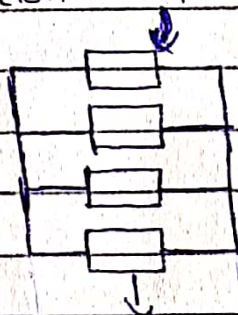
$$R_{eq} = \frac{R_1 \times R_2}{R_1 + R_2}$$

For 'n' number of Resistance :

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

Q 1 b :

In a Parallel circuit, resistance decreases & conductance increases with the addition of more resistors



Adding successive resistors in Parallel

R increases with more Resistors

G Decreases with more Resistors

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

$$\text{so } G_1 = \frac{1}{R_1}, \quad G_2 = \frac{1}{R_2}$$

$$G_T = G_1 + G_2$$