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Question # 1

Part (a)

Two formula for finding total resistance in parallel.

(1) $$\frac{1}{R_{TOT}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \ldots \text{etc}$$

This formula does not give you total resistance R_{TOT}. It gives you the reciprocal of R_{TOT} or $\frac{1}{R_{TOT}}$.

(2) $$R_{TOT} = \frac{R_1 \times R_2}{(R_1 + R_2)}$$

This formula is often refferred to as product over sum

Part (b)

In the addition of parallel resistors in parallel circuit resistance decreases and conductance increases with the addition of more resistors.

Question # 2

$V = 24$ volts

$R_1 = 3\ \Omega$

$R_2 = 2\ \Omega$

$R_3 = 1\ \Omega$

I_1 branch R_1 current

$$V = I_1 R_1$$

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

$$I_1 = \frac{24}{3} 8$$

$$\boxed{I_1 = 8A}$$

I_2 branch R_2 current

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

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

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

I_3 branch R_3 current

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

$$I_3 = \frac{24}{1}$$

$$\boxed{I_3 = 24\,A}$$

$$P_1 = I_1^2 R_1$$

$$P_1 = 8^2 \times 3$$

$$\boxed{P_1 = 192\,W}$$

$$P_2 = I_2^2 R_2$$

$$P_2 = 12^2 \times 2$$

$$\boxed{P_2 = 288\,W}$$

$$P_3 = I_3^2 R_3$$

$$P_3 = 24^2 \times 1$$

$$\boxed{P_3 = 576\,W}$$

Question #3

(a) Current

1) Current is the rate of flow of charge.
2) Unit of current is ampere
3) Current is measured using ammeter.
4) Field created is a magnetic field.

Voltage

1) Voltage is the energy per unit charge.
2) Unit of voltage is volt
3) Voltage is measured using voltmeter.
4) Field created is an electrostatic field.

(b) Resistance

1) The opposition to the flow of electric current is called resistance.
2) SI unit is ohm.
3) Represented by Ω.
4) $R = \frac{V}{I}$

Conductance

2) It is the reciprocal of resistance "the ease with which electric current passes."
2) Unit is Siemens.
3) Represented by $\mho$.
4) $G = \frac{I}{V}$ or $G = \frac{1}{R}$

(c) Power

1) The rate at which work is done or energy is transmitted.
2) Unit of power is watt.
3) Represented by P.

Energy

1) Energy is the capacity to do work.
2) Unit of energy is joule.
3) Represented by W.

(d) Inductance

1) Inductance is the property of a coil to resist any change in electric current flowing through it.
2) Inductance is measured in Henry.

Capacitance

1) The amount of charge that can be stored inside a capacitor at a given voltage is called capacitance.
2) Capacitance is measured in Farad.

(e)

Synchronus Motor	Asynchronus Motor
1) Construction is complicated	1) Construction is simple.
2) Not self-starting.	2) Self-starting.
3) Separate DC source is required for rotor excitation	3) Separate DC source is not necessary.
4) Speed is always synchronus.	4) Speed is always less than synchronus.
5) It is costly and requires frequent maintenance.	5) It is cheap and maintenance free.