



GENERAL REVISION

GRADE 12 ADVANCE

TRIMESTER 2

KHALIFA BIN ZAYED SECONDARY SCHOOL

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Q1: The flow of charges as time goes on according to the charge function :

$$q = 3t^3 - 5t + 4$$

Calculate the current at ($t = 5.0 \text{ s}$)

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Q2: A typical rechargeable AA battery is rated at ($q = 700 \text{ mAh}$) .
How long can this battery provide a current of ($i = 0.1 \text{ mA}$) ?

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Q3: Calculate the intensity of the electrical current passing through a wire when an electrical charge (15.0) passes through the wire for half a minute

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Q1: A current of (**0.123 mA**) flows in a silver wire whose cross-sectional area is (**0.923 mm²**).

Find the current density in the wire assuming that the current is uniform.

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Q2: The number of charges that flow through a wire of radius (**2.0 mm**) each second is (**4.5×10^{19}**) charges.

Calculate the current density of this wire

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Q3: SIU for the current density is

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Fill the blank with the best word to complete the statement

The resistivity (ρ)	The resistance(R)	conductance (G)
$\Omega.m$	Ω	$\Omega^{-1} = S$

Q1: a measure of how strongly a material opposes the flow of electric current is 1.....SIU FOR IT is 2.....

Q2: a material's opposition to the flow of electric current IS

3 SIU FOR IT is 4

Q3: The ability of a material to allow current to pass 5.....
SIU FOR IT is 6.....

Q4: Copper wire its length (60 m) and diameter (2.4 mm) and The resistivity (ρ) of copper ($1.72 \times 10^{-8} \Omega.m$) .

Answer the following :

1- Calculate the conductivity of the wire (σ).

2- Calculate the electrical resistance of the wire (R) .

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Q5: Device written on it (8.8 A , 0.04 S) Answer the following :

1- Calculate the resistance of the device.

2- Calculate the potential difference

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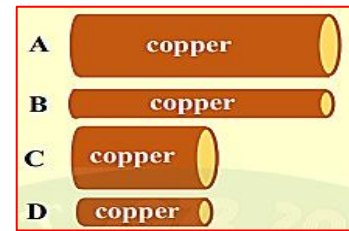
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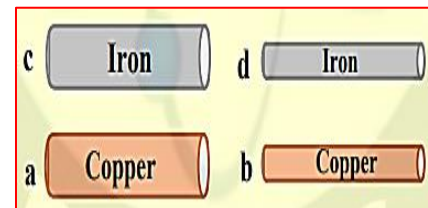
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Q6: which of the copper wires shown in the figure has the least resistance?



Q7: which of the wires shown in the figure has the greatest resistance?



Q8: The graph shows the current as a function of voltage in a resistor

1- What does slope of this line means ?

2- Calculate the resistance of this wire

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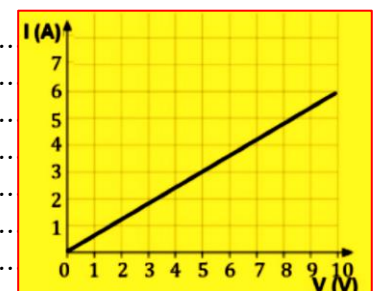
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Magnetic properties

Q- Chose the best answer from the table

north pole (N)	pairs .	Opposite,	two new magnets,	poles.
south pole (S)	attract	Like, .	repel	

Q1- A magnet always has a and a

Q2- magnetic poles always come in

Q3- poles ,and **Poles**.....

Q4- Breaking a bar magnet in half results in each with a north and a south pole .

Q5- The strength of the magnet is concentrated at the

Magnetic Field Lines

Q - Chose the best answer from the table

field lines	magnetic field lines	higher field	North Pole	South Pole
			South Pole	North Pole .

Q7- A magnetic field is represented using _

Q8- The magnetic field vector is always tangent to the..... .

Q9- The magnetic field lines closer spacing between lines indicates strength..... .

Q10 magnetic field lines from the..... to the..... outside magnets.

Q11 and complete their cycle inside magnets from..... the to the.....

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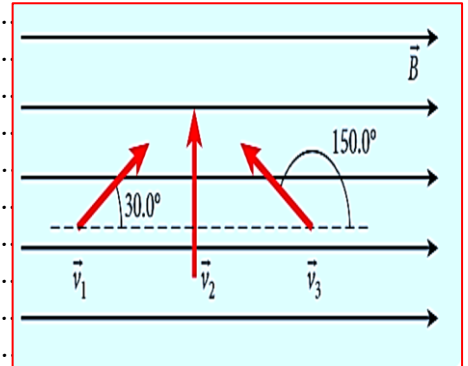
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Q16 The magnitude of the magnetic force on a particle with charge ($-2e$) moving with speed $v = 1.0 \times 10^5 \text{ m/s}$, F is $3.0 \times 10^{-18} \text{ N}$.
What is the magnitude of the magnetic field component perpendicular to the direction of motion of the particle?

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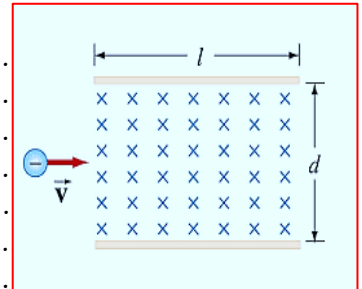
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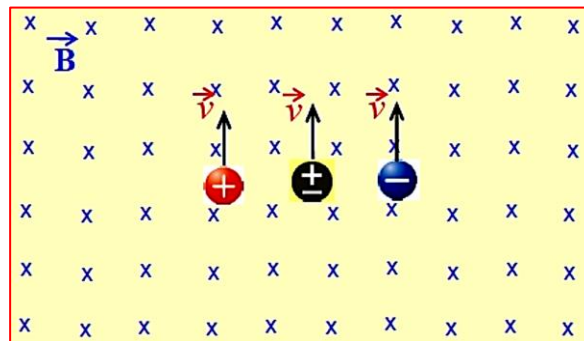
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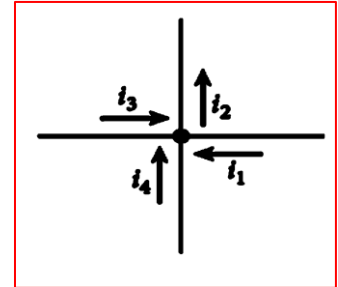
Q17 Three particles are ejected at the same speed in the positive direction of the Y axis and in the magnetic field (shown in figure) .
 Draw the path that each particle takes



Q1 The sum of the currents entering a junctionof the currents leaving the junction

Q2 For the junction shown in the figure,
which equation correctly expresses the sum of the currents?

- a) $i_1 + i_2 + i_3 + i_4 = 0$
- b) $i_1 - i_2 + i_3 + i_4 = 0$
- c) $-i_1 + i_2 + i_3 - i_4 = 0$
- d) $i_1 - i_2 - i_3 - i_4 = 0$
- e) $i_1 + i_2 - i_3 - i_4 = 0$

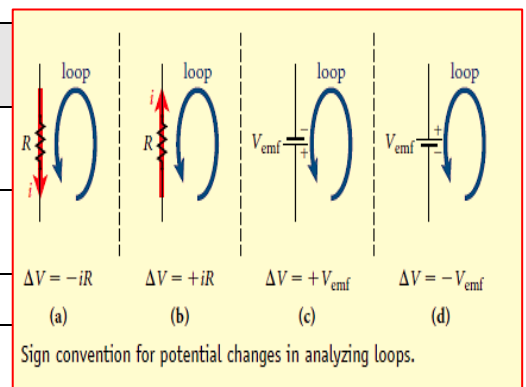


Q3 The potential difference around a complete circuit loop

must sum to zero.

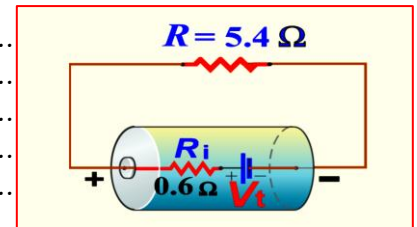
Q4 Determine the Sign of Potential Changes around a Single-loop Circuit Containing Several resistors and Sources of emf

Element	Direction of Analysis	Potential change
R	Same as current
R	Opposite to current
V_{emf}	Same as emf
V_{emf}	Opposite to emf



Q1: For the electric circuit shown in the figure: if the battery's electromotive force is (**12V**), the resistance is (**$R=2.4\Omega$**), what is the electric current flowing through the circuit?

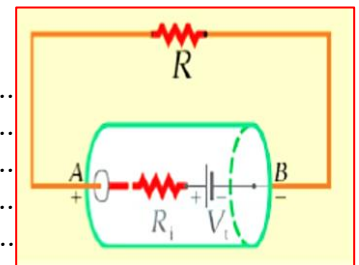
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Q2: Consider a battery that has (**$V_t = 12.0\text{ V}$**) when it is not connected to a circuit. When a (**10.0Ω resistor**) is connected with the battery, the potential difference across the battery's terminals drops to **10.9 V**.

What is the internal resistance of the battery ?

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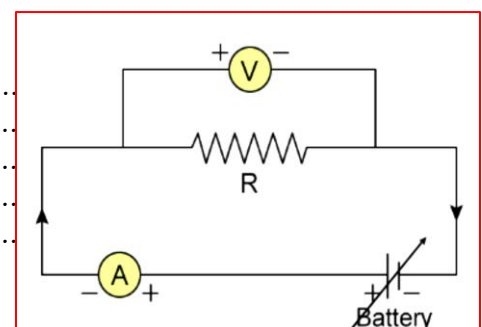
Q3: How many coulombs are there in **1mAh**?

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Q4: The voltage across a resistor is (**12.0 V**) and the current flowing in it is (**2.0 A**).

Find the resistance of this resistor?

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Q5: A light bulb of resistance ($30.0 \, \Omega$) is traversed by a current of ($50.0 \, \text{mA}$).

Calculate the voltage across its terminals

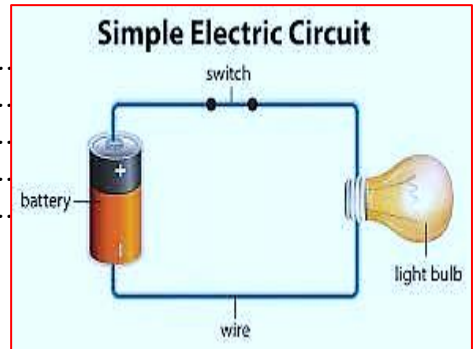
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Q1: Copper wire its **length** ($60.0 \, \text{m}$) and **diameter** ($2.4 \, \text{mm}$) and The **resistivity** (ρ) of copper ($1.72 \times 10^{-8} \, \Omega \cdot \text{m}$).

Answer the following :

1- Calculate the **conductivity** of the wire (σ).

2- Calculate the **electrical resistance** of the wire (R).

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Q2: The resistivity of a conductor is ($\rho = 1.00 \times 10^{-5} \Omega \cdot m$). If a cylindrical wire is made of this conductor, with a cross-sectional area of ($A=1.00 \times 10^{-6} m^2$).

what should the length of the wire be for its resistance to be 10.0Ω ?

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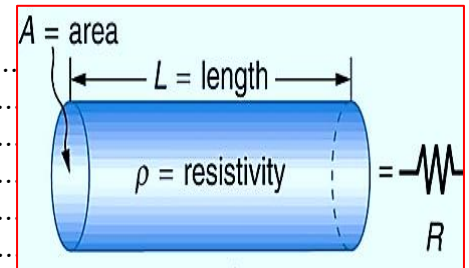
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Q3: A cylindrical aluminum wire is ($L=32.0m$) long and has a resist($R=0.20 \Omega$)the resistivity of aluminum is ($2.82 \times 10^{-8} \Omega \cdot m$).

What is the radius of the cylinder

(Hint: Area of the circle is equal to $r^2\pi$)

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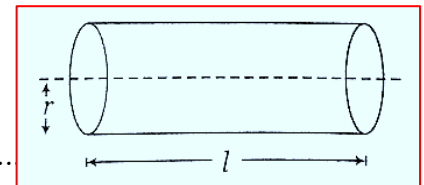
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Q1: What are the relative values of the two resistances in Figure

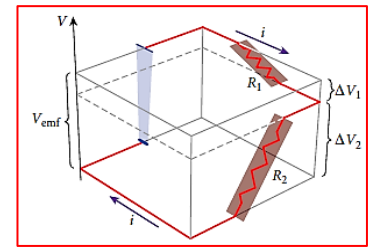
CHOOSE THE BEST ANSWER

a) $R_1 < R_2$

b) $R_1 = R_2$

c) $R_1 > R_2$

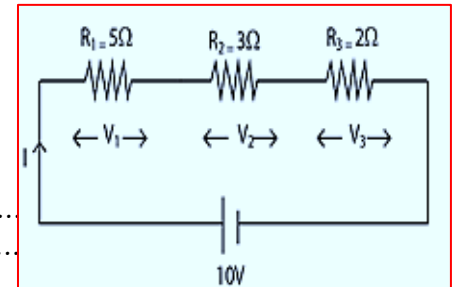
d) Not enough information is given in the figure to compare the resistances.



Q2: Three resistors, ($R_1 = 5.0 \, \Omega$, $R_2 = 3.0 \, \Omega$, and $R_3 = 2.0 \, \Omega$), are connected in series across

($V = 10.0 \, \text{V}$) battery.

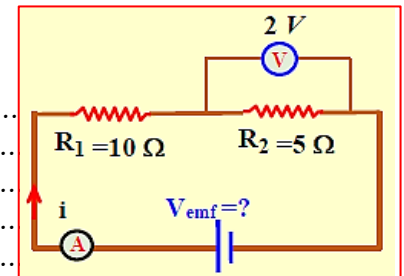
- 1- *What is the current in the circuit?*
- 2- *What is potential drop in R_1 ?*



Q3: In the circuit shown in the figure ($R_1 = 10.0 \, \Omega$, $R_2 = 5.0 \, \Omega$ and $V_2 = 2.0 \, \text{V}$).

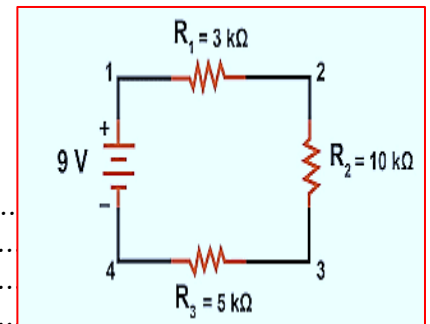
Answer the following

- 1- Calculate the current measured by the ammeter (The current in the circuit).
- 2- Calculate the V_{emf} .



Q4: Three resistors ($R_1 = 3.0 \, \text{k}\Omega$, and $R_2 = 10.0 \, \text{k}\Omega$, $R_3 = 5.0 \, \text{k}\Omega$) are connected in series with ($V_{emf} 9.0 \, \text{V}$) battery.

- 1- Find the total resistance of the circuit.
- 2- Calculate the current in the circuit.
- 3- Calculate the voltage across each resistor.



Q1: A (100W) light bulb connected to a (120 V) power line.

The current in the light bulb is equal?

- A- 2.1 A
- B- 2.0 A
- C- 1.0 A
- D- 0.8 A

Q2: The electric energy wasted by a (60.0 W) lamp in (2.5 hours) ?

- A- $1.5 \times 10^2\text{ J}$
- B- $4.2 \times 10^{-2}\text{ J}$
- C- $2.4 \times 10^1\text{ J}$
- D- $5.4 \times 10^5\text{ J}$

Q3: A current of (5.0 mA) passes through a circuit that has a resistance of ($50.0\ \Omega$).

How much the circuit power ?

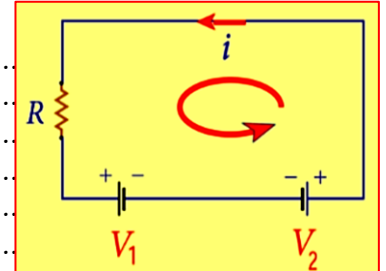
- A- $1.00 \times 10^{-2}\text{ W}$
- B- $2.50 \times 10^{-3}\text{ W}$
- C- $1.00 \times 10^{-3}\text{ W}$
- D- $1.25 \times 10^{-3}\text{ W}$

Q4: An electrical device with a power of (968W) is connected to a source of electromotive force ($V = 220\text{V}$) .

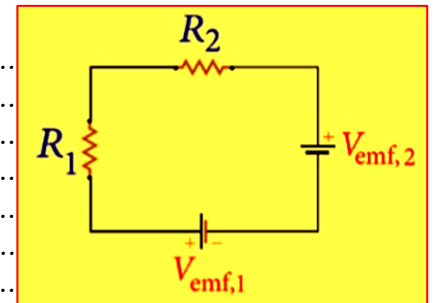
What is the resistance of this device?

- A- $50.0\ \Omega$
- B- $4.40\ \Omega$
- C- $0.23\ \Omega$
- D- $2.0\ \Omega$

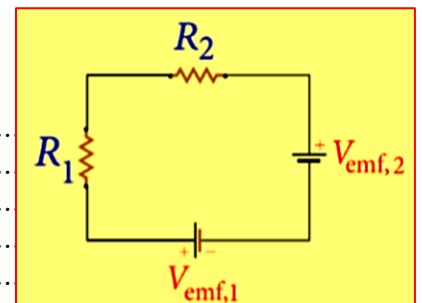
Q1: In the adjacent figure is a battery whose voltage is ($V_1 = 12\text{ V}$), connected to another battery with a voltage of (V_2), and a resistance ($R = 10\ \Omega$) through which an electric current of (0.15 A) passes. Calculate the battery voltage (V_2)



Q2: In the adjacent figure if you know ($V_{emf1} = 21\text{ V}$, $V_{emf2} = 12\text{ V}$, $R_1 = 24\ \Omega$, $R_2 = 12\ \Omega$) Calculate the intensity of current I



Q3: In the adjacent figure if you know ($V_{emf1} = 9\text{ V}$, $V_{emf2} = 24\text{ V}$, $R_1 = 16\ \Omega$, $I = 0.5\text{ A}$) Calculate the resistance (R_2)

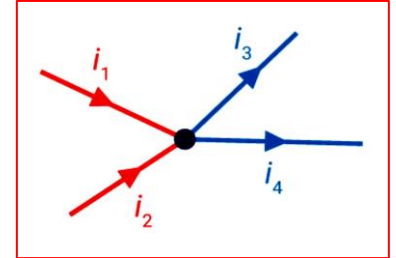


Q1: Which of the below choices are correct about the image shown to the right?

A- $i_1 + i_2 = i_3 + i_4$

B- $i_1 + i_3 = i_2 + i_4$

C- $i_2 + i_3 = i_1 + i_4$



Q2: Five wires are connected as shown in the image to the right.

IF ($i_1 = 3.0A, i_2 = 9.0A, i_3 = 4.0A, i_5 = 3.0A$) Applying Kirchhoff's junction rule to

Find magnitude of i_4 ,

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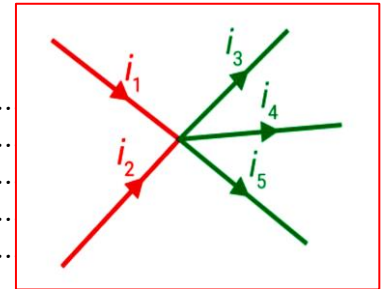
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Q3: Four wires that carry different amounts of currents are connected to a single point as shown.

What is the electric current through the blue wire ?

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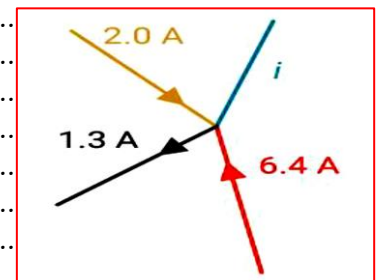
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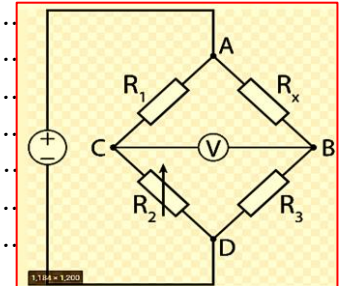
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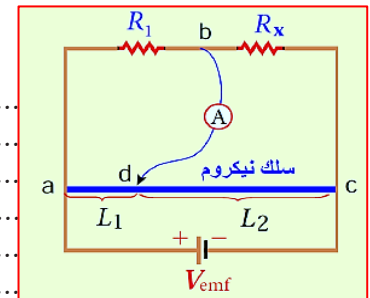
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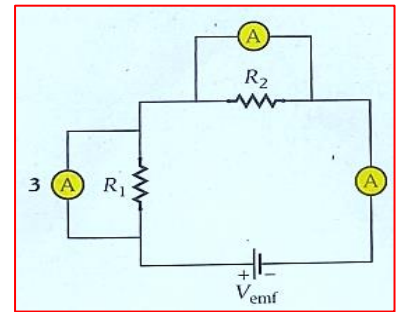
when the voltage across V_{CB} is zero and thus the bridge is balanced



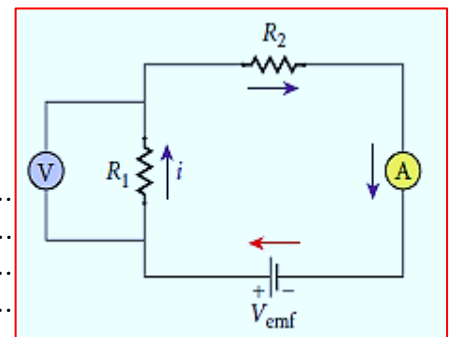
HINT (Nichrome wire is resistor)



Q2: Consider a simple circuit consisting of a source of emf with voltage($V_{emf} = 30.0 \text{ V}$) and two resistors with resistance($R_1 = 10.0 \Omega$, and $R_2 = 5.0 \Omega$)

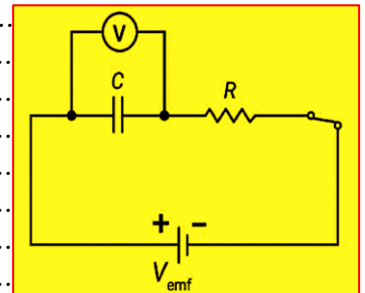


- 1- What is the ammeter reading?
- 2- What is the voltmeter reading?



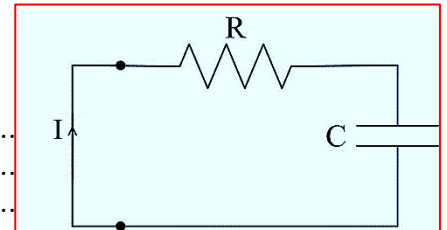
- 1- What is the **maximum amount of charge** that a capacitor can accumulate?
- 2- find the time constant of the circuit **τ**
- 3-What is the amount of charge on the capacitor after (**$t=2.0\text{ s}$**).
- 4-What is the electric current through the circuit after(**5.0 s**) from closing the switch

- 1- What is the **maximum amount of charge** that a capacitor can accumulate?
- 2- find the time constant of the circuit **τ**
- 3-What is the amount of charge on the capacitor after (**$t=2.0\text{ s}$**).
- 4-What is the electric current through the circuit after(**5.0 s**) from closing the switch



Q2: The time constant for the circuit shown to the right is ($\tau = 4.5 \text{ s}$). Assume that the capacitor is fully charged. After a certain period of time, the charge on the plates of the parallel-plate capacitor **decreased by 60% from** its initial amount.

What is the period of time (t)



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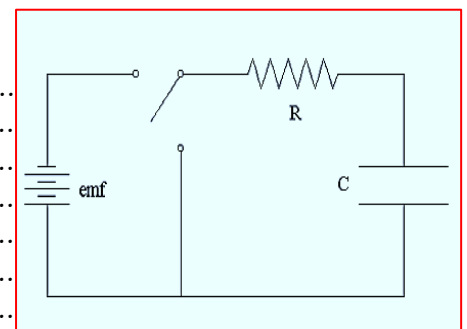
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Q3: An RC circuit consisting of ($V=12.0\text{ v}$) battery ,the current flowing in the circuit as a function of time given by

$$I(t) = 3.0 \times 10^{-3} (e^{-t/0.5}),$$

Answer the following questions :

- 1- what is the time constant for the circuit?
- 2- What is the value of the maximum current flow in circuit?
- 3- What is the resistance for the circuit?
- 4- Calculate the capacitance for the capacitor?
- 5- Calculate the maximum charge for the circuit ?



17,19,20

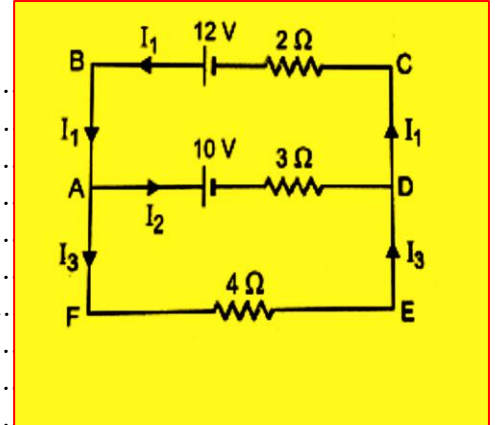
Q1: Using Kirchhoff's Loop and Junction Rules,

1- determine the currents I_1 , I_2 , and I_3 flowing through R_1 , R_2 and R_3 , respectively, in the direction indicated in the figure.

2- Calculate the potential drop across R_2

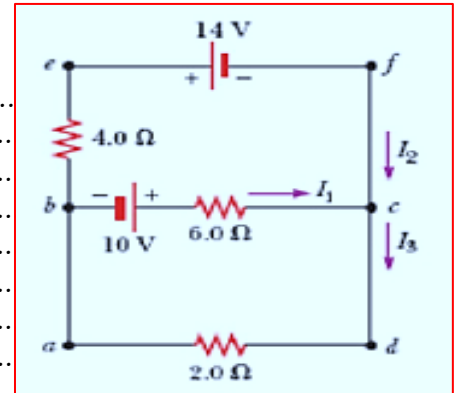
3- Calculate the amount of power consumed through resistor R_1

4- How much energy consumed in R_3 after 5 seconds



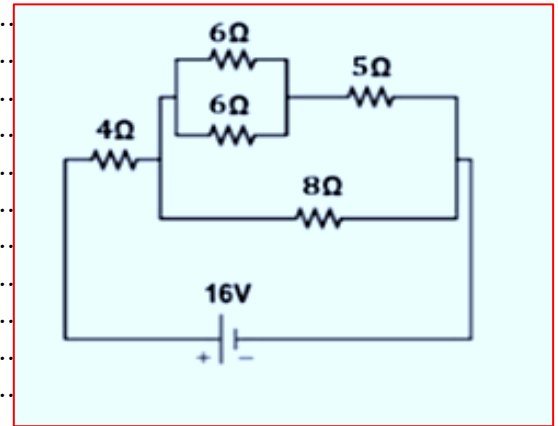
Q2: Using Kirchhoff's Loop and Junction Rules,
 1- determine the currents I_1 , I_2 , and I_3 flowing through $R_1=6.0\ \Omega$, $R_2=4.0\ \Omega$ and $R_3=2.0\ \Omega$, respectively, in the direction indicated in the figure.

2- Calculate the potential drop across R_2



Q1: Five resistors are connected to ($V_{emf}=16.0\text{ V}$) battery as shown in the figure below .

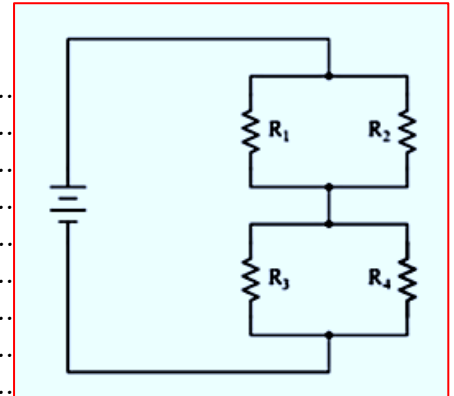
- 1- Calculate the equivalent resistance of the circuit.
- 2- Calculate the total current in the circuit.
- 3- Calculate the power dissipated by the ($4.0\ \Omega$) resistor .
- 4- Calculate the total electrical energy from battery in **30 seconds**



Q2: Four resistors ($R_1=20.0\ \Omega$, $R_2=30.0\ \Omega$, $R_3=40.0\ \Omega$, $R_4=60.0\ \Omega$), are connected to

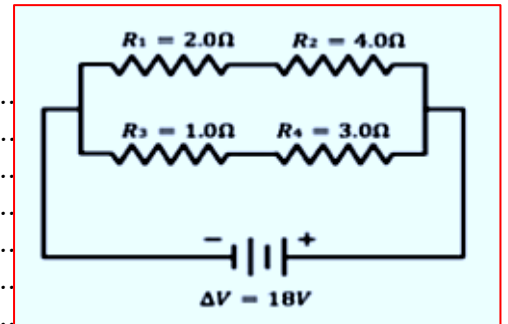
a ($V_{emf}=180.0\text{ v}$) battery as shown below.

- 1- Calculate the equivalent resistance of the circuit
- 2- Calculate the voltage across R_1
- 3- Calculate the power dissipated by R_2



Q3: The circuit diagram below has four resistors connected to a battery.

- 1- Calculate the equivalent resistance of the circuit
- 2- Calculate the total current drawn from the battery.
- 3- What is the current through the resistor R_1
- 4- What is the current through the resistor R_4
- 5- Calculate the power dissipated by R_4



GOOD LUCK