

physics

Electric Circuits

CH4

FAHED KAMAL ALSAGHBEENI

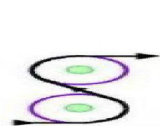


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0502444731



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PHYSICS

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ELECTRIC CIRCUITS

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1

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I reached two different resistors respectively with a battery, the following statements are true in describe the equivalent resistance of the circuit

وصلت مقاومتين مختلفتين على التوالي باستخدام بطارية، أي العبارات التالية صحيحة في وصف المقاومة المكافئة للبطارية



- | | | | |
|---|---|---|--|
| A | The equivalent resistance is smaller than the biggest resistance | C | The equivalent resistance is smaller than the small resistance |
| B | The equivalent resistance is equal to the value of the resistance . | D | The equivalent resistance is greater than the large resistance |

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Three resistors($3\Omega, 2\Omega, 6\Omega$) on series the equivalent resistance

ثلاث مقاومات ($3\Omega, 2\Omega, 6\Omega$) على التوالي المقاومة المكافئة:



- | | | | |
|---|------------|---|-------------|
| A | 11Ω | C | 36Ω |
| B | 1Ω | D | 0.5Ω |

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Three resistors($3\Omega, 2\Omega, 6\Omega$) on parallel the equivalent resistance

ثلاث مقاومات ($3\Omega, 2\Omega, 6\Omega$) على التوازي المقاومة المكافئة:



- | | | | |
|---|------------|---|-------------|
| A | 11Ω | C | 36Ω |
| B | 1Ω | D | 0.5Ω |

I reached two different resistors parallel with a battery, the following statements are true in describe the equivalent resistance of the circuit



وصلت مقاومتين مختلفتين على التوازي باستخدام بطارية، أي العبارات التالية صحيحة في وصف المقاومة المكافئة للبطارية

| | | | |
|---|--|---|--|
| A | The equivalent resistance is smaller than the biggest resistance | C | The equivalent resistance is smaller than the small resistance |
| B | The equivalent resistance is equal to the | D | The equivalent is very big |

Which of the following represents a **safety** device in the Circle ?



أي مما يلي يمثل جهاز **أمان** في الدائرة؟

| | | | | | | | |
|---|---------|---|-----------|---|------------|---|----------|
| A | Ammeter | B | Voltmeter | C | Galvanomet | D | Breacker |
|---|---------|---|-----------|---|------------|---|----------|

Which of the following devices have a circuit that **senses a new path** of current over current?



أي من الأجهزة التالية يحتوي على دائرة تستشعر مسارًا جديدًا للتيار؟

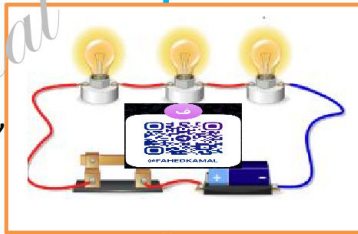
| | | | | | | | |
|---|--------|---|------|---|--------------------------|---|-----------------|
| A | Switch | B | Fuse | C | ground-fault interrupter | D | Circuit Breaker |
|---|--------|---|------|---|--------------------------|---|-----------------|

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In the circuit , if we remove a resistor from the circle, what is the change in each From the resistance, the current passing through it?



في الدائرة، إذا قمنا بإزالة مقاومة من الدائرة، ما التغير في كل من المقاومة المكافئة، التيار الذي يمر عبرها؟

A

Less equivalent resistance, less total current

C

Less equivalent resistance, increase total current

B

increase equivalent resistance, less total current

D

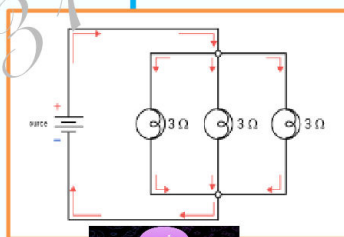
increase equivalent resistance, increase total current

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In the circuit , if we remove a resistor from the circle, what is the change in each From the resistance, the current passing through it?



في الدائرة، إذا قمنا بإزالة مقاومة من الدائرة، ما التغير في كل من المقاومة المكافئة، التيار الذي يمر عبرها؟

A

Less equivalent resistance, less total current

Less equivalent resistance, increase total current

B

increase equivalent resistance, less total current

D

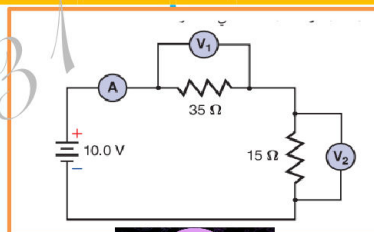
increase equivalent resistance, increase total current

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In the adjacent circle, compare the readings of the voltametric conductors at every resistance.



في الدائرة المجاورة، قارن قراءات الفولتمتر عند كل مقاومة

A

$$V_1 > V_2$$

$$V_1 = V_2$$

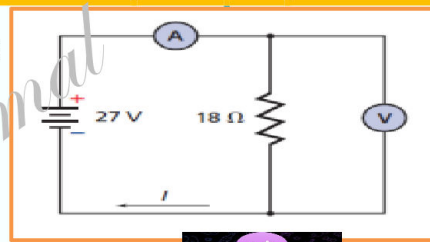
B

$$V_1 < V_2$$

D

$$V_{\text{SOURCE}} = V_1 = V_2$$

What is the reading of the ammeter in the circuit shown in the figure?



ما قراءة الأميتر في الدائرة الموضحة في الشكل؟

A

1.5 A

2.5 A

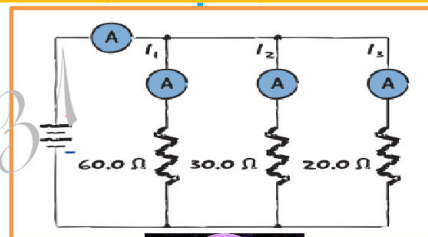
B

3.5 A

D

4.5 A

In the circle Compare the readings of the ammeter connected devices at each resistance



في الدائرة قارن بين قراءات الأميتر عند كل مقاومة

A

 $I_1 = I_2 = I_3$ $I_1 < I_2 < I_3$

B

 $I_1 > I_2 > I_3$

D

 $I_1 = I_2 > I_3$

What is the scientific law on which Kirchhoff's link base is based ?

ما هو القانون العلمي الذي بنيت عليه قاعدة الوصلة لكيرشوف؟



A

The law of conservation of mass

C

The law of conservation of charge

B

The law of conservation of momentum

D

The law of conservation of energy

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What is the scientific law underlying Kerkhof's ring rule?

ما هو القانون العلمي الذي يقوم عليه قانون الحلقة لكيرشوف؟



| | | | |
|---|-------------------------------------|---|-----------------------------------|
| A | The law of conservation of mass | C | The law of conservation of charge |
| B | The law of conservation of momentum | D | The law of conservation of energy |

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If the equivalent resistance of **four** identical resistors connected in a Series is **120Ω**. How much is each resistance?

إذا كانت المقاومة المكافئة لأربع مقاومات متطابقة متصلة على التوالي هي 120 أوم. كم هي كل مقاومة؟



| | | | |
|---|-------|---|-------|
| A | 0.3 Ω | C | 30 Ω |
| B | 40 Ω | D | 480 Ω |

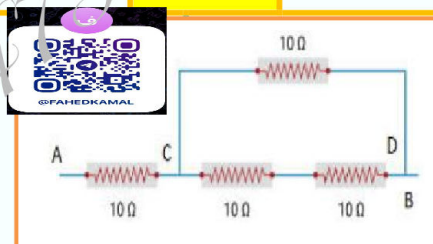
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The equivalent resistance of the **combination** shown in the figure is

المقاومة المكافئة الشكل تساوي



| | | | | | | | |
|---|------|---|------|---|------|---|----|
| A | 19.2 | B | 17.6 | C | 16.7 | D | 14 |
|---|------|---|------|---|------|---|----|

If the equivalent resistance of **eight** similar resistors connected in **parallel** is **equal 3 Ω** how much each resistance?

إذا كانت المقاومة المكافئة لثمانية مقاومات متشابهة موصلة على التوازي تساوي **3 أوم** كم كل مقاومة؟



A

0.375 Ω

C

2.67 Ω

B

24 Ω

D

12 Ω

How much power is delivered to a motor with resistance of **20 Ω** from a battery of **24 volt**?

ما مقدار القدرة التي يتم توصيلها إلى محرك مقاومته **20 أوم** من بطارية جهدها **24 فولت**



A

29 W

C

1.2 W

B

0.9 W

D

30 W

How much power is delivered to a lamp with resistance of **40 Ω** if a current passes through the **0.8 A** lamp

ما مقدار الطاقة التي يتم توصيلها إلى مصباح مقاومته **40 أوم** إذا مر تيار مقداره **0.8 أمبير** عبر المصباح



A

29 W

C

0.02 W

B

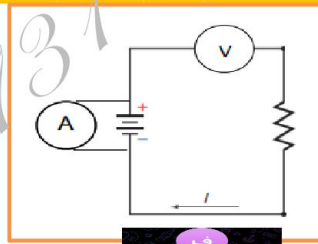
50 W

D

26 W

What is the mistake in the circuit?

ما هو الخطأ في الدائرة؟



A The way of connecting voltmeter
Ammeter and

The symbol of the battery

B The signs of the battery terminals.

D The direction of the conventional current

a short piece of metal that acts as a safety device by melting and stopping the current when too large a current passes through it.

قطعة معدنية قصيرة تعمل كجهاز أمان عن طريق إذابة وإيقاف التيار عند مرور تيار كبير جدًا عبرها.

A Circuit Breaker

C Grounding breaker

B Fuse

D Switch

an automatic switch that acts as a safety device by stopping the current if the current gets too large and exceeds a threshold value.

مفتاح تلقائي يعمل كجهاز أمان عن طريق إيقاف التيار إذا أصبح التيار كبيرًا جدًا وتجاوز قيمة العتبة.

A Circuit Breaker

C Grounding breaker

B Fuse

D Switch

when a circuit with very low resistance, we can called it is

عندما تكون الدائرة ذات مقاومة منخفضة جدًا، يمكننا تسميتها كذلك



A

Open circuit

C

Short circuit

B

Load

D

Nothing

what happens to light lamps connected on the **series** if one breakdown ?



what happens to light lamps connected on the **parallel** if one breakdown ?

Three resistance connected on series ($5\Omega, 3\Omega, 6\Omega$) with **24 volt**.

Calculate the strength current.



Three $22\text{-}\Omega$ resistors are connected in series across a 125-V generator. What is the equivalent resistance of the circuit? What is the current in the circuit?



A $12\text{-}\Omega$, a $15\text{-}\Omega$, and a $5\text{-}\Omega$ resistor are connected in a series circuit with a 75-V battery. What is the equivalent resistance of the circuit? What is the current in the circuit?



A 9-V battery is in a circuit with three resistors connected in series.

- If the resistance of one of the resistors increases, how will the equivalent resistance change?
- What will happen to the current?
- Will there be any change in the battery voltage?



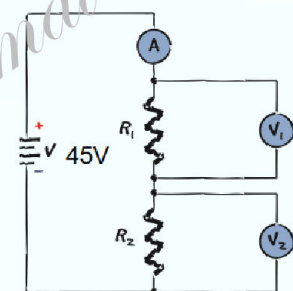
A string of lights has ten identical bulbs with equal resistances connected in series. When the string of lights is connected to a 117-V outlet, the current through the bulbs is 0.06 A. What is the resistance of each bulb?



Calculate the potential differences across three resistors, 12- Ω , 15- Ω , and 5- Ω , that are connected in series with a 75-V battery. Verify that the sum of their potential differences equals the potential difference across the battery.

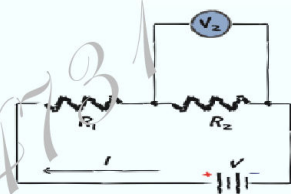


The circuit shown in Example Problem 1 is producing these symptoms: the ammeter reads 0 A, ΔV_1 reads 0 V, and ΔV_2 reads 45 V. What has happened?



Suppose the circuit shown in Example Problem 1 has these values: $R_1 = 255 \, \Omega$, $R_2 = 290 \, \Omega$, and $\Delta V_1 = 17 \, \text{V}$. No other information is available.

- What is the current in the circuit?
- What is the potential difference across the battery?
- What is the total power used in the circuit, and what is the power used by each resistor?
- Does the sum of the power used in each resistor in the circuit equal the total power used in the circuit? Explain.



Holiday lights often are connected in series and use special lamps that short out when the voltage across a lamp increases to the line voltage. Explain why. Also explain why these light sets might blow their fuses after many bulbs have failed.



1. A 9.0-V battery and two resistors, $390\ \Omega$ and $470\ \Omega$, are connected as a voltage divider. What is the potential difference across the $470\text{-}\Omega$ resistor?



The circuit in Example Problem 1 has unequal resistors. Explain why the resistor with the lower resistance will operate at a lower temperature.



You connect three $15.0\text{-}\Omega$ resistors in parallel across a 30.0-V battery.

- What is the equivalent resistance of the parallel circuit?
- What is the current through the entire circuit?
- What is the current through each branch of the circuit?



Suppose you replace one of the $15.0\text{-}\Omega$ resistors in the previous problem with a $10.0\text{-}\Omega$ resistor.

- How does the equivalent resistance change?
- How does the current through the entire circuit change?
- How does the current through one of the $15.0\text{-}\Omega$ resistors change?

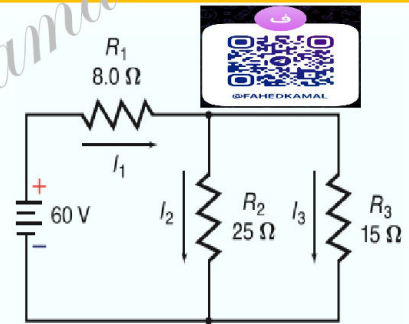


You connect a $120.0\text{-}\Omega$ resistor, a $60.0\text{-}\Omega$ resistor, and a $40.0\text{-}\Omega$ resistor in parallel across a 12.0-V battery.

- What is the equivalent resistance of the parallel circuit?
- What is the current through the entire circuit?

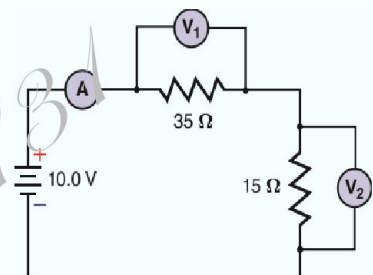


What is the current through each branch of the circuit?



Refer to **Figure 20** to answer the following questions:

- What should the ammeter read?
- What should voltmeter 1 read?
- What should voltmeter 2 read?
- How much energy is supplied by the battery per minute?
- What is the equivalent resistance in the circuit?



Total Current A parallel circuit has four branch currents: 120 mA, 250 mA, 380 mA, and 2.1 A. How much current passes through the power source?

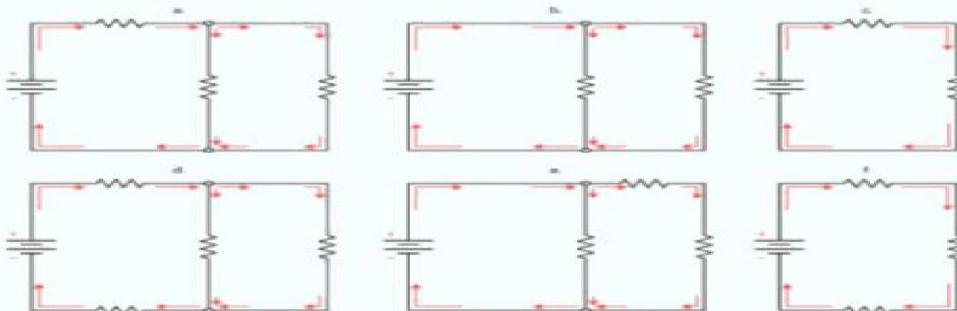


The load across a battery consists of two resistors, with values of $15\ \Omega$ and $47\ \Omega$, connected in series.

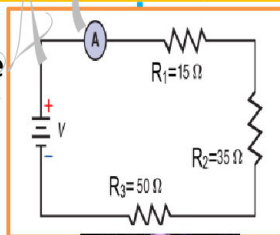
- What is the total resistance of the load?
- What is the potential difference across the battery if the current in the circuit is 97 mA?



Which of these are combination series-parallel circuits?



Which ordering correctly express the potential drop in the three branches of the circuit in the figure

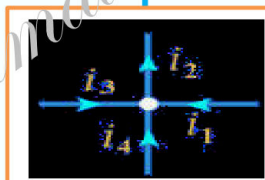


أي الترتيب يعبر بشكل صحيح عن الانخفاض المحتمل في الفروع الثلاثة للدائرة في الشكل

| | | |
|---|--|--|
| A | $\Delta V_1 = \Delta V_2 = \Delta V_3$ | $\Delta V_3 < \Delta V_2 < \Delta V_1$ |
| B | $\Delta V_3 > \Delta V_2 > \Delta V_1$ | $\Delta V_3 > \Delta V_2 < \Delta V_1$ |

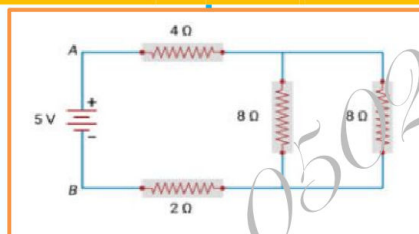
From the figure below, if $I_1 = 4A$, $I_3 = 2A$, $I_4 = 12A$ determine the value of I_2

من الشكل أدناه، إذا كان $I_1 = 4A$ ، $I_3 = 2A$ ، $I_4 = 12A$ أوجد قيمة I_2



| | | | | | | | |
|---|-----|---|-----|---|------|---|------|
| A | 3 A | B | 6 A | C | 18 A | D | 28 A |
|---|-----|---|-----|---|------|---|------|

The current supplied by the voltage source is



التيار الذي يوفره مصدر الجهد هو

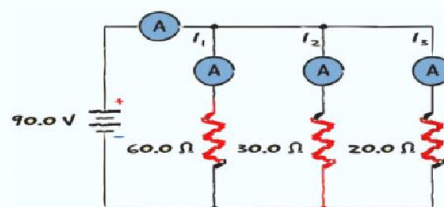
| | | | | | | | |
|---|--------|---|-------|---|-------|---|--------|
| A | 0.25 A | B | 0.5 A | C | 1.5 A | D | 1.25 A |
|---|--------|---|-------|---|-------|---|--------|

Three parallel resistors 20Ω , 60Ω , 30Ω connected with the battery $90V$

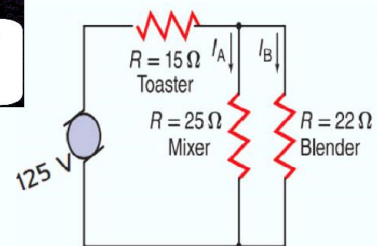
a- calculate I_1 , I_2 , I_3

b- Equivalent resistance

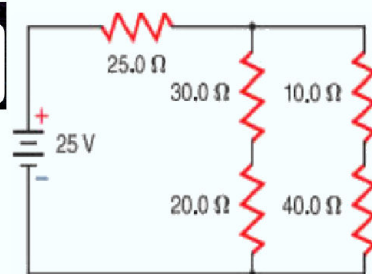
c- calculate the net current



A series-parallel circuit has three appliances on it. A blender and a stand mixer are in parallel, and a toaster is connected in series as shown in Figure. Find the current through the blender.



. Consider the resistors in the circuit in Rank them from least to greatest specifically indicating any ties, using the following criteria:
a. the current through each
b. the potential difference across each



GOOD LUCK

لكم مني اطيب التمنيات بالتوفيق



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