أسئلة اختبار الوحدة الثالثة Current Electric القسم الأول Circuits and Current منهج انسباير

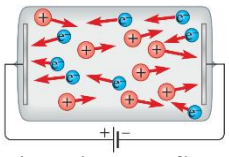
1. Choose the correct answer of the following questions:

1) How do electrons flow in a wire with respect to the **direction** of conventional current?

ⓐ Both are in the same direction. ⓑ Perpendicular to each other.

ⓒ In the opposite direction. ⓓ There is no relation between them.

2) Which of the following statements is true in terms of **the direction** of charge flow through a conductor?



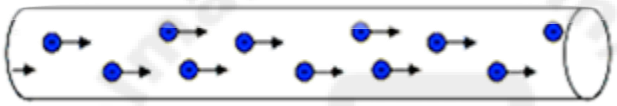
ⓐ Negative charges flow from the higher potential to the lower potential.

ⓑ Positive and negative charges flow from the higher potential to the lower potential.

ⓒ Positive charges flow from the higher potential to the lower potential.

ⓓ Positive and negative charges flow from the lower potential to the higher potential.

3) Which one of the following represents the **electric current unit**?



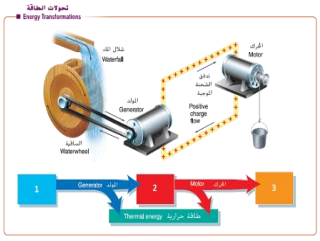
ⓐ C/s ⓑ C.s ⓒ s/C ⓓ C/s^2

4) A conductor carries a current of 2.0 A. What is **the charge** flowing through it in 10 s?

ⓐ 0.2 C ⓑ 20 C ⓒ 5.0 C ⓓ 12 C

5) In the shown diagram, energy transforms between different forms,
which of the following table rows shows the correct forms of energy in 1, 2and 3?

	1	2	3
ⓐ	Potential energy	Work done by motor	Electric energy
ⓑ	Electric energy	Potential energy	Work done by motor
ⓒ	Electric energy	Work done by motor	Potential energy
ⓓ	Potential energy	Electric energy	Work done by motor



6) When the charges are going completely around an electric circuit, **the net change in potential energy** should be zero. What is the **reason** for this?

ⓐ The electric charge is conserved through the circuit. ⓑ The total energy of the charges decreases through the circuit.

ⓒ The electric charge decreases through the circuit. ⓓ The total energy of the charges increases through the circuit.

7) A 1.5 A of current passes through a resistor which dissipates energy at a rate of 45 W.
What is **the potential difference** across the resistor?

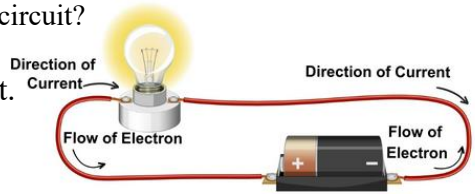
ⓐ 20 V ⓑ 30 V ⓒ 45 V ⓓ 68 V

8) A 75 V battery is connected across a 150 Ω resistor. What is the **current** through the resistor?

ⓐ 0.5 A ⓑ 2.0 A ⓒ 75 A ⓓ 11250 A

9) In a simple electric circuit that follows Ohm's Law
Which of the following will **increase the electric current** in the circuit?

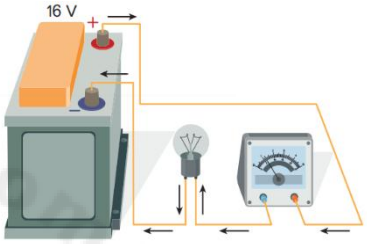
A. Increasing the length of the wire in the circuit.
B. Increasing the potential difference (voltage) across the circuit.
C. Increasing the resistance of the circuit.
D. Increasing the cross-sectional area of the wire.



ⓐ *B only* ⓑ *A, B, C* ⓒ *B and D* ⓓ *All (A, B, C, D)*

10) When the switch is closed in the electric circuit, an electric charge of 3 coulombs flows through the ammeter in 1.5 seconds.
Using the information given and the 16-volt battery shown in the circuit:
What The reading of the **ammeter** and the value of the **resistance** in the circuit?

	Ammeter	*Resistance*
ⓐ	*1 A*	*16 Ω*
ⓑ	*4 A*	*4 Ω*
ⓒ	*2 A*	*8 Ω*
ⓓ	*6 A*	*2.67 Ω*

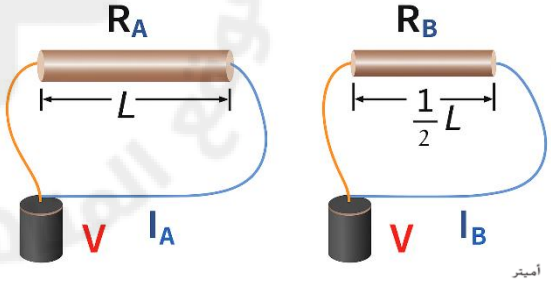


11) A 5.00 W resistor is connected to a 10.0 V battery. What is the **resistance** of the resistor?

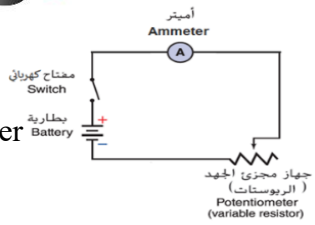
ⓐ 50.0 Ω ⓑ 2.00 Ω ⓒ 20.0 Ω ⓓ 12.00 Ω

12) Two copper wires with the same length and their resistances are RA and RB. Each wire is connected to a battery with voltage V, so that a current I pass across it, as shown in the figure.
Which of the following statements is **correct**?

ⓐ RA<RB, IA>IB ⓑ RA=RB, IA=IB
ⓒ RA>RB, IA<IB ⓓ RA<RB, IA<IB

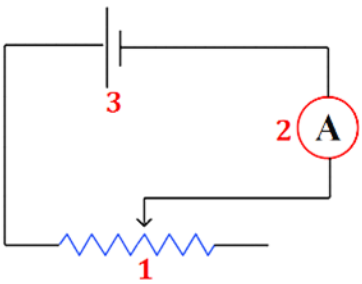


13) Which of the following cannot be used **to change the electric current** in the electric circuit shown in the figure.
ⓐ the Ammeter ⓑ the switch ⓒ the battery ⓓ the potentiometer



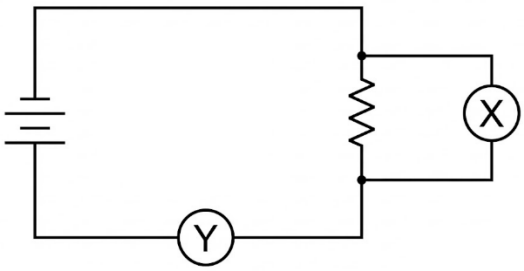
14) In the physics lab, Mr. Abdulrahman Esam, connected an electrical circuit as in figure.
Which of the following rows in the table is **correct** for the symbols shown in the circuit?

	1	2	3
ⓐ	Variable Resistor	Ammeter	Battery
ⓑ	Ammeter	Variable Resistor	Battery
ⓒ	Variable Resistor	Battery	Ammeter
ⓓ	Battery	Ammeter	Variable Resistor

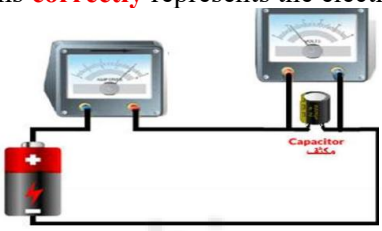


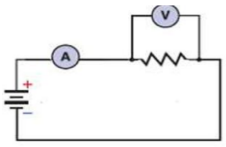
15) Depending on the circuit in which an electric current is flowing.
Which of the following is correct?

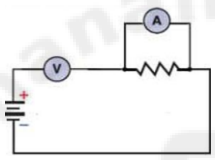
	X	Y
ⓐ	ammeter	ammeter
ⓑ	ammeter	voltmeter
ⓒ	voltmeter	voltmeter
ⓓ	voltmeter	ammeter

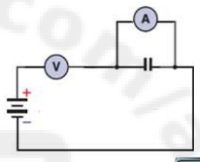


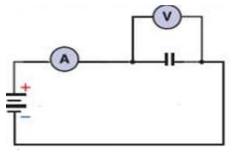
16) Which of the following diagrams **correctly** represents the electrical circuit shown in the figure?



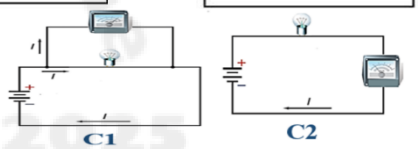
ⓐ 

ⓑ 

ⓒ 

ⓓ 

17) The diagram shows two electrical circuits, C1 and C2.
What is the **connection** method in each of the two circuits?



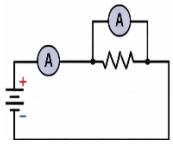
ⓐ ***C1:*** *The components are connected* ***in parallel****.*
C2: *The components are connected* ***in series****.*

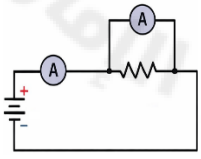
ⓑ **Parallel** connection in CI and C 2

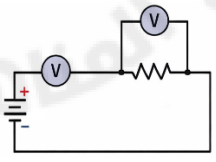
ⓒ ***C1:*** *The components are connected* ***in series****.*
C2: *The components are connected* ***in parallel****.*

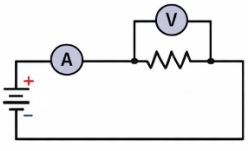
ⓓ **Series** connection in Cl and C2

18) Which of the following diagrams shows the **correct** connection of the components in circuit?

ⓐ 

ⓑ 

ⓒ 

ⓓ 

19) In a closed electric circuit, what **physical quantity** does the symbol **x** represent in the equation:

$$x = \frac{E}{\Delta V\, t}$$

ⓐ Current in the circuit (I).

ⓑ Resistance in the circuit (R).

ⓒ Square of the current in the circuit (I^2).

ⓓ Square of the resistance in the circuit (R^2).

20) Which of the following quantities is measured **in the unit kilowatt-hour**?

ⓐ Time ⓑ Work ⓒ Energy ⓓ Power

Question 1 – (10 Marks)

A. The two figures below show a graph of the changes in potential difference with electric current for two electrical resistors, where figure (a) is for a metal resistor, and figure (b) is for a lamp resistor.

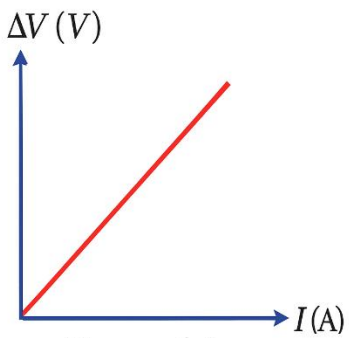


Figure (a)

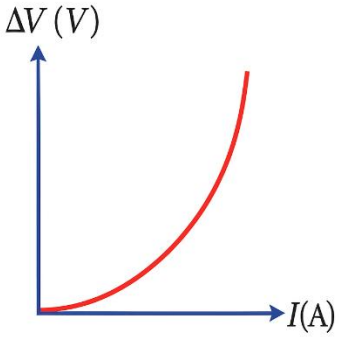


Figure (b)

Which of the two figures obeys Ohm's law (Ohmic resistance)? Justify your answer.

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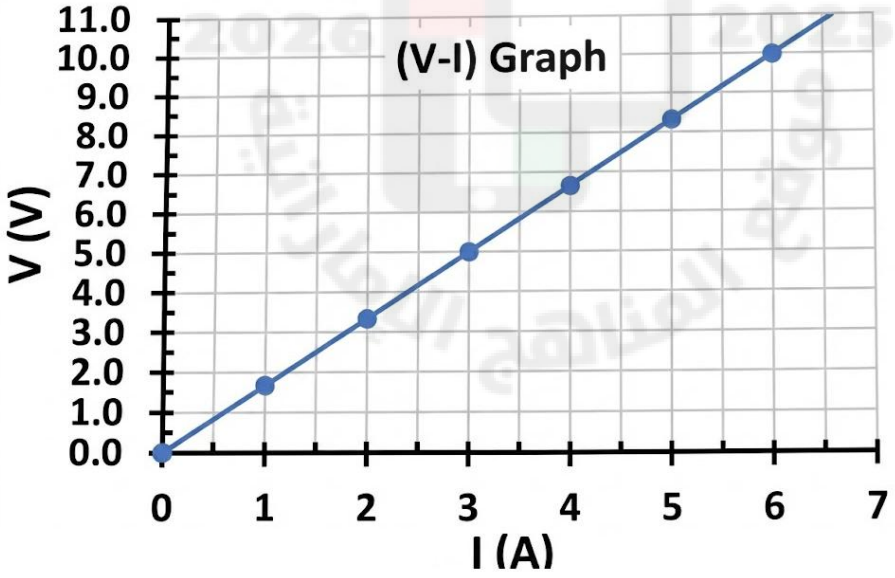
B. The electric current as a function of voltage of a wire is presented by the (V–I) graph.
Use the graph below to answer the following items:



Find the **resistance** of the wire.

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What is the **power** dissipated **in the resistor** when the applied voltage is 5 V?

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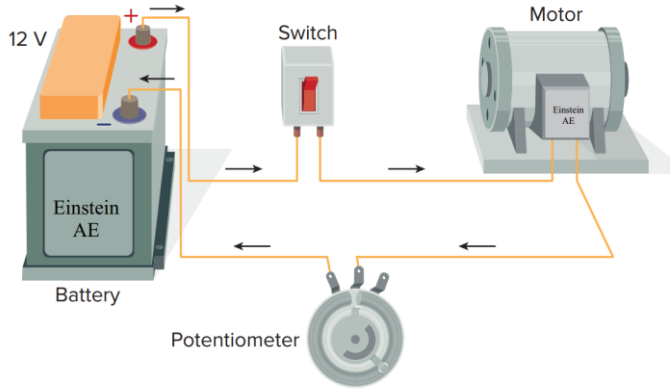
Question 2 – (10 Marks)

The figure shows a simple electric motor connected in a circuit.
Study the figure carefully and answer the following:



A. How can you change the **speed of rotation** of the motor **without adding or removing any components** from the circuit?

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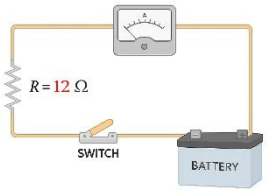
B. Draw inside the frame below a **schematic diagram** of this circuit using correct circuit symbols.

One mark is awarded for each component, and one mark is awarded for drawing the complete closed circuit.

Question 3 – (10 Marks)

When the switch is closed in the electric circuit shown, an electric charge of **3 C** flows through the ammeter in **1.5 s**, and the resistor has a resistance of **12 Ω**.
Use the figure to answer the following questions:



a. Calculate the **current** in the circuit.
b. Calculate **the potential difference** across the battery.
c. Calculate **the electrical power** delivered to the resistor.
d. The 12-Ω resistor is **replaced** with a 24-Ω resistor while the battery voltage remains the same. Explain what happens to the **ammeter reading**.

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