

QUESTION 1

Select the correct answer.

Khaled has a 12.0 cm long copper wire with a diameter of 2.50 mm. If the conductivity of this wire is

$$6.10 \times 10^7 \text{ S/m}$$

, what is the resistance of this wire?



☐ $2.10 \times 10^{-4} \Omega$

☐ $3.20 \times 10^{-4} \Omega$

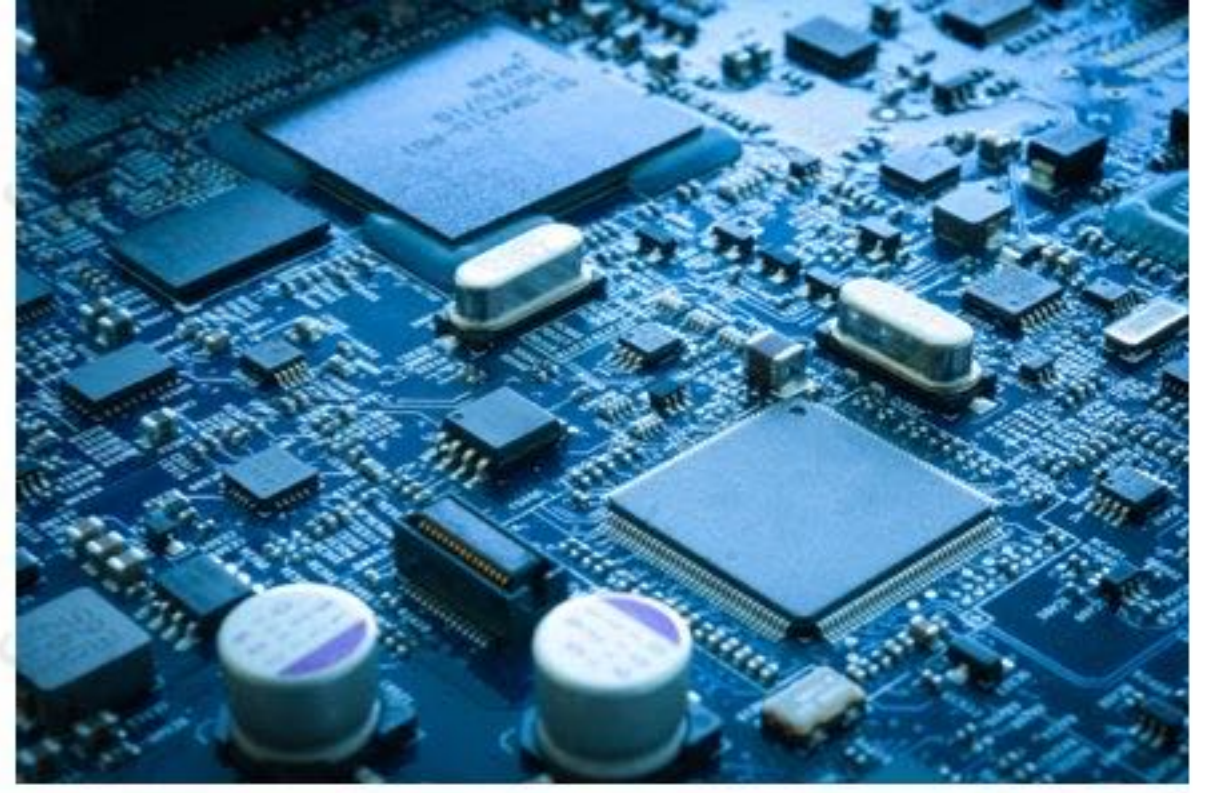
☐ $6.00 \times 10^{-4} \Omega$

☒ $4.00 \times 10^{-4} \Omega$ ✓

QUESTION 2

Select the best answers.

Which of the following factors may change the conductivity of a semiconductor?



☒ The voltage that is applied to the semiconductor. ✓

☒ Adding impurities to the semiconductor. ✓

☐ The area of the semiconductor.

☐ The volume of the semiconductor.

☐ The shape of the semiconductor.

☐ The mass of the semiconductor.

QUESTION 3



Select the correct answer.

What happens to the conductivity of distilled water when you dissolve table salt in the water?



- ☒ The conductivity of the water increases. ✓
- ☐ The conductivity of the water stays the same.
- ☐ The conductivity of the water decreases.
- ☐ The conductivity of the water increases to infinity.

QUESTION 4

Drag and drop the best answers in the sentence below to complete it.

Tungsten has a resistivity of

$$5.20 \times 10^{-8} \Omega \text{ m}$$

Tungsten can be classified as a

conductor ✓

since its

conductivity is about

$$1.92 \times 10^7 \text{ S / m} \checkmark$$



Diamond is classified as an insulator ✓ since it has

conductivity of

$$2.86 \times 10^{-13} \text{ S/m}$$

and resistivity of

$$3.50 \times 10^{12} \Omega \text{ m} \checkmark$$



superconductor

$$6.32 \times 10^{12} \Omega \text{ m}$$

semiconductor

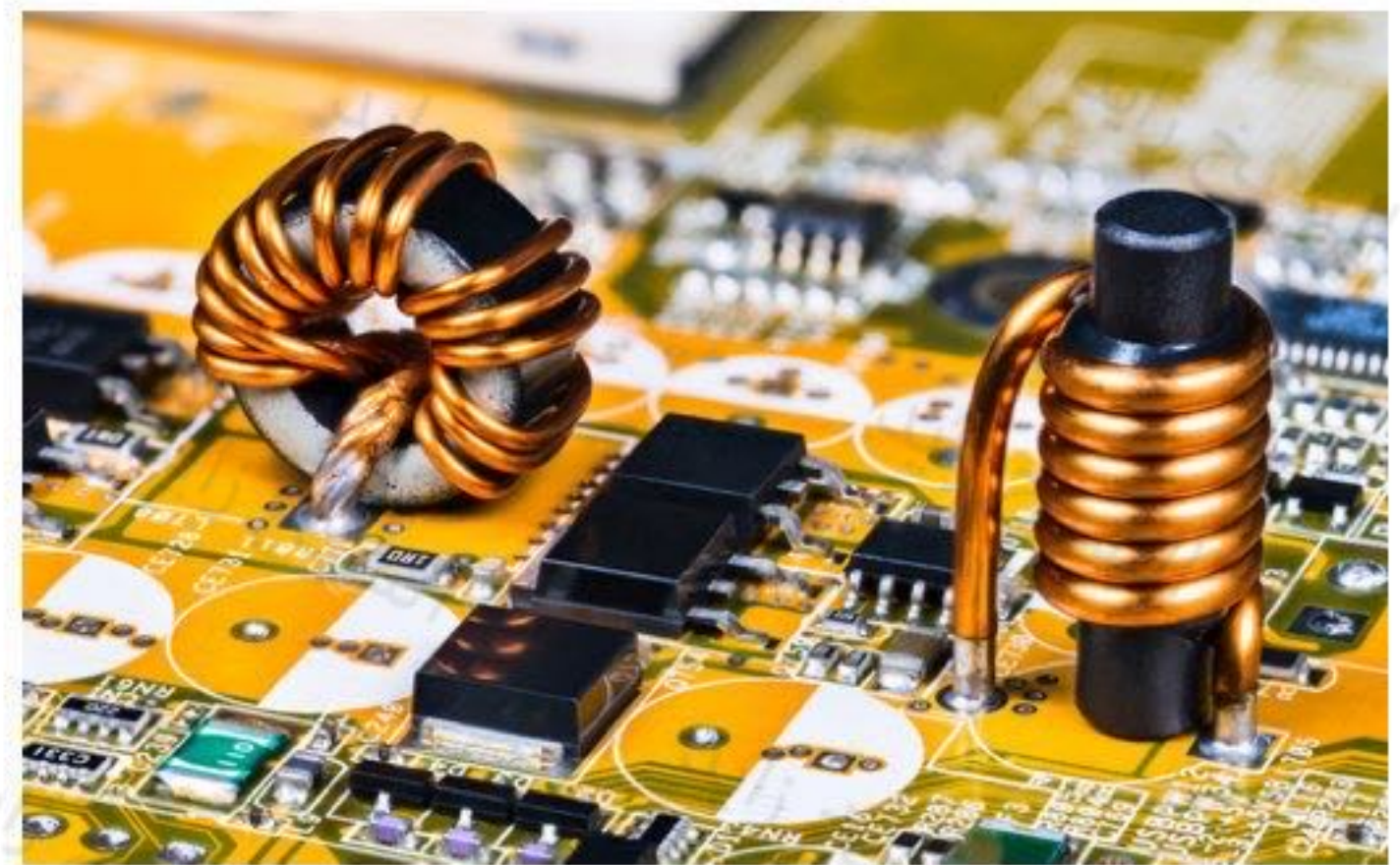
$$4.15 \times 10^7 \text{ S/m}$$

QUESTION 5



Select the correct answer.

What properties are needed to find the resistance of a copper wire connected to a closed circuit?



- the temperature of the copper wire
- length of the wire
- the cross-sectional area of the wire

- the resistivity of the copper wire

- the resistivity of the copper wire
- the length of the wire
- the temperature of the wire

- the resistivity of the copper wire
- the length of the wire
- the cross-sectional area of the wire

- the resistivity of the copper wire
- the temperature of the wire
- the cross-sectional area of the wire

QUESTION 6

Select the best answer from the drop-down menu.

Some materials can be used as conductors, and others can be used as insulators. For example,

glass is a good insulator and copper is a good conductor.

QUESTION 7

Select the best answers.

Sami performed a small experiment and found that copper conducts a maximum current when connected in a closed circuit. What can you say about copper wire?

- ☐ Copper has zero resistivity.

☐ Copper has low conductivity.

☒ Copper has low resistivity. ✓

☒ Copper has high conductivity. ✓

☐ Copper has zero conductivity.

☐ Copper has high resistivity.

QUESTION 8



Select the correct answer.

Which of the following equations can be used to find the resistivity of a wire?

☐ $\rho = \frac{Rl}{A}$

☐ $\rho = \frac{l}{RA}$

☒ $\rho = \frac{RA}{l}$ ✓

☐ $\rho = RlA$

QUESTION 9

Drag and drop the best equations or phrases to complete the sentence below.

Khaled and Sultan are doing an experiment. Khaled found the resistivity,

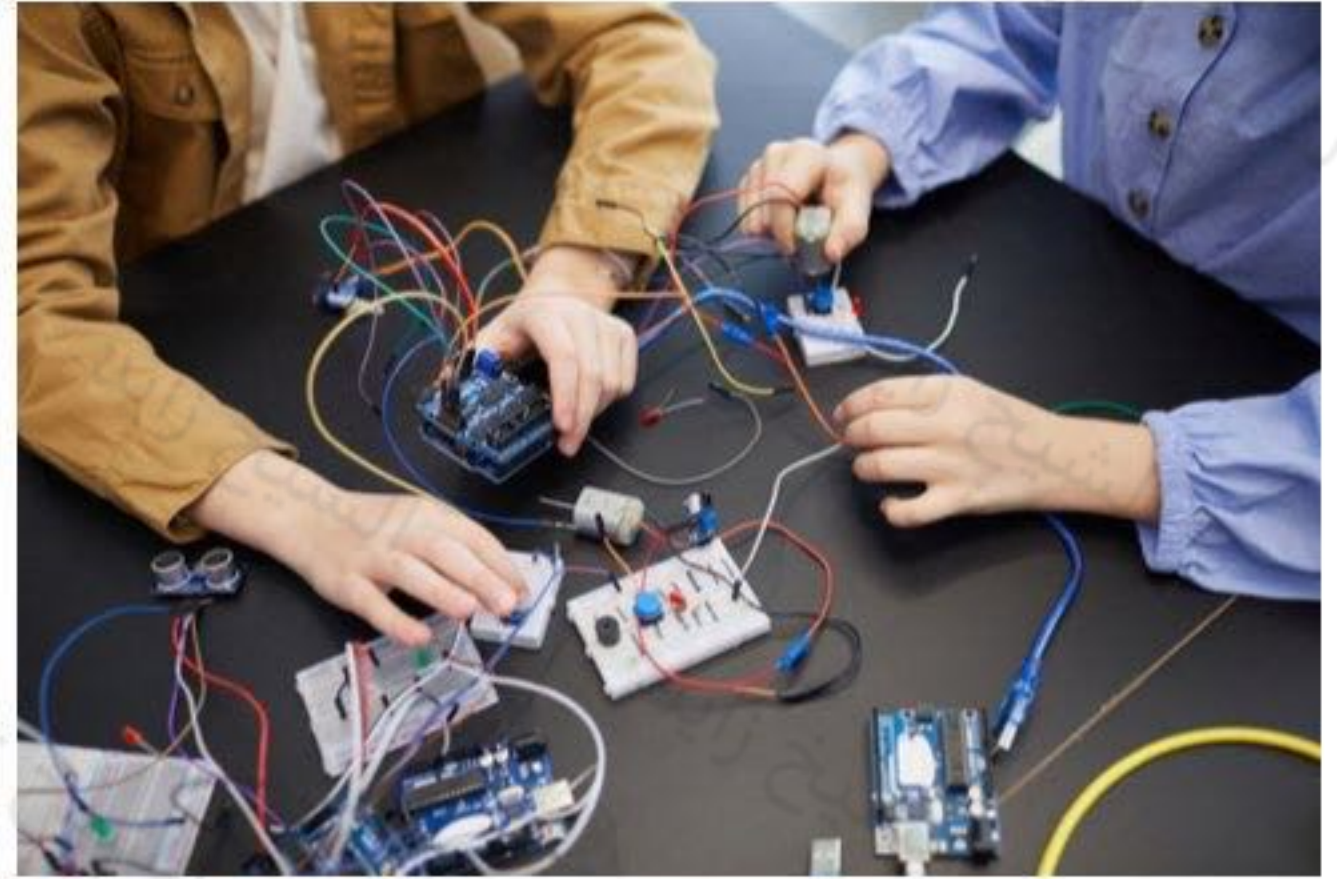
ρ

, of a copper wire, and he wants to find its conductivity.

Sultan told Khaled to calculate the

inverse of the resistivity ✓ because

$$\sigma = \frac{l}{RA} = \frac{1}{\rho} \quad \checkmark$$



square of the resistivity

$$\sigma = \frac{A}{Rl} = \frac{1}{\rho}$$

$$\sigma = \frac{RA}{l} = \rho$$

inverse of the square of the resistivity

QUESTION 10

Select the correct answer.

The electrical resistivity of a nickel bar is

$$7.0 \times 10^{-6} \Omega \text{ cm}$$

. What is its electrical conductivity?



☐ $5.9 \times 10^6 \text{ S / cm}$

☐ $1.6 \times 10^6 \text{ S / cm}$

☐ $7.5 \times 10^6 \text{ S / cm}$

☒ $1.4 \times 10^5 \text{ S / cm}$ ✓

QUESTION 11



Select the best answers from the drop-down menus.

Silicon and germanium ✓ ▼ are well-

known semiconductors ✓ ▼ . They are used

widely in the production of electronic devices.



QUESTION 12

Select from the drop-down menu the best answer.

Khaled wants to do an experiment to find the resistivity of tungsten. He gets a tungsten bar that has a length of 12 cm and a cross-sectional area of

$$4.0 \times 10^{-4} \text{ m}^2$$

. He connects the tungsten bar to a power supply that has a potential difference of

$$1.4 \times 10^{-4} \text{ V}$$

He found using an ammeter that 8.2 A of current passes through the tungsten bar.

The electrical resistivity of tungsten is

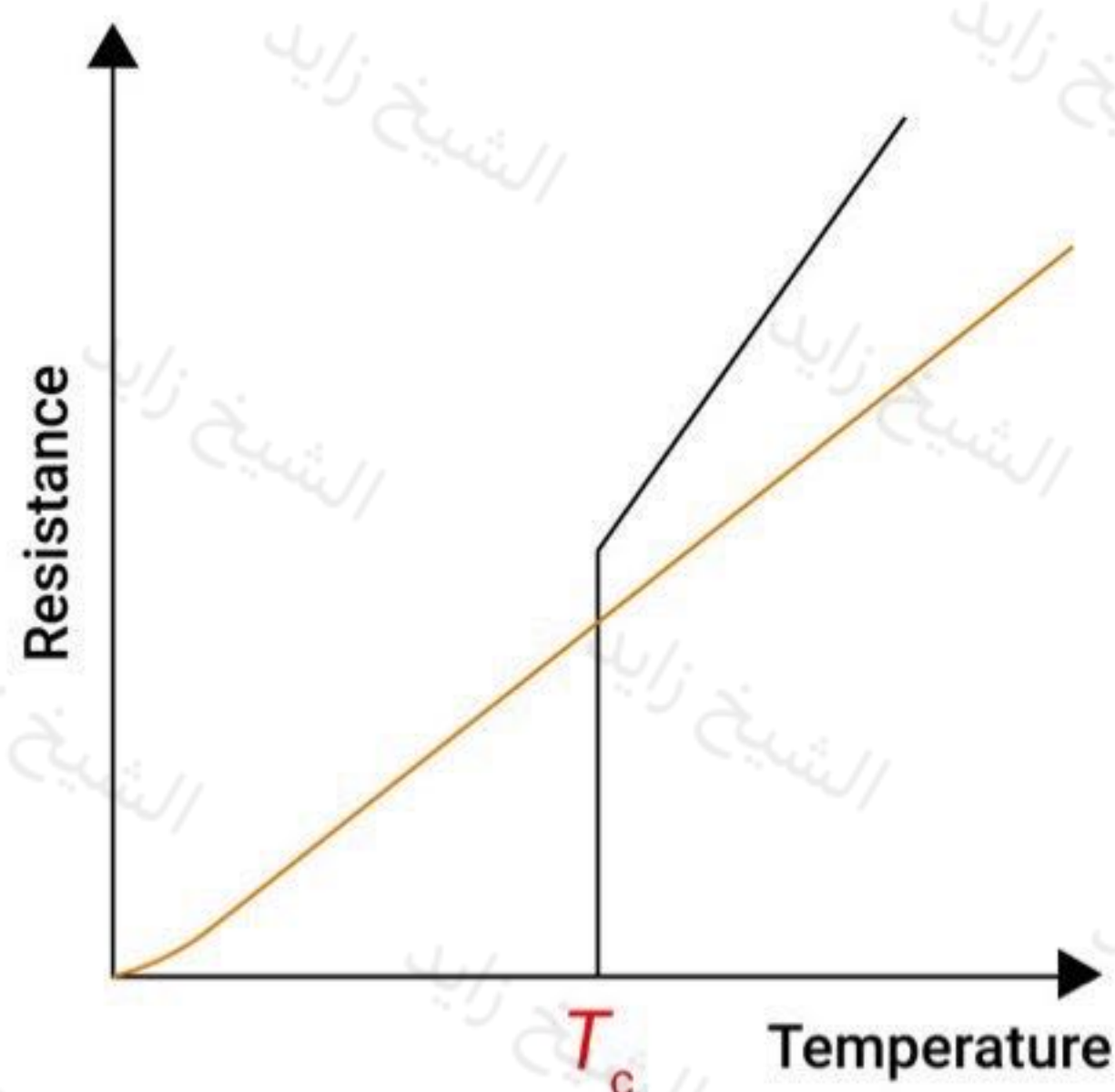
$$5.7 \times 10^{-8} \Omega \text{ m}$$



QUESTION 13

Select the correct answer.

Which of the following lines best describes superconductors and why?





The yellow line represents a superconductor because it shows that temperature and resistance are directly proportional for all temperature values.



The black line represents a superconductor because it loses all of its resistance at a temperature near the critical temperature.



Both lines represent a superconductor because the temperature does not affect the resistance.



Neither the black nor yellow line represents a superconductor.

QUESTION 14



Select the correct answer.

Sami performed an experiment to find the conductivity of some materials. His aim was to find the superconductive material. Which piece of data below tells Sami a material is superconductive?



$$R = 10^7 \Omega$$



$$R = 0 \Omega$$



$$R = 1000 \Omega$$



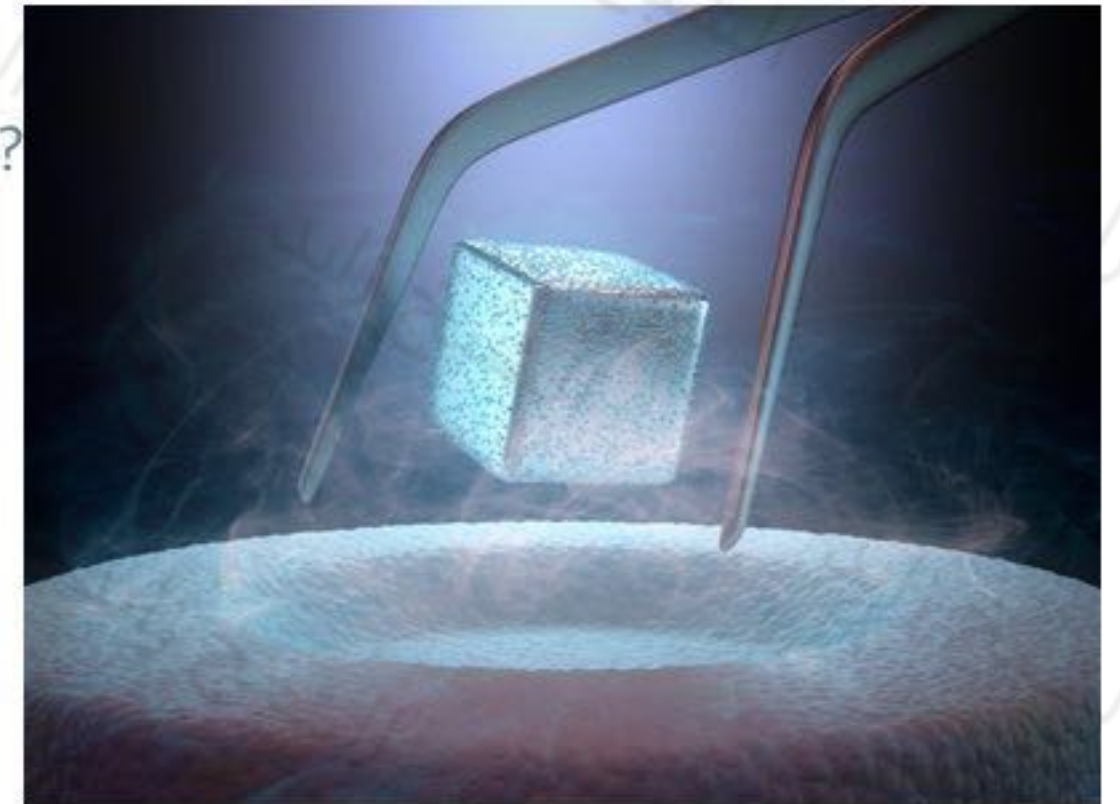
$$R = \infty \Omega$$

QUESTION 15



Select the best answers.

Which of the following statements are true about superconductors?



Most materials have a critical temperature that is less than 0 K.



A material can become superconductive when its temperature rises above the material's critical temperature.



Superconductors have zero resistance.



A material can become superconductive when its temperature drops below the material's critical temperature.



Superconductors have high resistance.



Most materials have a critical temperature between 0 K and 10 K.



Most materials have a critical temperature near 125 K.



Superconductors can not yet be observed.

