Test on Electron Theory, Static Electricity & Conduction, and Electrical Terminology

CLO1

Part 1: Multiple-Choice Questions

Electron Theory (5 MCQs)

1. What is the primary particle responsible for electricity?

- A) Proton
- B) Neutron

C) Electron

• D) Positron

2. What charge does an electron carry?

• A) Positive

B) Negative

- C) Neutral
- D) It depends on the material

3. In the atomic structure, electrons are found in:

- A) The nucleus
- B) Orbitals or shells

4. Which of the following best describes ionization? Saims A) The process of adding electrons (

- B) The process of removing or adding electrons to an atom
- C) The combination of protons and electrons
- D) The process of removing protons from an atom
- 5. When an atom has more electrons than protons, it is known as a:
 - A) Neutral atom
 - B) Positive ion

 $-2 > p^{+}$

C) Negative ion

• D) Neutron-rich atom

Static Electricity and Conduction (5 MCQs)

6. Static electricity is generated when:

- A) There is a flow of current
- B) Two materials are rubbed together
- C) An object is connected to a battery
- D) A circuit is completed

7. Which of the following materials is an insulator?

- A) Copper -> Contreh-
- B) Aluminium -> Contactor
- C) Rubber -> insurales
- · D) Gold __ CONTUN

8. What happens when a positively charged object comes into contact with a

Jglass, plasse, proble

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nourral

connect it-write be positive

repel

Charge

neutral conductor?

- A) The conductor becomes negatively charged
- B) The conductor becomes positively charged
- C) No charge transfer occurs
- D) Both become neutral

9. Which of the following is a good conductor of electricity?

- A) Wood
- B) Plastic X
- C) Copper
- D) Glass

10. When two objects with the same charge are brought close to each other, they will: Samc Cnarsc

- A) Attract each other
- B) Repel each other
- C) Lose their charge



Electrical Terminology (5 MCQs + 5 Short Written Questions)

different charge

11. The SI unit of electrical resistance is:

- A) Volt B) Ohm • C) Watt • D) Ampere 12. What is the relationship between voltage, current, and resistance according to Ohm's Law? • A) V = IR 1-78 • B) I = VR • C) R = IV • D) V = I/R 13. Electrica power is measured in: s watto A) Volts • B) Amps • C) Ohms D) Watts . 25 14. A resistor in a circuit: 1 TJ A) Increases the voltage B) Opposes the flow of current • C) Amplifies current • D) Stores electrical energy s charge G 15. The unit of electrical charge is: A) Coulomb • B) Farad • C) Volt
 - D) Henry

Part 2: Essay/Problem Solving (5 Short Written Questions)

1. Explain how static electricity is generated, and provide an example of where this may occur in everyday life.

2. Using Ohm's Law, calculate the current flowing through a circuit if the voltage across a resistor is 12 volts and the resistance is 6 ohms.

3. Describe the difference between a conductor and an insulator, and give an example of each.

4. Define electrical power and explain how it can be calculated in an electrical circuit. Provide a simple numerical example.

5. Describe the relationship between current, voltage, and resistance in an electrical circuit, and explain how changing one affects the others.

Answer Key

Part 1: Multiple-Choice Answers

Electron Theory

- 1. C) Electron
- 2. B) Negative
- 3. B) Orbitals or shells
- 4. B) The process of removing or adding electrons to an atom
- 5. C) Negative ion

Static Electricity and Conduction

- 6. B) Two materials are rubbed together
- 7. C) Rubber
- 8. B) The conductor becomes positively charged
- 9. C) Copper
- 10. B) Repel each other

Electrical Terminology

- 11. B) Ohm
- 12.A) V = IR
- 13. D) Watts

14. B) Opposes the flow of current

15. A) Coulomb

Part 2: Short Written Question Suggested Answers

1. How static electricity is generated and example:

 Static electricity is generated when two objects are rubbed together, causing a transfer of electrons from one object to the other. This results in one object becoming positively charged (losing electrons) and the other negatively charged (gaining electrons). An everyday example is rubbing a balloon on your hair, causing your hair to stick to the balloon due to the static charge.

2. Using Ohm's Law to calculate current:

Ohm's Law states that \(V = IR \), where \(V \) is voltage, \(I \) is current, and \(R \) is resistance. Rearranging for current, we have: \[I = \frac{V}{R} = \frac{12 \text{ volts}}{6 \text{ ohms}} = 2 \text{ amperes} \] Therefore, the current is 2 amperes.

3. Difference between conductor and insulator:

• A conductor is a material that allows the flow of electric current easily due to its free electrons, such as copper. An insulator is a material that resists the flow of current, such as rubber.

4. Definition of electrical power and calculation:

Electrical power is the rate at which electrical energy is transferred by an electric circuit. It is calculated using the formula \(P = IV \), where \(P \) is power in watts, \(I \) is current in amperes, and \(V \) is voltage in volts. For example, if a circuit has a voltage of 10 volts and a current of 2 amperes: \[P = 10 \text{ volts} \times 2 \text{ amperes} = 20 \text{ watts} \] The electrical power is 20 watts.

5. Relationship between current, voltage, and resistance:

 According to Ohm's Law, \(V = IR \), where voltage is the product of current and resistance. If voltage is increased while resistance remains the same, the current increases. Conversely, increasing resistance while keeping the voltage constant will reduce the current. Therefore, voltage and current are directly proportional, while resistance and current are inversely proportional.