Electric Charge: Understanding the Fundamentals

Student Name: _____

Class: _____

Due Date: _____

Introduction to Electric Charge

Essential Understanding:

- Definition of electric charge
- Types of electric charge (positive and negative)
- Properties of electric charge (conservation, additivity, and quantisation)

Complete these concept checks:

1. Define electric charge and explain its importance in physics.

2. Describe the difference between positive and negative electric charge.

Conservation of Charge

Key Concepts:

- Definition of conservation of charge
- Examples of conservation of charge in everyday life

Complete these problems:

1. A glass rod is rubbed with a silk cloth, resulting in a transfer of electrons. What is the net charge on the glass rod and the silk cloth?

2. A system consists of two particles, one with a charge of +3 μC and the other with a charge of -2 μC. What is the total charge of the system?

Additivity of Charge

Key Concepts:

- Definition of additivity of charge
- Examples of additivity of charge in everyday life

Complete these problems:

1. A conductor has a charge of +4 μC. What is the charge on the conductor if it is placed in contact with a neutral conductor?

2. A system consists of three particles, each with a charge of +2 μC. What is the total charge of the system?

Quantisation of Charge

Key Concepts:

- Definition of quantisation of charge
- Significance of quantisation of charge in the structure of atoms and molecules

Complete these problems:

1. A particle has a charge of -2e. How many electrons does it have?

2. Explain the significance of quantisation of charge in the structure of atoms and molecules.

Electric Charge in Everyday Life

Key Concepts:

- Role of electric charge in the functioning of electronic devices
- Examples of electric charge in nature

Complete these problems:

1. Explain the role of electric charge in the functioning of electronic devices.

2. Describe an example of electric charge in nature.

Research Investigation

Choose ONE of these topics for detailed research:

1. Applications of electric charge in technology
2. Electric charge in medical equipment
3. Electric charge in space exploration

Extension Activities

Choose any combination:

1. Design an experiment to demonstrate the conservation of charge
2. Research and write a short essay on the applications of electric charge in technology
3. Create a diagram to illustrate the structure of an atom, including the distribution of electric charge

Multiple Choice Questions

Choose the correct answer:

1. What is the unit of electric charge?
   - a) Coulomb
   - b) Ampere
   - c) Volt
   - d) Ohm

2. Which of the following is an example of a conductor?
   - a) Glass
   - b) Metal
   - c) Wood
   - d) Plastic

Short Answer Questions

Answer the following questions:

1. Explain the difference between a conductor and an insulator.

2. What is the significance of the conservation of charge in the study of physics?

Essay Question

Answer the following essay question:

Explain the concept of electric charge and its significance in the structure of atoms and molecules. Discuss the principles of conservation, additivity, and quantisation of charge, and provide examples of their application in everyday life.