

# What is Electric Charge?

## Worksheet

Electric charge (symbol  $q$  or  $Q$ ) is the physical property that gives rise to electric and magnetic forces; it is measured in coulombs (C) and can be related to current and time by  $Q = I t$ .

$$F = k \frac{Q_1 Q_2}{r^2}$$

## Questions

1. What is the SI unit of electric charge?  
A) Ampere  
B) Coulomb  
C) Volt  
D) Ohm
2. A 4 A current flows for 10 s. What charge passes?  
A) 0.4 C  
B) 14 C  
C) 40 C  
D) 400 C
3. Which statement about charge is true?  
A) Charge can be created freely  
B) Like charges attract  
C) Charge is quantized in units of  $e$   
D) Charge has no unit
4. Two positive charges are brought close together. What happens?  
A) They attract  
B) They repel  
C) Nothing happens  
D) They cancel out
5. A wire carries a steady current of 3 A for 5 seconds. How much charge flows through it?
6. A capacitor accumulates 40 C of charge from a 0.5 A charging current. How long did it charge?
7. How much charge does a 2 A current deliver in 1 minute?
8. Define: What is electric charge?
9. Define: What are the two types of charge?
10. Define: What is the elementary charge?

## Answer Key

1. B) Coulomb - Electric charge is measured in coulombs (C).
2. C) 40 C -  $Q = I t = 4 \cdot 10 = 40 \text{ C}$ .
3. C) Charge is quantized in units of  $e$  - All free charge is an integer multiple of the elementary charge  $e$ .
4. B) They repel - Like charges repel each other.
5.  $Q = I t$   $Q = 3 \cdot 5 = 15 \text{ C}$
6.  $Q = I t$   $t = Q / I = 40 / 0.5 = 80 \text{ s}$
7.  $t = 60 \text{ s}$   $Q = I t = 2 \cdot 60 = 120 \text{ C}$
8. A fundamental property of matter that causes particles to exert and feel electric forces; measured in coulombs (C).
9. Positive and negative - like charges repel, unlike charges attract.
10. The smallest free charge unit, carried by one proton (+ $e$ ) or one electron ( $e$ ),  $e = 1.6 \cdot 10^{-19} \text{ C}$ .

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