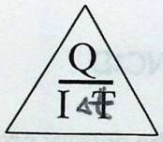
Science, Gr. 9
Characteristics of Electricity – Measuring Electricity

Current & Charge Calculations Worksheet



current = charge moving past a point / time

$I = \frac{Q}{\Delta t}$

Units: I is A (amperes), Q is C (coulombs), Δt is s (seconds)

1. Find the unknown quantity:

a) I = 0.4A
Q =
Δt = 20 s

$I = \frac{Q}{\Delta t}$

$Q = I\Delta t$
$= 0.4A \times 20s.$
$= 8C$

b) I = ?
Q = 240 C
t = 300 s

$I = \frac{Q}{\Delta t}$
$= \frac{240C}{300s}$
$= 0.8A$

c) I = 2 A
Q = 400 C
Δt = ?

$I = \frac{Q}{\Delta t}$

$\Delta t = \frac{Q}{I}$
$= \frac{400C}{2A}$
$= 200s.$

2. Find the unknown quantity (CONVERT FIRST to seconds)

a) I =
Q = 140 C
t = 4 min = 240 s (4 × 60)

$I = \frac{Q}{\Delta t}$
$= \frac{140C}{240s}$
$= 0.583A$
$\doteq 0.58\ A$

b) I = 0.3 A
Q =
t = 1.5 hours = 5400 s (1.5 × 3600)

$I = \frac{Q}{\Delta t}$
$Q = I\Delta t$
$= 0.3A \times 5400s$
$= 1620\ C$

c) I = 0.9 A
Q =
t = 3 min = 180 s (3 × 60)

$I = \frac{Q}{\Delta t}$
$Q = I\Delta t$
$= 0.9A \times 180s$
$= 162\ C$

WORD PROBLEMS

1. If there is a current of 10 amperes in a circuit for 10 minutes, what quantity of electric charge flows in through the circuit?

$\Delta t = 10\ min = 600s$
$I = 10A$
$Q = I\Delta t$
$= 10A\ (600s) = 6000C$

2. How much current must there be in a circuit if 100 coulombs flow past a point in the circuit in 4 seconds?

$I = ?$
$Q = 100C$
$\Delta t = 4s$

$I = \frac{Q}{\Delta t}$
$= \frac{100C}{4s}$
$= 25A$

3. How much time is required for 10 coulombs of charge to flow past a point if the rate of flow (current) is 2 amperes?

$\Delta t = ?$
$Q = 10C$
$I = 2A$

$I = \frac{Q}{\Delta t}$

$\Delta t = \frac{Q}{I}$
$= \frac{10C}{2A}$
$= 5s$