

# Current and Voltage Questions for GCSE Physics



1. What physical quantity does the symbol **Q** represent?

*(electric) charge*

2. What is the symbol used for electric current?

*I (must be a capital letter)*

3. What is the unit of electric charge?

*Coulomb (C)*

4. Write down the equation that links **current, charge and time**.

*$I = Q/t$  (or  $Q = It$  or  $t = Q/I$ )*

5. Write down the equation that links **voltage, energy and charge**.

*$V = E/Q$  (or  $E = VQ$  or  $W = EV$ )*

*[Well done if you wrote  $V = \Delta E/Q$  or  $V = \Delta W/Q$ ]*



6. A charge of **10 C** flows past a point in **5 s**. Calculate the current.

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$$I = Q/t = 10/5 = 2A$$

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7. A battery supplies **60 J** of energy to **10 C** of charge. Calculate the voltage.

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$$V = E/Q = 60/10 = 6V$$

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8. **50 C** of charge flows in **25 s**. Calculate the current.

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$$I = Q/t = 50/25 = 2A$$

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9. **150 J** of energy is transferred to **25 C** of charge. Calculate the voltage.

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$$V = E/Q = 150/25 = 6V$$

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10. A current of **0.5 A** flows for **40 s**. Calculate the charge transferred.

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$$Q = I t = 0.5 \times 40 = 20C$$

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11. A current of **3 A** flows for **2 minutes**. Calculate the charge transferred.  
(Remember to convert units.)

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$$Q = I t = 3 \times (2 \times 60) = 360\text{C}$$

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*[there are 60 seconds in a minute so two minutes are 2 x 60 seconds]*

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12. A device transfers **20 J** of energy to **4 C** of charge. Calculate the voltage.

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$$V = E / Q = 20 / 4 = 5\text{V}$$

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13. A battery transfers **360 C** of charge in **3 minutes**. Calculate the current.

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$$I = Q / t = 360 / (3 \times 60) = 2\text{A}$$

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14. A charge of **24 C** flows with a current of **2 A**. Calculate the time taken.

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$$t = Q / I = 24 / 2 = 12 \text{ seconds}$$

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15. A **12 V** lamp transfers **20 C** of charge. Calculate the energy transferred.

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$$E = Q V = 20 \times 12 = 240\text{J}$$

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16. A device operates at **6 V** and transfers **90 J** of energy. Calculate the charge transferred.

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$$Q = E / V = 90 / 6 = 15C$$

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17. A battery transfers **480 J** of energy while a current of **4 A** flows for **40 s**.  
a) Calculate the charge transferred. b) Calculate the voltage of the battery.

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$$a) Q = I t = 4 \times 40 = 160C$$

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$$b) V = E / Q = 480 / 160 = 3V$$

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18. A lamp transfers **180 J** of energy while operating at **12 V**. The current in the lamp is **0.5 A**.  
Calculate: a) the charge that flows; b) the time taken.

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$$a) Q = E / V = 180 / 12 = 15C$$

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$$b) t = Q / I = 15 / 0.5 = 30s$$

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19. A power supply delivers **600 J** of energy to a circuit in **1 minute**. The current in the circuit is **2 A**.  
a) Calculate the charge transferred. b) Calculate the voltage of the power supply.

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$$a) Q = I t = 2 \times 60 = 120C$$

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$$b) V = E / Q = 600 / 120 = 5V$$

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20. **30 C** of charge flows through a component connected to a **9 V** battery in **10 s**.  
Calculate: a) the current; b) the energy transferred.

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$$a) I = Q / t = 30 / 10 = 3A$$

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$$b) E = Q V = 30 \times 9 = 270J$$

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