

AQA (GCSE Notes)

Chapter 2: Electricity

- Q1.** What is the role of a potential difference in a closed circuit?
- Q2.** Define electric current in terms of charge flow.
- Q3.** Describe the conditions needed for an electric current to flow in a circuit.
- Q4.** What happens to the electric current if the circuit is not closed?
- Q5.** Write the equation that links charge flow, current and time.
- Q6.** Explain what each symbol represents in the equation $Q = I \times t$.
- Q7.** What unit is used to measure charge flow?
- Q8.** In what unit is current measured, and what is its symbol?
- Q9.** Why must a source of potential difference be included in a circuit?
- Q10.** How does increasing the time affect the total charge transferred in a circuit?
- Q11.** What is the current in a wire if 6 C of charge passes in 2 seconds?
- Q12.** A circuit has a current of 3 A for 4 seconds. How much charge flows through it?
- Q13.** Explain why the current is the same at every point in a simple closed loop.
- Q14.** If a current of 2 A flows for 10 seconds, how much charge has passed?
- Q15.** How can you increase the current in a circuit without changing the time?
- Q16.** What is the relationship between potential difference and current?
- Q17.** Describe how current behaves in a series circuit.
- Q18.** Why is a potential difference needed to push charges through a wire?
- Q19.** In a closed loop, what would you expect the current to be at different points in the loop?
- Q20.** What does a straight wire symbol represent in a circuit diagram?
- Q21.** How would you draw a circuit with a battery, switch, and lamp?



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- Q22.** How do you show a component is connected in series in a diagram?
- Q23.** How do you show a voltmeter connected correctly in a circuit diagram?
- Q24.** What does the symbol for a resistor look like?
- Q25.** What is the purpose of a fuse in a circuit, and how is it represented?
- Q26.** Explain how to measure current in a circuit using an ammeter.
- Q27.** Why must an ammeter be connected in series?
- Q28.** How is a battery represented in a circuit diagram?
- Q29.** Why do we use standard circuit symbols in diagrams?
- Q30.** What happens to the current if the potential difference increases and resistance remains the same?
- Q31.** How is a closed circuit different from an open circuit?
- Q32.** Why does current stop flowing when a switch is opened?
- Q33.** Describe how current flows from the positive terminal to the negative terminal.
- Q34.** If no potential difference is applied to a circuit, what happens to the current?
- Q35.** What happens to the current when you add more resistors in series?
- Q36.** If a charge of 10 C flows in 5 seconds, what is the current?
- Q37.** How would you calculate the time if you know the charge flow and current?
- Q38.** A charge of 24 C passes in 6 seconds. What is the value of the current?
- Q39.** What symbol is used to represent time in the charge flow equation?
- Q40.** How would the current be affected if the time doubled but charge stayed the same?
- Q41.** Draw a circuit with a battery, resistor, and an open switch.
- Q42.** Which part of the circuit provides the energy needed for charge to move?
- Q43.** Why does a bulb not light up when a switch is open?
- Q44.** What do you understand by the term “closed circuit”?



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- Q45.** Why is it important to learn standard circuit symbols?
- Q46.** What does the unit ampere represent in practical terms?
- Q47.** What causes electric charge to flow in a circuit?
- Q48.** Can current exist in a circuit without potential difference? Explain.
- Q49.** How does the length of time current flows affect the total charge moved?
- Q50.** Explain what is meant by the term 'electric charge'.
- Q51.** What is the relationship between current, resistance, and potential difference?
- Q52.** Write the equation that links potential difference, current, and resistance.
- Q53.** Define potential difference in terms of current and resistance.
- Q54.** What unit is used to measure resistance?
- Q55.** What happens to the current in a circuit if the resistance increases but the potential difference stays the same?
- Q56.** What is the effect of increasing potential difference while keeping resistance the same?
- Q57.** Describe how to calculate resistance if you know the current and the potential difference.
- Q58.** A component has a current of 2 A and a potential difference of 10 V. What is its resistance?
- Q59.** How does the current change if resistance is doubled and potential difference stays the same?
- Q60.** What is meant by an ohmic conductor?
- Q61.** How does the resistance of an ohmic conductor behave at constant temperature?
- Q62.** Give an example of a component that is an ohmic conductor.
- Q63.** How does the resistance of a filament lamp change as the current increases?
- Q64.** What happens to the temperature of a filament lamp when current flows through it?
- Q65.** Describe the current-potential difference graph for an ohmic conductor.
- Q66.** Describe the current-potential difference graph for a filament lamp.
- Q67.** Why does the resistance of a filament lamp increase as it gets hotter?



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- Q68.** What is the direction of current flow through a diode?
- Q69.** Why does a diode have high resistance in the reverse direction?
- Q70.** Sketch the current-potential difference graph for a diode.
- Q71.** What is a thermistor?
- Q72.** How does the resistance of a thermistor change with temperature?
- Q73.** What is a practical application of a thermistor?
- Q74.** Describe a circuit where a thermistor is used in a thermostat.
- Q75.** What is an LDR?
- Q76.** How does the resistance of an LDR change with light intensity?
- Q77.** Give one example where an LDR is used in real life.
- Q78.** How can an LDR be used to automatically switch on lights in the dark?
- Q79.** What happens to the resistance of an LDR in bright sunlight?
- Q80.** Why is it useful that the resistance of a thermistor decreases when it gets hot?
- Q81.** What does a linear component mean in terms of resistance?
- Q82.** How can you tell from a graph if a component is non-linear?
- Q83.** How would you set up a circuit to measure the resistance of a component?
- Q84.** What instruments do you need to measure resistance in a circuit?
- Q85.** Why must you measure both current and potential difference to calculate resistance?
- Q86.** Draw a circuit diagram for measuring the resistance of a resistor.
- Q87.** In what part of the circuit should you place the ammeter?
- Q88.** In what part of the circuit should you place the voltmeter?
- Q89.** Why must the voltmeter be connected in parallel?
- Q90.** Why should the wire be kept at constant temperature in resistance investigations?
- Q91.** How does increasing the length of a wire affect its resistance?



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- Q92.** What type of wire would have the lowest resistance?
- Q93.** Why is it important to use the same wire material when testing wire length and resistance?
- Q94.** How would you investigate the effect of wire length on resistance?
- Q95.** What safety precautions should you take when investigating wire resistance?
- Q96.** How do resistors behave when placed in series in a circuit?
- Q97.** How does adding more resistors in series affect total resistance?
- Q98.** How does adding more resistors in parallel affect total resistance?
- Q99.** Explain how current behaves in a parallel circuit with two resistors.
- Q100.** Explain how the total resistance in a series circuit is calculated.
- Q101.** Explain how the total resistance in a parallel circuit is calculated.
- Q102.** How would you use a graph to identify if a component is ohmic or non-ohmic?
- Q103.** What would a curved line on a current-potential difference graph suggest about the component?
- Q104.** What does it mean if a component shows a straight line through the origin on a current-potential difference graph?
- Q105.** What is the resistance if a potential difference of 12 V causes a current of 3 A to flow?
- Q106.** If a component has a resistance of 4 Ω and the current is 2 A, what is the potential difference across it?
- Q107.** What is the current when the potential difference is 15 V and the resistance is 5 Ω ?
- Q108.** Why does a diode conduct only in one direction?
- Q109.** How can you tell from a graph that a diode only allows current in one direction?
- Q110.** How would the resistance of a thermistor behave if placed in a cold environment?
- Q111.** How does the function of a thermistor help in regulating heating systems?
- Q112.** What does the symbol for a diode look like and what does the arrow show?
- Q113.** Why does a light bulb glow brighter as the current increases?



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- Q114.** How does increasing the resistance affect the brightness of a bulb?
- Q115.** What happens to total resistance when identical resistors are placed in parallel?
- Q116.** How would you explain to someone why LDRs are useful in automatic lighting systems?
- Q117.** Why is it incorrect to assume resistance is always constant in every component?
- Q118.** Why is it necessary to repeat readings and take averages when investigating resistance?
- Q119.** What would you expect the graph of resistance vs. temperature for a thermistor to look like?
- Q120.** Why do non-ohmic components not obey Ohm's law?
- Q121.** What is the difference between a series and a parallel circuit?
- Q122.** In a series circuit, what happens to the current at each component?
- Q123.** In a parallel circuit, how does the potential difference across each component behave?
- Q124.** What is the formula to calculate total resistance in a series circuit?
- Q125.** Why does adding more resistors in series increase total resistance?
- Q126.** Why does adding resistors in parallel reduce the total resistance?
- Q127.** What happens to the total current in a parallel circuit when more branches are added?
- Q128.** In a series circuit, how is the total potential difference of the power supply divided?
- Q129.** In a parallel circuit, what remains constant across all components?
- Q130.** What does the term "equivalent resistance" mean in a circuit?
- Q131.** If one bulb breaks in a series circuit, what happens to the rest of the circuit?
- Q132.** If one bulb breaks in a parallel circuit, what happens to the rest of the circuit?
- Q133.** How do you calculate current in different branches of a parallel circuit?
- Q134.** Why is it easier to add more components in a parallel circuit than in series?
- Q135.** What type of circuit is commonly used in domestic lighting and why?
- Q136.** Describe how energy is shared between components in a series circuit.
- Q137.** What happens to the brightness of bulbs in a series circuit if more bulbs are added?



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- Q138.** Why do components in a parallel circuit get full potential difference?
- Q139.** How does current behave at junctions in a parallel circuit?
- Q140.** What is a common use of series circuits in everyday devices?
- Q141.** Why is the total resistance in a parallel circuit always lower than the smallest resistor?
- Q142.** In a series circuit with 2 resistors, how is the current affected if one resistor is doubled?
- Q143.** Describe a method to test if two resistors are connected in series or parallel.
- Q144.** How does current behave in a complete series loop?
- Q145.** What must remain equal in all components of a series circuit?
- Q146.** In parallel, how is total current related to branch currents?
- Q147.** What is the main difference in energy distribution between series and parallel circuits?
- Q148.** What happens to the total resistance if you connect identical resistors in series?
- Q149.** Explain the design of a basic dc series circuit used for testing components.
- Q150.** How would you construct a circuit to measure total resistance in a series circuit?
- Q151.** Why can series circuits be useful for safety alarms?
- Q152.** What makes a parallel circuit more suitable for household wiring?
- Q153.** Why is it important to understand equivalent resistance in circuits?
- Q154.** What does a frequency of 50 Hz mean in terms of alternating current?
- Q155.** What is the potential difference of mains electricity in the UK?
- Q156.** What is the role of the live wire in a three-pin plug?
- Q157.** What does the neutral wire do in a mains circuit?
- Q158.** What is the purpose of the earth wire in electrical safety?
- Q159.** What are the colour codes for the three wires in a three-core cable?
- Q160.** Why is the earth wire connected to the metal casing of some appliances?
- Q161.** What danger exists even when a switch is off in a mains circuit?



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- Q162.** Why is the live wire the most dangerous part of the mains supply?
- Q163.** What could happen if the live wire touches a metal case without an earth connection?
- Q164.** Why is there no current in the earth wire during normal operation?
- Q165.** What does it mean for the neutral wire to be at “earth potential”?
- Q166.** How does the earth wire prevent electric shocks?
- Q167.** What would happen if the live and earth wires were connected directly?
- Q168.** Why is touching a live wire dangerous even if the appliance is off?
- Q169.** Why must appliances have a properly wired plug?
- Q170.** What safety features are included in UK plug design?
- Q171.** What role does fuse or circuit breaker play in protecting the mains circuit?
- Q172.** What happens if you touch the live wire while standing on the ground?
- Q173.** How does mains electricity differ from battery electricity?
- Q174.** Why is ac used for mains instead of dc?
- Q175.** What should you check before wiring a plug?
- Q176.** What might happen if the earth wire is disconnected?
- Q177.** Why must electrical appliances be earthed if they have a metal case?
- Q178.** How does the live wire cause electric shock?
- Q179.** How do fuses protect the circuit from too much current?
- Q180.** Why do we use insulation on each wire in a three-core cable?
- Q181.** What is the equation that links power, potential difference, and current?
- Q182.** Write the equation that links power, current, and resistance.
- Q183.** Define power in terms of electrical circuits.
- Q184.** How does increasing the potential difference affect power if current stays the same?
- Q185.** How does power change if the current is doubled and resistance stays the same?



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- Q186.** What unit is used to measure electrical power?
- Q187.** If a device has a high current and low resistance, what can you say about its power?
- Q188.** Describe how to calculate power using current and resistance.
- Q189.** What happens to the power if the current increases and resistance remains constant?
- Q190.** Why do we use two different equations to calculate power?
- Q191.** What is meant by energy transferred in an electric circuit?
- Q192.** How is energy transferred related to power and time?
- Q193.** Write the equation that links energy transferred, charge flow, and potential difference.
- Q194.** If a device is switched on for a longer time, how does this affect the energy transferred?
- Q195.** What is the unit for energy transferred?
- Q196.** If an appliance uses more power, what happens to the energy it transfers in a given time?
- Q197.** How do you calculate the energy used by a 100 W appliance in 1 hour?
- Q198.** Why is it useful to know the power rating of a domestic appliance?
- Q199.** What does a 2 kW power rating mean for an appliance?
- Q200.** What is the relationship between charge flow and energy transferred?
- Q201.** How does a fan transfer energy when it is switched on?
- Q202.** Give an example of a device that transfers electrical energy to heat.
- Q203.** Why do some appliances need a higher power rating than others?
- Q204.** What does the power rating of an appliance tell you about its energy use?
- Q205.** How can two appliances use the same amount of energy but have different power ratings?
- Q206.** Why is it important to switch off appliances when not in use?
- Q207.** What happens to energy when electrical work is done in a circuit?
- Q208.** How does energy transfer differ in a battery-powered device compared to a mains-powered one?



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- Q209.** Describe how a toaster transfers energy during use.
- Q210.** Explain how electrical energy is transferred to kinetic energy in a washing machine.
- Q211.** What is the National Grid and what is its purpose?
- Q212.** How does electrical power travel from power stations to homes?
- Q213.** Why is a step-up transformer used at a power station?
- Q214.** What does a step-down transformer do in the National Grid?
- Q215.** Why is it efficient to use a high potential difference to transfer electricity?
- Q216.** What happens to current when potential difference is increased in transmission lines?
- Q217.** How does reducing current help make energy transfer more efficient?
- Q218.** What is the role of transformers in the National Grid?
- Q219.** Why is energy lost as heat in transmission lines?
- Q220.** What is the advantage of using cables with low resistance in the National Grid?
- Q221.** What happens when two insulating materials are rubbed together?
- Q222.** What kind of particles are transferred during rubbing of insulating materials?
- Q223.** What charge does a material have if it gains electrons?
- Q224.** What charge does a material have if it loses electrons?
- Q225.** Why does rubbing a balloon on your hair cause it to stick to a wall?
- Q226.** What is the name of the force between two charged objects that are not touching?
- Q227.** What happens when two objects with the same charge are brought close together?
- Q228.** What happens when two objects with opposite charges are near each other?
- Q229.** What is meant by a non-contact force?
- Q230.** How can you show that charged objects attract or repel without touching?
- Q231.** What causes sparking between two charged objects?
- Q232.** Why can static electricity be dangerous in certain places?



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- Q233.** How can static electricity be reduced in aircraft fuel lines?
- Q234.** What everyday situations can cause a build-up of static charge?
- Q235.** Why is a person more likely to get a static shock in dry weather?
- Q236.** What is the difference between static electricity and current electricity?
- Q237.** Why does a plastic ruler attract small pieces of paper after being rubbed?
- Q238.** What is the result of unequal distribution of electrons between two materials?
- Q239.** What safety precautions can be taken to avoid static sparks in petrol stations?
- Q240.** What happens to electrons in static charge build-up?
- Q241.** What is an electric field?
- Q242.** How does the strength of an electric field change with distance from a charged object?
- Q243.** What direction do electric field lines point for a positively charged object?
- Q244.** What direction do electric field lines point for a negatively charged object?
- Q245.** What shape is the electric field around a single charged sphere?
- Q246.** How do electric fields explain the attraction between charged objects?
- Q247.** How do electric fields explain repulsion between objects with like charges?
- Q248.** How can we draw an electric field to show its strength?
- Q249.** Why is the electric field stronger closer to the charged object?
- Q250.** What is the link between electric fields and the force on a nearby charged object?
- Q251.** How can electric fields cause sparking between objects?
- Q252.** Why does a charged object influence another object without touching it?
- Q253.** What would happen to the electric field if the charge of the object increases?
- Q254.** How can field lines show the difference between strong and weak electric fields?
- Q255.** What is the shape of the electric field between two oppositely charged plates?
- Q256.** Why are electric field lines never crossed or broken?



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Q257. What does the spacing between electric field lines tell us?

Q258. How can the idea of electric fields help to understand lightning?

Q259. What causes the force between a charged balloon and a neutral wall?

Q260. How does a charged rod cause small bits of paper to jump toward it?

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