

OCR (B) Physics GCSE

Topic 2.2 - How can electricity be generated?

Flashcards

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What are the main energy resources available to humans?



What are the main energy resources available to humans?

Fossil fuels (oil, gas and coal), nuclear fuels, biofuels, wind, hydroelectricity, tides and solar energy.



Define renewable energy



Define renewable energy

Energy which can be replenished from a source which does not run out.



Which energy sources are
non-renewable?



Which energy sources are non-renewable?

- Fossil fuels
- Nuclear fuel



Which energy sources are renewable?



Which energy sources are renewable?

- Biofuels
- Wind
- Hydroelectric and tidal energy
- Geothermal energy
- Solar power



Why is non-renewable energy used to provide electricity on a large scale?



Why is non-renewable energy used to provide electricity on a large scale?

Non-renewable sources tend to have a larger energy output per kilogram of fuel.



How is electricity generated in power stations?



How is electricity generated in power stations?

By spinning a magnet near a wire, a voltage is induced in the wire. The voltage results in an electrical current.



Explain the mechanism of electricity production in power stations



Explain the mechanism of electricity production in power stations

Water is heated (using energy from sources such as fossil fuels), causing it to evaporate into steam which rises and spins a turbine which is connected to a generator, therefore producing electricity.



Define and give units for voltage



Define and give units for voltage

The potential difference which causes current to flow in a circuit. Voltage is measured in Volts, V.



Define and give units for current



Define and give units for current

Current is defined as the rate at which charge flows around a circuit. It is measured in Amperes, A.



Define alternating current



Define alternating current

A current that changes direction regularly (depending on its frequency). A 50Hz alternating current changes direction 50 times a second.



Define direct current



Define direct current

Direct current is a movement of charge in one direction only (i.e. only positive or only negative).



Give examples of direct current



Give examples of direct current

- Cells
- Batteries



Give an example of alternating current



Give an example of alternating current

Mains electricity provides an alternating current.



Give the key features of mains electricity
in the UK



Give the key features of mains electricity in the UK

- Alternating current of frequency 50Hz
- 230 V



How does electricity in the National Grid differ from mains supply?



How does electricity in the National Grid differ from mains supply?

Electricity is transported in the National Grid at much higher voltages to reduce energy loss.



How is the voltage of electricity altered?
(eg. for transport across the National
Grid)



How is the voltage of electricity altered?

Using **transformers**. The voltage is increased for travelling long distances.



What is a step up transformer?



What is a step up transformer?

A transformer which increases voltage (decreasing the current).

These are used in the National Grid to increase p.d. to a high value for transport.



What is a step down transformer?



What is a step down transformer?

A transformer which decreases the voltage (increasing the current).

These are used to decrease p.d. from the national grid for domestic use.



Name the wires are in a typical plug/appliance?



Name the wires in a typical plug/appliance

1. Live
2. Neutral
3. Earth



Describe the live wire (and give its voltage)



Describe the live wire and give its voltage

The live wire is **brown** and carries 230V.



What is the purpose of the live wire?



What is the purpose of the live wire?

It carries alternating potential difference from the supply to the appliance.



Describe and give the voltage of the
neutral wire



Describe and give the voltage of the neutral wire

The neutral wire is **blue** and carries 0V.



What is the function of the neutral wire?



What is the function of the neutral wire?

It completes the circuit.



Describe and give the voltage of the
earth wire



Describe and give the voltage of the earth wire

The earth wire has **green and yellow stripes** and carries 0V.



What is the purpose of the earth wire?



What is the purpose of the earth wire?

It is a safety wire, preventing the appliance from becoming live with static electricity.



How does the earth wire work?



How does the earth wire work?

The earth wire is connected to both the earth and the appliance casing. If the live wire touches the casing, the appliance becomes live, which will cause electric shocks if touched. The earth wire instead transfers the current to the ground, discharging the casing of the appliance so it does not become live.



Describe the projected trend of energy uses and why this is problematic



Describe the projected trend in energy usage and why this is problematic

Energy use has been, and is projected to continue to be, increasing since the industrial revolution. This is problematic because of finite resources running out (non-renewable fuels).

