WJEC England GCSE Physics 1.2 - Conservation, Dissipation and National and Global Energy Sources

Flashcards

State the law of energy conservation.

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Energy cannot be created or destroyed (it can only be transferred into different forms).

State any changes in the **total energy** of a ball that is kicked, assuming that no external forces act.

State any changes in the **total energy** of a ball that is kicked, assuming that no external forces act.

The total energy of the system remains constant due to the conservation of energy.

What is waste energy?

What is waste energy?

The energy that is not used by the device for its desired purpose.

Describe the energy changes that occur in a filament light-bulb.

Describe the energy changes that occur in a filament light-bulb.

- Electrical energy is transferred into light and heat energy.
- Light is a useful energy form, heat is waste energy.

State **two** equations to calculate efficiency.

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=Useful Energy Output / Total Energy Input

=Useful Power Output / Total Power Output

State the consequence for energy transfer of a material with a high thermal conductivity.

State the consequence for energy transfer of a material with a high thermal conductivity.

The rate of energy transfer through the material is higher than for a material with a lower thermal conductivity.

Do double-glazed windows have a higher or lower thermal conductivity than single-glazed windows?

Do double-glazed windows have a higher or lower thermal conductivity than single-glazed windows?

Lower, meaning less energy transfers through them.

State **three** methods of reducing heat loss in a building.

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1. Double glazing
2. Loft and wall insulation
3. Thicker walls

How can the efficiency of a mechanical machine with moving parts be improved? (Higher)

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Lubricate any moving parts to reduce the friction and therefore energy loss due to heating.

How can the efficiency of a radiator be improved? (Higher)

How can the efficiency of a radiator be improved? (Higher)

Installing metal foil sheets behind the radiator to reflect the heat back into the room rather than it being absorbed into the walls.

How can the efficiency of boiling water in a pan be improved? (Higher)

How can the efficiency of boiling water in a pan be improved? (Higher)

By placing a lid on the pan to reduce the heat loss from the top.

State the three different types of (thermal) energy transfer.

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1. Conduction
2. Convection
3. Radiation

Explain using a particle model, the process of convection.

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- When heated, fluids expand, making the particles spread out and the fluid less dense.
- Less dense fluids rise above cooler more dense fluids.
- These cooler fluids then heat up and rise upwards, creating a cyclic motion of particles.

Explain using a particle model, the process of conduction in a metal.

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- A metal consists of positive ions and free electrons.
- As temperature increases, the ions gain kinetic energy and vibrate.
- This energy is then passed onto the free electrons which have the ability to move throughout the whole metal.
- These electrons transfer kinetic energy to other ions further down in the metal, increasing their temperature.

Explain the process of heat transfer by radiation.

Explain the process of heat transfer by radiation.

- Radiation involves the transfer or energy through waves rather than particles.
- Infrared radiation carries energy from one place to another.

Which type of energy transfer can occur in a vacuum?

Which type of energy transfer can occur in a vacuum?

Radiation since it doesn't require particles to transfer energy.

What is a renewable energy resource?

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An energy source which can be replenished as it is being used up.

Give **four** examples of renewable energy resources.

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1. Wind Energy
2. Hydro-Electricity
3. Tidal Energy
4. Solar Energy

Give an example of a non-renewable energy resource.

Give an example of a non-renewable energy resource.

Fossil fuels (for example coal, oil and gas).

What are the advantages of generating power using gas rather than coal?

What are the advantages of generating power using gas rather than coal?

- Flexible Generation: Gas power stations have short start-up times so can be switched on/off more readily.
- Lower emissions of carbon dioxide.

State **two** disadvantages of using renewable energy resources to generate power.

State **two** disadvantages of using renewable energy resources to generate power.

- Output often determined by external factors (like wind speed), so supply is uncertain.
- Generating power through other means is often more efficient and economically beneficial.

Explain the environmental impacts of burning fossil fuels.

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- Carbon Dioxide contributes to the greenhouse effect, and causes global warming.
- Sulphur Dioxide leads to acid rain, which can damage buildings and crops.

State **three** advantages of fossil fuels as an energy resource.

State **three** advantages of fossil fuels as an energy resource.

1. Reliable: Not dependent on external factors so can generate power anytime.
2. Can produce large amounts of energy for a given quantity.
3. Still relatively abundant, so cost-effective.

State **three** advantages of nuclear power.

State **three** advantages of nuclear power.

1. Very large amounts of energy for relatively small quantities of fuel.
2. Doesn't release greenhouse gases and so doesn't contribute to climate change.
3. Low fuel costs

State **three** disadvantages of nuclear power.

State **three** disadvantages of nuclear power.

1. Produces nuclear waste which is harmful to humans & must be safely stored for centuries.
2. Non-Renewable energy source.
3. Risk of nuclear accidents, with fatal consequences on humans and the environment.

Give an example of a social factor which may act as a deterrent for certain types of energy production.

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- Visual Pollution
- Sound Pollution

(both of these are disadvantages of wind farms)