Your notes

GCSE Engineering: revision notes

Joining methods

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Permanent and temporary joints

- **Permanent joints** can't be taken apart without damage: **welding**, **brazing**, soldering, riveting and adhesives.
- Temporary (non-permanent) joints can be taken apart: nuts and bolts, machine screws and set screws.

Thermal joining

- **Welding** melts the edges of the **parent metals** so they fuse, usually with a filler rod. It is very strong. Types include MIG (a wire electrode fed through a gun with shielding gas), TIG (a tungsten electrode, for precise work) and oxy-acetylene gas **welding**.
- **Brazing** uses a brass filler that melts at a lower temperature; the **parent metals** don't melt. It is weaker than **welding**.
- **Soldering** uses a tin alloy filler at an even lower temperature. It is used for electronics and plumbing.

Mechanical fastenings and adhesives

- **Rivets** are permanent mechanical fasteners. Pop **rivets** can be fitted from one side, useful for hollow sections.
- Nuts, bolts and washers make strong **temporary joints**. Locking nuts and spring washers stop them loosening from vibration.
- Adhesives such as epoxy resin can join different materials and spread the load over a large area, but may need time to cure and careful surface preparation.

Welding safety

- Wear a **welding** mask with a tinted screen (to protect from UV light and sparks), leather gloves and an apron, and work in a ventilated area.

Key terms

Permanent joint	A joint that can't be taken apart without damage.
Temporary joint	A joint that can be taken apart, such as nuts and bolts.
Welding	Melting the parent metals so they fuse together.
Brazing	Joining metals with a brass filler, without melting the parent metals.
Soldering	Joining with a low-melting tin alloy, often for electronics.
Rivet	A permanent mechanical fastener.
Parent metal	The metal being joined.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. Which is a temporary joint?
2. What happens to the parent metals in welding?
3. How is brazing different from welding?
4. What is soldering mainly used for?
5. Why are pop rivets useful?
6. What does MIG welding use?
7. Why must welders wear a tinted mask?
8. What stops nuts loosening from vibration?

Answers

1. Nuts and bolts
2. They melt and fuse together
3. The parent metals don't melt
4. Electronics and plumbing
5. They can be fitted from one side
6. A wire electrode fed through a gun with shielding gas
7. To protect eyes from UV light and sparks
8. Locking nuts or spring washers

What to do next

Practise 10 questions on this topic

Try 3 exam questions, with mark schemes

Read the lesson, one step at a time

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