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Design & Technology
AQA GCSE

Composite materials

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary
- For the multiple choice questions, circle your answer

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don’t spend too much time on one question

Good luck!

Q1. Which one of the following is a composite material?

A Carbonfibre reinforced plastic (CRP)

B Graphene

C Titanium

Q2. GRP is a combination of which materials??

A Glass fibre and resin

B Wood fibre and resin

C Carbon fibre and resin

Q3. What is a suitable composite material for the body of a Formula 1 car?

A GRP

B GRC

C Lightweight ceramic

Q4. What is the primary purpose of combining materials in composites like carbon fibre reinforced plastic (CRP)?

A To reduce production costs

B To create a material that combines the best properties of each component

C To make the material biodegradable

Q5. Explain the meaning of ‘composite material’ **(2 marks)**

Q6. Explain how composite materials like glass reinforced plastic (GRP) are produced, and describe one advantage and one limitation of using composites **(4 marks)**

Answers

Q1. A
Q2. A
Q3. A
Q4. B

Q5.

- A mix of two of more materials (1)
- To produce a material with enhanced properties (1)

Q6.

Production Method (2 marks):

- A **matrix material** (e.g., plastic/resin) is combined with a **reinforcement material** (e.g., glass/carbon fibres).
- The fibres provide **strength/stiffness**, while the matrix **binds them together** and transfers loads.

Advantage (1 mark):

- **High strength-to-weight ratio** (lighter than metals but just as strong)
- **Corrosion resistance** (unlike metals)
- **Customisable properties** (by varying fibre orientation/materials)

Limitation (1 mark):

- **Expensive production** (vs traditional materials like steel)
- **Difficult to recycle** (mixed materials hard to separate)
- **Complex manufacturing** (requires skilled labour/special equipment)