

Design & Technology

AQA A-Level

Polymer finishing

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. What is a 'self-finishing' polymer?

- A** A polymer that requires additional coatings for protection
- B** A polymer that has an acceptable surface finish straight from production
- C** A polymer that can only be painted

Q2. Acrylic spray paints are commonly used on polymers because they:

- A** Chemically bond with the polymer surface
- B** Provide a durable, fast-drying finish
- C** Only work on thermosetting plastics

Q3. Thermoplastic elastomers (TPE) are often used in products like grips and seals because they:

- A** Are rigid and brittle
- B** Combine flexibility with durability
- C** Cannot be coloured during moulding

Q4. What is the purpose of adding pigments to polymers during moulding?

- A** To increase melting temperature
- B** To reduce production costs
- C** To provide colour without post-processing

Q5. Give three reasons why a gel coat is used when laminating a glass reinforced plastic (GRP) product **(3 marks)**

Q6. Explain why thermoplastic elastomer (TPE) is a suitable material for the manufacture of the grips in this grip strength training tool **(4 marks)**



Answers

Q1. B

Q2. B

Q3. B

Q4. C

Q5.

Gel coat:

- can be used to provide a pigment to the external surfaces of a GRP product
- may be enhanced with additives such as UV stabilisers to increase the durability of the GRP product
- provides a hard scratch resistant surface to a GRP product
- produces an impermeable coating which protects the GRP product from water damage
- provides a smooth flat surface that is capable of being polished to a high lustre.
- Is the first stage of the moulding process that ensures a smooth outer surface finish and aids the release of the moulding once cured.

Q6.

Thermoplastic elastomer (TPE)

- The TPE inserts provide a textured area where the user would interact with the grip tool, providing additional grip especially when the user may have damp/sweaty hands.
- The TPE insert would be soft and flexible, providing additional friction where the hands are
- TPE can be successfully over moulded over the HDPE body, preventing the two materials from becoming detached from each other.