

Design & Technology

AQA A-Level

Elastomers

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 property of elastomers allows them to return to their original shape after stretching?

- A** Plasticity
- B** Ductility
- C** Elasticity

Q2. Silicone is commonly used for baking moulds and medical implants. Which two properties make it suitable for these applications?

- A** High electrical conductivity and rigidity
- B** Non-toxicity and heat resistance
- C** Biodegradability and flexibility

Q3. Which elastomer is self-finishing, making it ideal for products requiring minimal post-processing?

- A** Natural rubber
- B** Neoprene
- C** Thermoplastic Elastomer (TPE)

Q4. The use of elastomers for ergonomic grips on tools primarily leverages their:

- A** High density and rigidity
- B** Soft texture and non-slip surface
- C** Electrical insulation properties

Q5. Explain why silicone is an appropriate material for the manufacture of the oven mitt **(6 marks)**

Q6. Explain why neoprene is a suitable material to manufacture a case to carry a laptop **(8 marks)**



Answers

Q1. C

Q2. B

Q3. C

Q4. B

Q5.

- Silicone is a flexible material that can be deformed under pressure and will return to its original shape when the pressure is released. This allows the user to easily grip pans, trays or tins of different shapes and sizes.
- The non-slip surface texture of the material enables hot items to be securely held.
- Additional texture or surface pattern can be added during the moulding process.
- The elastomer is an insulator and it is heat resistant to approx. 250C, protecting the user from being burnt by hot pans.
- The upper temperature range of 250C makes it suitable for use with most domestic ovens.
- Silicone can be injection moulded, allowing for the shape of the oven mitt to be easily produced.
- Silicone has good chemical resistance and is impermeable to water meaning that it will not be damaged by grease associated with cooking and can also be cleaned by detergents.
- Silicone is food safe meaning it will not cause an issue if contact with food is made.
- Silicone is a suitable material to be used in a dishwasher allowing for the mitt to be easily cleaned.
- Silicone can be easily pigmented so can be manufactured in a wide range of colours allowing consumers to match the mitt to other kitchen products.

Q6.

- Neoprene is an elastomer and will stretch around the laptop holding it securely.
- Neoprene is soft so will not scratch the screen or casing of the laptop.
- It is thin and lightweight so does not add unnecessary bulk when being used.
- It is available in a wide range of colours.
- It is available in a range of thicknesses for different applications.

- The neoprene can be printed on and logos or branding applied.
- Fixings such as zips and poppers can be stitched into the fabric.
- Neoprene is water repellent, protecting the product from small spillages.
- Laptops are often carried and are fragile devices that require a protective sleeve to prevent damage. Neoprene will help prevent damage from impact if dropped.
- The case can be used as a protective surface to rest the laptop on when not in use