

Design & Technology

AQA GCSE

Polymers

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 thermoforming polymer?

- A** Polyester resin (PR)
- B** High density polythene (HDPE)
- C** Epoxy resin (ER)

Q2. Which plastic is used for drinks bottles because it's lightweight, clear and recyclable?

- A** Acrylic (PMMA)
- B** High impact polystyrene (HIPS)
- C** Polyethylene terephthalate (PET)

Q3. What would you choose to make a school ruler that needs to be tough but flexible?

- A** Polypropylene (PP)
- B** Polyvinyl chloride (PVC)
- C** Phenol formaldehyde (PF)

Q4. What material is best for a see-through phone case?

- A** Acrylic (PMMA)
- B** High impact polystyrene (HIPS)
- C** Polyethylene terephthalate (PET)

Q5. Which material would a dentist use for strong tooth fillings?

- A** Epoxy resin (ER)
- B** Acrylic (PMMA)
- C** High density polythene (HDPE)

Q6. What plastic is used for electrical plug casings?

- A** Urea-formaldehyde (UF)
- B** Polypropylene (PP)
- C** Polyester resin (PR)

Q7. High density polyethylene (HDPE) is widely used in the manufacture of household box bottles and containers such as those used to store bleach.

Give two detailed reasons why HDPE is suitable for this type of packaging **(2 x 2 marks)**

Answers

Q1. B

Q2. C

Q3. A

Q4. A

Q5. A

Q6. A

Q7.

Reasons making HDPE suitable for household bottles and containers are:

- Moisture resistance – they do not dissolve in water, become soggy and leak.
- Chemical resistance – do not react with contents.
- Durability – can be dropped without breaking.
- Can be recycled – now widely recycled and used in different polymer products saving finite resources.
- Ability to recycle means less materials and energy are used in primary processing of raw materials.
- Can be self-coloured during manufacture – finish does not wear away as it is a full depth feature.
- Manufactured in one piece, eg injection moulding lid parts, blow moulding bottle body, so a fast process making it more commercially viable for mass production.
- Mould can incorporate integral ergonomic handles, eg milk containers, detergent bottles, using material for two purposes.
- One material used in construction so no need to separate different materials for recycling.
- In some applications containers can be refilled and reused making it better for the environment.