

OCR A-Level

Thermoplastics and Thermosetting Plastics (5.2a v)

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 of these polymers is a thermoset and cannot be remoulded after initial curing?

- A** PET
- B** Polypropylene
- C** Epoxy resin

Q2. A manufacturer needs to produce disposable, clear drink bottles that are lightweight and have good gas barrier properties. Which polymer is most suitable?

- A** PVC
- B** PET
- C** Polystyrene

Q3. Which polymer is known for its high impact resistance, toughness, and is commonly used in LEGO bricks and automotive trim?

- A** ABS
- B** Urea formaldehyde
- C** LDPE

Q4. The primary chemical difference that makes a thermosetting polymer irreversible upon heating is:

- A** The presence of cross-links between polymer chains
- B** A lower melting temperature
- C** A higher degree of crystallinity

Q5. The image below shows a hearing aid.



Identify a suitable specific material for the ear mould.

Justify your answer. **(2 marks)**

Q6. The image below shows an electric iron.



Q6a. Identify a suitable thermopolymer for the body of the iron **(1 mark)**

Answers

Q1. C

Q2. B

Q3. A

Q4. A

Q5.

Possible materials may include:

- Acrylic (1).
- Silicone (1).
- PVC (1).

Any other valid suggestion.

Justification for Silicone as an example:

- Flexible so it can fit into the ear comfortably (1).
- Transparent so that it can be discretely fitted (1).
- Malleable/ can be moulded to shape so it can be formed into the shape of ear (1).
- Any other valid suggestion.

Accept reference to flexibility if PP, LDPE, PVC or LSR (silicone rubber).

Q6a.

Possible materials may include:

- ABS (1)
- PP (1)

Any other suitable response LDPE, acrylic, PVC and PET are unsuitable due to the casing needing to be rigid.

Q6b.

Suitable manufacturing method:

- Injection moulding (1).

Justifications may include:

- Intricacies and level of detail/ complexity of the moulding (1).
- Type of product and quantity to be manufactured/ commercial/ mass/ automated production (1).

Two part moulding with reference to the colours in the iron is acceptable.
Any other suitable response.

Q7.

This question is about the suitability of polymer-based materials for children's toys during play activities. Creditworthy responses will make connections which show understanding of factors that need to be considered, going beyond general knowledge.

Candidates might refer to the following in their responses:

- Use of colour
- Ease of cleaning
- Hygiene
- Health concerns
- Inert material
- Cost
- Realism / detail
- Toughness
- Durability
- Strength
- Weight
- Age of user
- Hand to mouth issues
- Learning aids
- Anthropometrics / ergonomics / surface textures / feel