Design & Technology
(Product Design)

DTBase©

OCR A-Level

Methods of Joining Materials (7.2a)

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 the following is an example of a **permanent joint**?

A Screws

B Bolts

C Mortise and tenon joint

Q2. Which of these is typically used for **temporary or semi-permanent joints**?

A Adhesives

B Nuts and bolts

C Welding

Q3. Which method joins materials by **using heat or adhesives**?

A Spot welding

B Knock-down fittings

C Riveting

Q4. Which of the following is an example of using **standard components and fixings**?

A Brazing

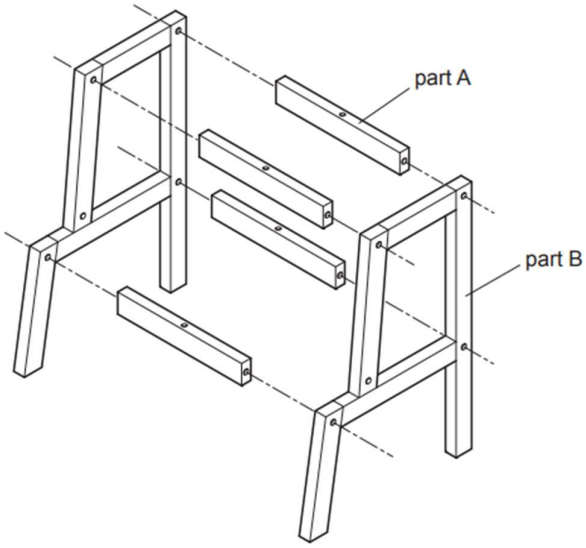
B Hinges and screws

C Epoxy resin

Q5. The image shows a frying pan.

Use annotated sketches and/or notes to show how part B would be manufactured and permanently joined to part A. Identify any relevant specialist tooling and quality control checks. **(5 marks)**

Q6. The image shows an exploded diagram of the step stool framework.



Q6a. Identify a suitable standard fixing or component that could be used to join part A to part B as shown in the image **(1 marks)**

Q6b. Give two benefits to the manufacturer of using standard fixings or components. Justify each of your answers. **(4 marks)**

Answers

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

Q5.
Indicative content:

The candidate is expected to demonstrate their understanding of the process involved through a series of annotated sketches and/or notes. There may be variations to the process as indicated but to get into L3 candidates must demonstrate a clear understanding of the end to end process.

Process:

- Aluminium sheet prepared
- Handle stamped, hydraulic press to create the blank
- Sheet metal clamped over female die (shape of part A)
- Hydraulic male die pushes blank into female die with a punch
- Holes punched in pan (Give credit if this is stated in part i)
- Holes punched in handle
- Holes aligned and clamped into place
- Rivet shaft inserted
- Set is placed over the head of the rivet
- Rivet shaft hammered compressing the two parts together
- Parts riveted together
- Joint checked for strength and removed & recycled if doesn't pass checks
- Reference made to batch manufacture

Any other valid suggestion

Q6a.
Possible standard fixings or components may include:

- Cam lock/ Cam fitting (1).
- Barrel nut and bolt (1).
- Modesty block / corner block (1).
- Screw (1).
- Any other valid suggestion.

Q6b.

Possible benefits to the manufacturer may include:

- Standard fixings/components could be bought in bulk/at a lower cost (1) saving the manufacturer money as they are already made (1).
- Standard fixings/ components do not need to be manufactured (1) saving the manufacturer time (1).
- Less skilled workers are needed to make standard fixings/ components (1) therefore saving the manufacturer money (1).
- Any other valid suggestion.