OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
General Certificate of Secondary Education

DESIGN & TECHNOLOGY
INDUSTRIAL TECHNOLOGY

1959/4

PAPER 4 Higher Tier
Wednesday **14 JUNE 2006** Afternoon 1 hour 15 minutes
Candidates answer on the question paper.
No additional materials are required.

Candidate Name

Centre Number

Candidate Number

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and candidate number in the boxes above.
- Answer **all** questions.
- Write your answers in the spaces provided on the question paper.
- Use blue or black ink. Pencil may be used for diagrams only.
- Do not write in the bar code. Do not write in the grey area between the pages.
- **DO NOT** WRITE IN THE AREA **OUTSIDE** THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- All dimensions are in millimetres.
- Assume any mechanical system to be 100% efficient.

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
TOTAL	

This question paper consists of 12 printed pages.

SP (DR/DR) S98355/5

[Turn over

1 Fig. 1 shows a nameplate for an office door. It has been made using a computer controlled router.

Fig. 1

(a) (i) Give **two** reasons why a computer controlled machine would be suitable for making the nameplate.

Reason 1 _____[1]

Reason 2 _____[1]

(ii) Give the name of **two** other workshop machines that can be computer controlled.

Machine 1 _____[1]

Machine 2 _____[1]

(b) The manufacturers have noticed that the quality of the finished nameplates has deteriorated during batch production.

Give **two** quality control checks that could be carried out to help prevent any deterioration during manufacture.

Check 1 _____[1]

Check 2 _____[1]

(c) Another company is about to install CAM equipment in their manufacturing plant.

Explain **two** issues that the company must consider before installing the CAM equipment.

Issue 1 _____

_____

_____[2]

Issue 2 _____

_____

_____[2]

[Total: 10]

2 Fig. 2 shows a thin polystyrene knife made for fast food restaurants. Due to the quantities required it must be very cheap to produce.

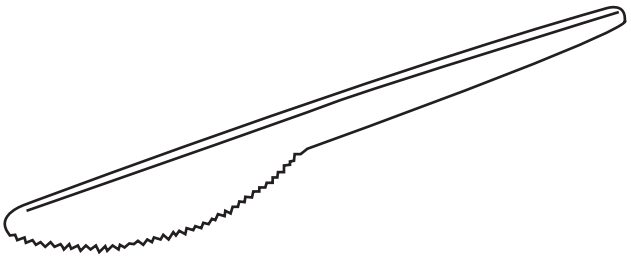


Fig. 2

Fig. 3 shows that during use the knife bends and is hard to control.

An image has been removed due to third party copyright restrictions

Details:

An image of a plastic knife cutting into an onion

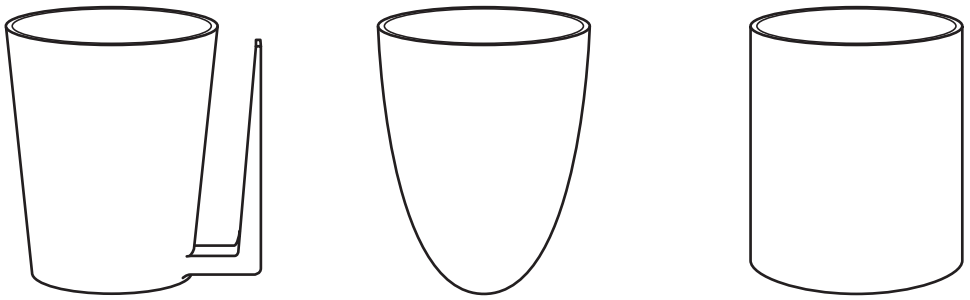
Fig. 3

(a) Using sketches and notes, show how the knife can be improved.

The knife must:
- be more rigid;
- be very cheap to produce;
- be made out of polystyrene.

[3]

Fig. 4 shows three disposable plastic cups designed for the same fast food restaurants.



cup **A** cup **B** cup **C**

Fig. 4

Each of the cups has a design fault.

(b) State a design fault on each of the cups.

Cup **A** _____[1]

Cup **B** _____[1]

Cup **C** _____[1]

(c) Using sketches and notes, show how the design of cup **C** can be improved.

[2]

The company has a reputation for being 'environmentally friendly'.

(d) Explain how disposable cups may affect this reputation.

_____

_____[2]

[Total: 10]

3 Fig. 5 shows a hook manufactured from 3mm diameter mild steel rod.

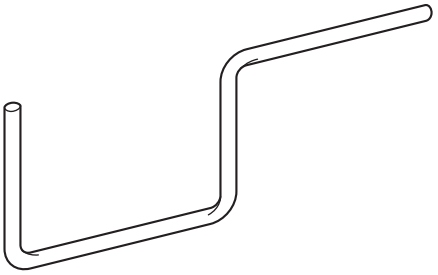


Fig. 5

(a) Using sketches and notes, show a design for a jig.

The jig must:
- enable the mild steel rod to be cut to the correct length;
- allow a single hook to be bent to shape.

[4]

(b) Ten hooks are to be brazed into a pre-drilled mild steel plate as shown in Fig. 6.

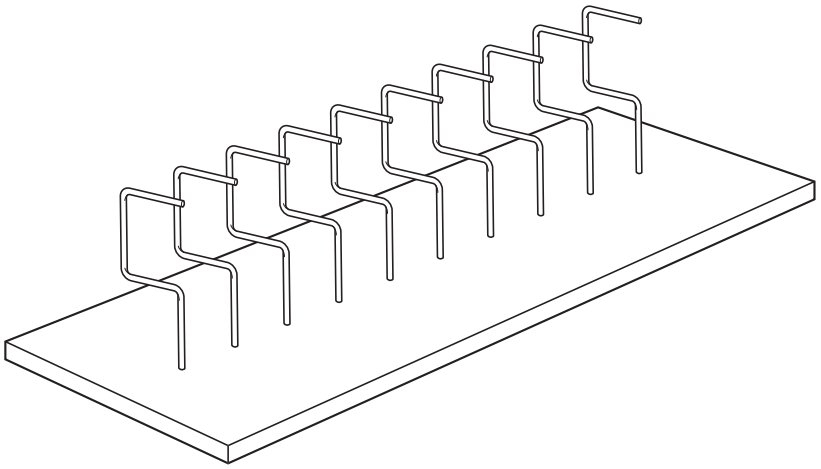


Fig. 6

State **three** preparation stages required **before** brazing.

Stage 1 _____[1]

Stage 2 _____[1]

Stage 3 _____[1]

The completed unit is to be finished using a plastic powder coating.

(c) Describe the stages of powder coating the completed unit.

_____

_____

_____

_____

_____[3]

[Total: 10]

4 Fig. 7 shows a heavy-duty cutting knife.

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Details:

An illustration of a heavy duty knife

Fig. 7

(a) It is important to consider safety in the design of the cutting knife.
Give two health and safety specification points.

Point 1 _____[1]

Point 2 _____[1]

(b) The two-part body of the knife is to be produced by the die-casting process.

Describe the die-casting process.

_____

_____

_____

_____[3]

In order to change the blade, the manufacturers of the knife have decided to replace the cross-headed screw **A** with a quick release mechanism requiring no other tools for its operation.

(c) Using sketches and notes, show a design for the quick release mechanism.

The quick release mechanism must:
- hold the two part body together securely;
- allow for the easy changing of blades.

[5]

[Total: 10]

5 Fig. 8 shows a DVD case. It has been injection moulded in large quantities from polypropylene.

Fig. 8

(a) Give two reasons why the case has been injection moulded.

Reason 1 _____

_____[1]

Reason 2 _____

_____[1]

(b) It has been found that the first batch of DVD cases has a manufacturing fault and will not hold the disc securely.

Explain the possible reasons for the fault.

_____

_____

_____

_____

_____[3]

(c) Fig. 9 shows an acrylic DVD rack. It has been manufactured using a computer controlled laser cutter and a robotic line bender.

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Details:

An image of of a DVD rack

Fig. 9

Explain how new technology has improved the manufacture of the DVD rack.

_____

_____

_____

_____[2]

(d) In comparison to volume production some products are handmade.

Explain why some products are handmade.

_____

_____

_____

_____

_____[3]

[Total: 10]