



GENERAL CERTIFICATE OF SECONDARY EDUCATION

DESIGN AND TECHNOLOGY

A544

Industrial Technology

Technical Aspects of Designing and Making

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:
None

Thursday 17 June 2010
Morning

Duration: 1 hour 15 minutes



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions in Section A **and** Section B.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

INFORMATION FOR CANDIDATES

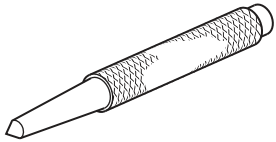
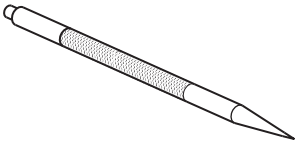
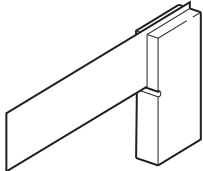
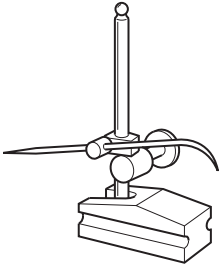
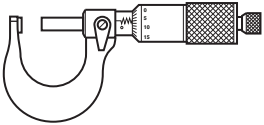
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- All dimensions are in millimetres.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
- This document consists of **12** pages. Any blank pages are indicated.

Section A

Answer **all** questions.

1 The table below shows tools used for measuring and marking out.

(a) Complete the table with the name of each tool and what the tool is used for.
The first one has been done for you.

TOOL	NAME OF TOOL	USE OF TOOL
	<p>Centre Punch</p>	<p>Used to mark the centre of a hole before drilling</p>
		
		
		<p>Used on a surface plate for marking parallel lines</p>
		

[7]

(b) Give **two** reasons why a centre punch must be used to mark the centre of a hole before drilling.

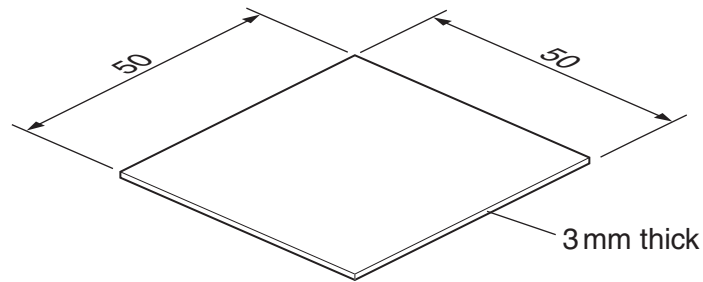
Reason 1

.....

Reason 2

..... [2]

(c) Use sketches and notes to show how a $\varnothing 45$ circle could be marked out centrally on the piece of 3 mm thick mild steel shown below.



[3]

[Total: 12]

2 Fig. 1 shows a key rack.

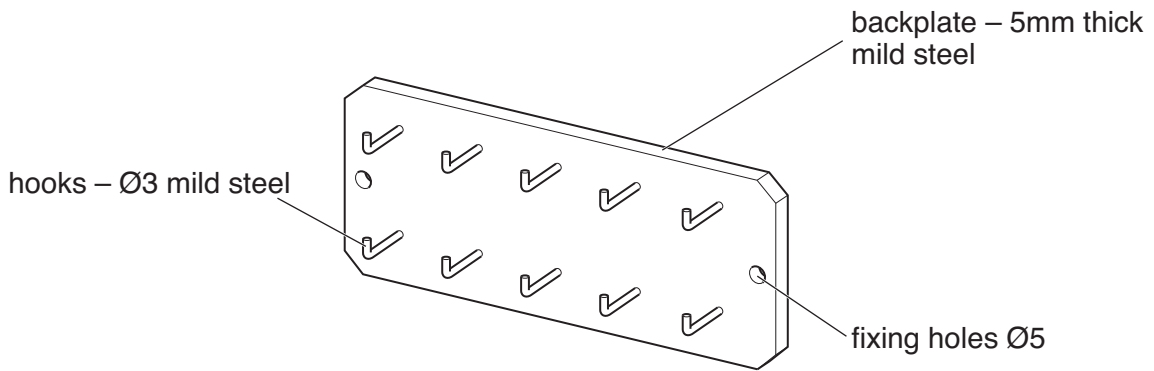


Fig. 1

(a) Give **three** safety precautions that should be taken when using a drilling machine.

1.
2.
3. [3]

The hooks are brazed into $\varnothing 3$ holes drilled in the backplate of the key rack.

(b) Complete the list below to show the stages needed to braze the hooks into the backplate. Two stages have been completed for you.

Stage 1 Drill the holes in the backplate

Stage 2

Stage 3

Stage 4

Stage 5

Stage 6

Stage 7 Clean with wire brush and emery cloth

[5]

(c) One of the hooks for the key rack is shown in Fig. 2.

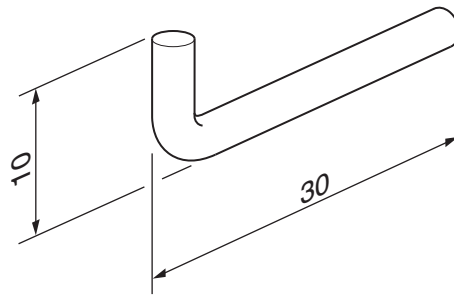


Fig. 2

When making batches of the key rack, a jig is needed to produce the hooks.

Use sketches and notes to show a jig that could be used to make a batch of hooks from lengths of $\text{Ø}3$ mild steel rod.

The jig must:

- locate and hold the $\text{Ø}3$ mild steel rod for bending
- allow each hook to be bent to the correct shape
- allow the stem of each hook to be cut to the correct length.

[4]

[Total: 12]

Turn over

- 3 Fig. 3 shows a display stand for perfume bottles.

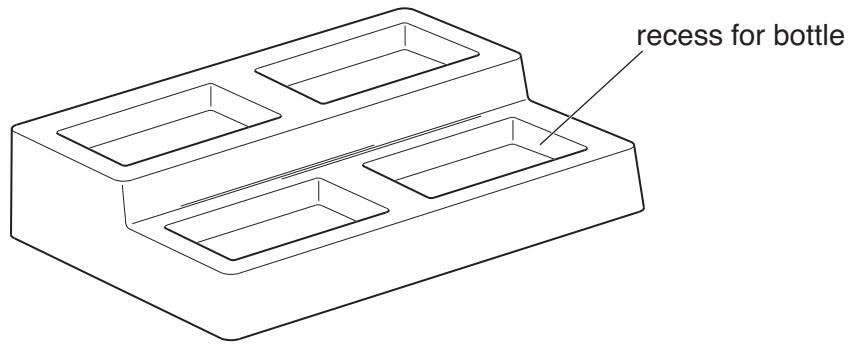


Fig. 3

- (a) The display stand has been made by vacuum forming 1 mm thick HIPS.

State what the letters HIPS stand for.

H..... I..... P..... S..... [1]

- (b) Give **one** reason why vacuum forming is a suitable process for making the display stand.

.....
 [1]

- (c) In the space below use sketches and notes to show the important features of a vacuum forming mould.

[3]

(d) Complete the list below to show the stages needed to produce a vacuum formed item. Three stages have been completed for you.

- 1. Position mould in vacuum forming machine.
- 2. Clamp sheet of plastic in place.
- 3.
- 4.
- 5.
- 6.
- 7. Remove finished vacuum formed item. [4]

(e) The display stand shown in Fig. 3 was designed using CAD and a prototype was made by 'rapid prototyping'.

Explain the main features of a rapid prototyping system you are familiar with.

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..... [3]

[Total: 12]

Section B

Answer **all** questions

4 Fig. 4 shows two cordless electric kettles fitted to their power bases.

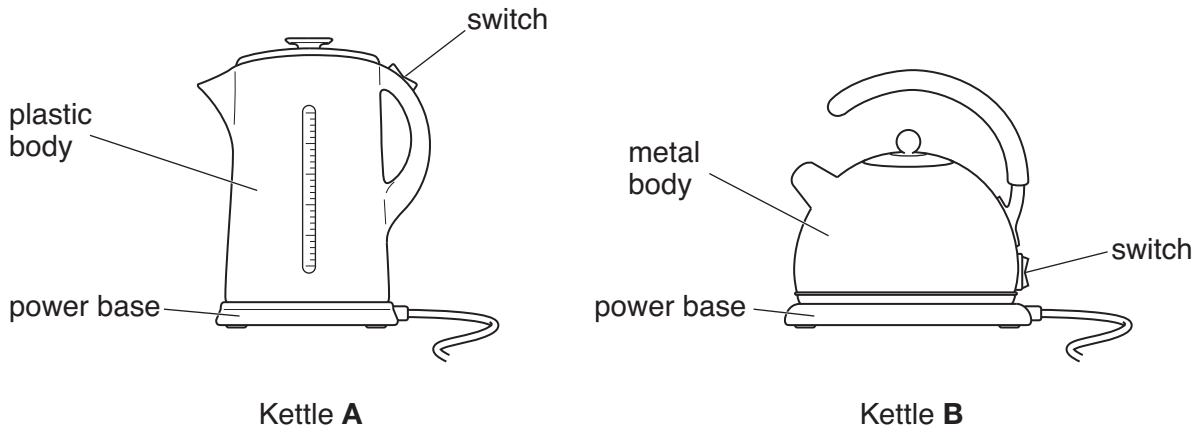


Fig. 4

(a) (i) Name **one** specific plastic suitable for making the body of kettle **A**.

..... [1]

(ii) Name the industrial process used to manufacture the body of kettle **A**.

..... [1]

(b) Give **two** advantages to the **user** of kettle **A** compared with kettle **B**.

1.

.....

2.

..... [2]

(c) Explain how ergonomic principles can be used in the design of an electric kettle.

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..... [2]

(d*) Discuss the implications for manufacturers in considering ‘**end of life disposal**’ when designing products.

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[Total: 12]

- 5 Fig. 5 shows a portable hanging rack used on market stalls. The parts of the rack are made from 30 mm square aluminium alloy tubing.

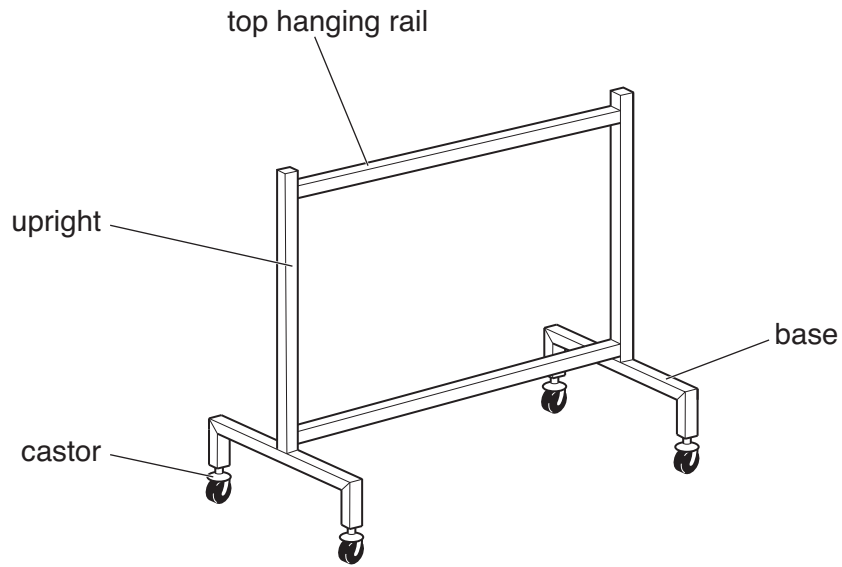


Fig. 5

- (a) Name the industrial process used to produce the aluminium alloy tubing for the hanging rack shown in Fig. 5.

..... [1]

- (b) The parts for the hanging rack are manufactured using the batch production method.

Explain why the batch production method is used.

.....
.....
..... [2]

- (c) The hanging rack is supplied as a flat pack containing separate uprights, bases and hanging rails.

In the space below, use sketches and notes to show how the top hanging rail could be joined to one of the uprights.

The joint must allow for quick assembly and disassembly.

[3]

- (d*) Explain the benefits of manufacturing the hanging rack as a flat pack product.

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[6]

[Total: 12]



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