THIS IS A NEW SPECIFICATION

OCR
RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION

DESIGN AND TECHNOLOGY A544

Industrial Technology

Technical Aspects of Designing and Making

OCE/16183

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:
None

Monday 18 January 2010
Afternoon

Duration: 1 hour 15 minutes

A544

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

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.

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 Fig. 1 shows hand tools used in the school workshop.

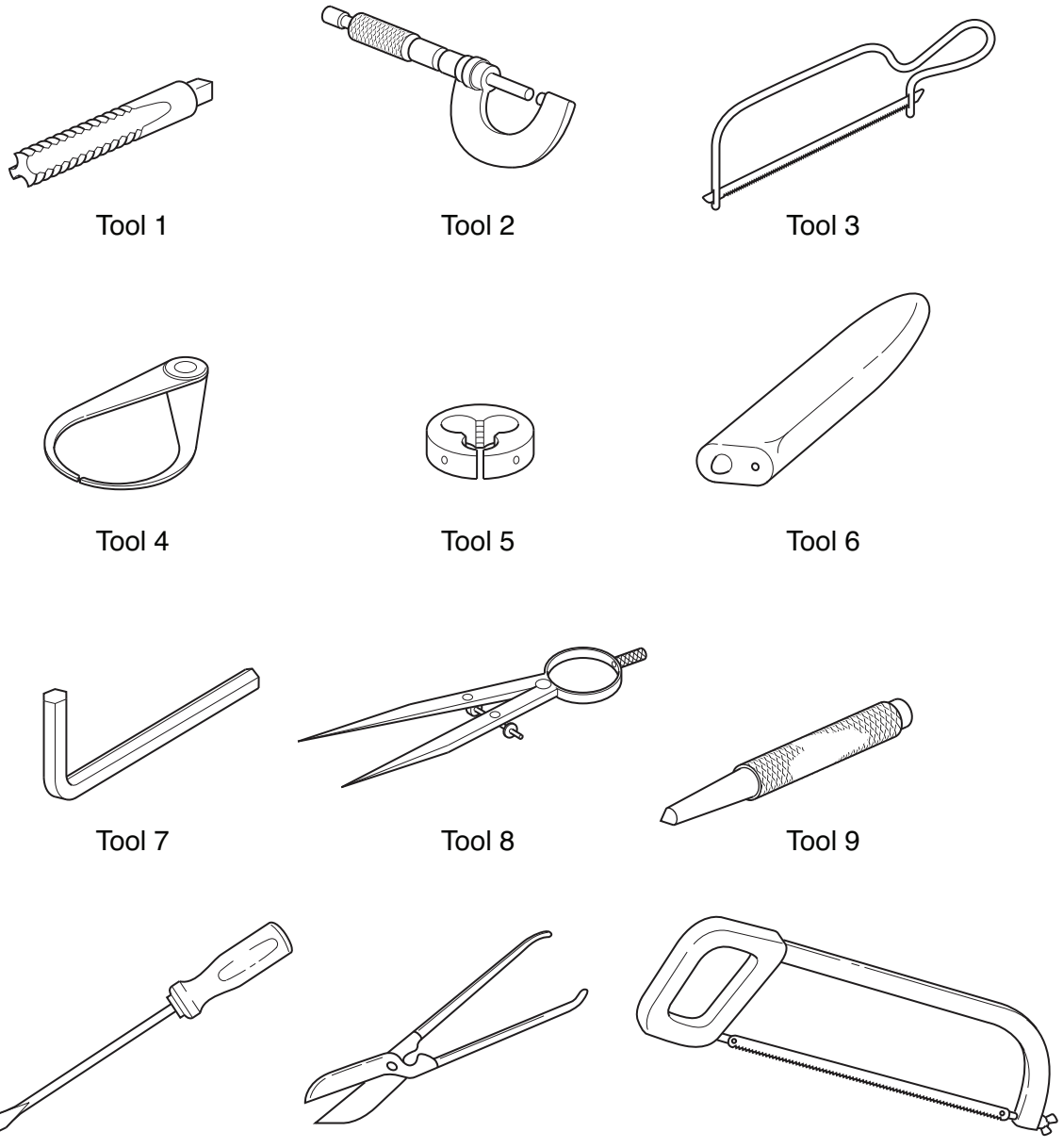


Fig. 1

(a) Complete the table below to show the tool number and correct name of the tool used to carry out each of the processes listed. The first one has been done for you.

Process	Tool No.	Correct Name of Tool
Forming the head of a snap head rivet	6	Rivet set and snap
Marking the position of a hole ready for drilling		
Cutting through 3 mm diameter steel wire		
Cutting a screw thread in a hole		
Accurately measuring the thickness or diameter of a piece of metal		
Marking circles and curves on metal		

[10]

(b) Fig. 2 shows an engineer's bench vice made from cast iron.

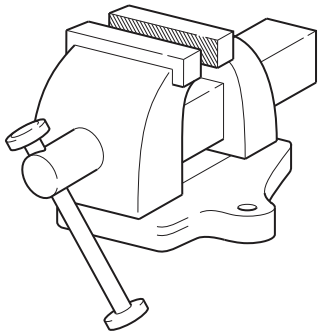


Fig. 2

Give **two** reasons why cast iron is a suitable material for an engineer's bench vice.

Reason 1 .....

..... **[1]**

Reason 2 .....

..... **[1]**

[Total: 12]

2 Fig. 3 shows a pulley support bracket produced in a school workshop.

The bracket is made from a blank of mild steel sheet 140 × 80 × 2 mm thick.

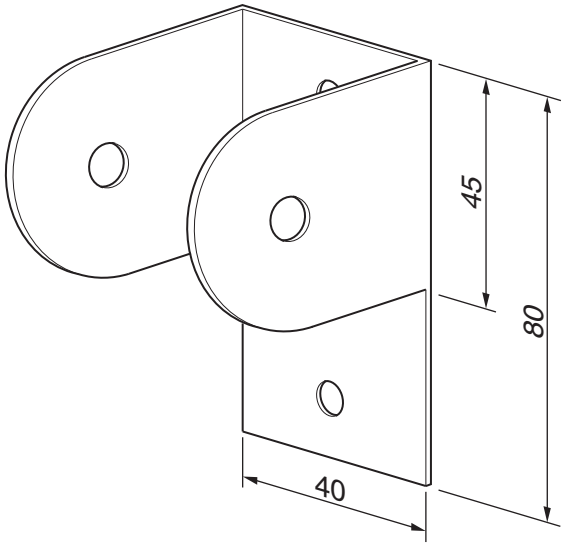
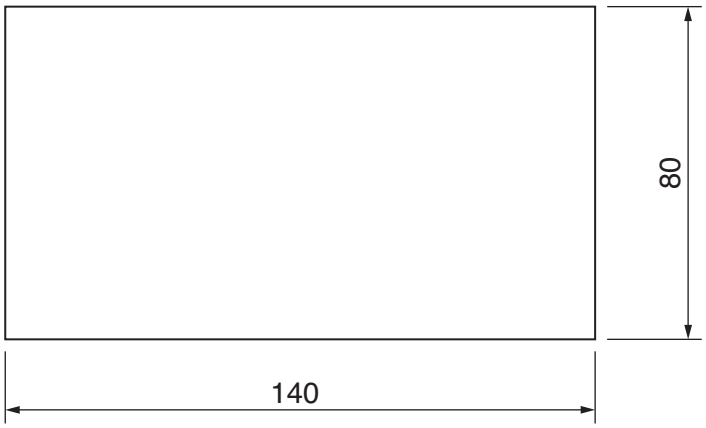


Fig. 3

(a) (i) Draw the net (development) of the pulley bracket on the blank shown below.



[2]

(ii) Name **one** device that could be made to help mark out batches of the pulley bracket.

..... **[1]**

(iii) Give **two** ways of making lines stand out more clearly when marking out metal.

1. ..... **[1]**

2. ..... **[1]**

(iv) Name **three** cutting tools that could be used when cutting out the shape of the net for the pulley bracket.

1. ..... **[1]**

2. ..... **[1]**

3. ..... **[1]**

(b) In the space below use sketches and notes to show how the net could be bent into the shape of the pulley bracket shown in Fig. 3.

[3]

(c) Name the industrial process that would be used to manufacture the mild steel pulley bracket in large quantities.

..... **[1]**

[Total: 12]

3 Fig. 4 shows a plant pot holder that can be fixed to a wall.

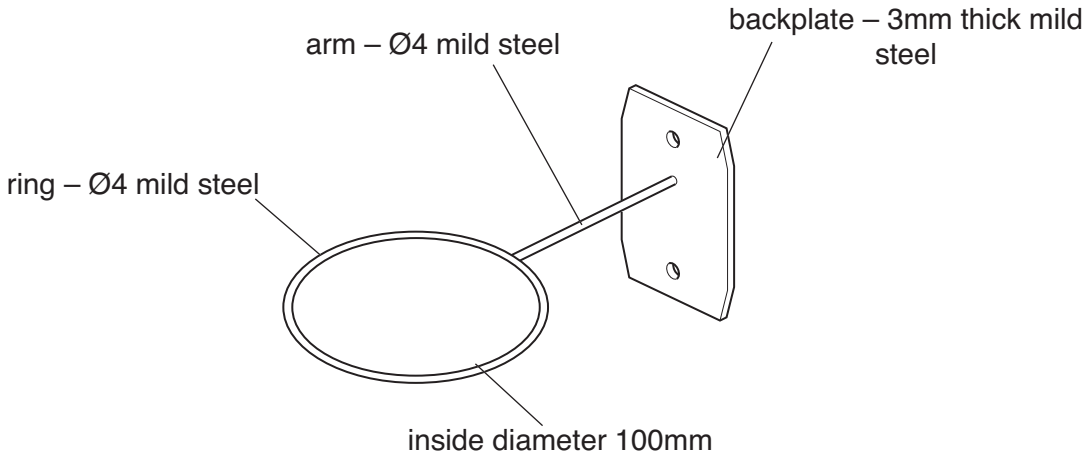


Fig. 4

(a) Complete the list below to give the stages needed to produce **one** of the angled corners of the backplate shown in Fig. 4. Two have been completed for you.

Stage 1 Mark out the shape of the corner onto the metal

Stage 2 .....

Stage 3 .....

Stage 4 .....

Stage 5 Smooth off finished shape with emery cloth

[3]

(b) Name **two** processes that would be suitable for permanently joining the arm to the backplate.

1. ..... **[1]**

2. ..... **[1]**

(c) Give **one** suitable finish, other than paint, for the mild steel plant pot holder.

..... **[1]**

(d) A batch of 50 plant pot holders is to be made.

In the space below use sketches and notes to show a jig that could be used when sawing the ∅4 arms to length.
The jig must:

- ensure that all the arms are cut to the correct length;
- hold the ∅4 bar securely for sawing;
- ensure that the ends of the bar are square to the sides.

[4]

(e) The arm of the plant pot holder is found to bend when in use.

In the space below use sketches and notes to explain how you would stop the arm from bending.

[2]

[Total: 12]

Section B

Answer **all** questions

4 Fig. 5 shows a mug designed for a young child. The mug is to be produced from injection moulded plastic.

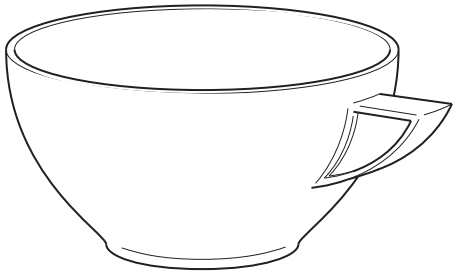


Fig. 5

(a) The mug has been designed using CAD.

Give **two** benefits to the designer of using CAD.

1. ..... **[1]**

2. ..... **[1]**

(b) When the prototype is tested, the mug shown in Fig. 5 is found to be unsatisfactory.

In the space below, use sketches and notes to explain how the mug could be made more suitable for a young child.

[2]

(c) Many products now make use of 'Smart' materials.

Name a 'Smart' material and state how it could be used to improve a mug for a young child.

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

(d*) Discuss the effects that the manufacturing of plastic products might have on the environment.

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..... **[6]**

[Total: 12]

5 Many different methods are used in modern manufacturing.

(a) Give **two** factors a manufacturer must consider when deciding whether to make a product by one-off, batch or high volume production methods.

1. ..... **[1]**

2. ..... **[1]**

(b) Explain how the 'Just-in-time' (JIT) manufacturing system operates.

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..... **[3]**

(c) Robots are used to perform many different tasks in the manufacturing industry.

Give **one** example of a process often carried out by robots.

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..... **[1]**

(d*) Discuss the issues a manufacturer would consider when introducing the use of robots.

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..... **[6]**

[Total: 12]

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