

**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 16 June 2011**  
**Morning**

**Duration: 1 hour 15 minutes**



|                       |  |                      |  |
|-----------------------|--|----------------------|--|
| Candidate<br>forename |  | Candidate<br>surname |  |
|-----------------------|--|----------------------|--|

|               |  |  |  |  |  |                  |  |  |  |  |
|---------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre number |  |  |  |  |  | Candidate number |  |  |  |  |
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- 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).
- Answer **all** the questions in Section A **and** Section B.
- Do **not** write in the bar codes.

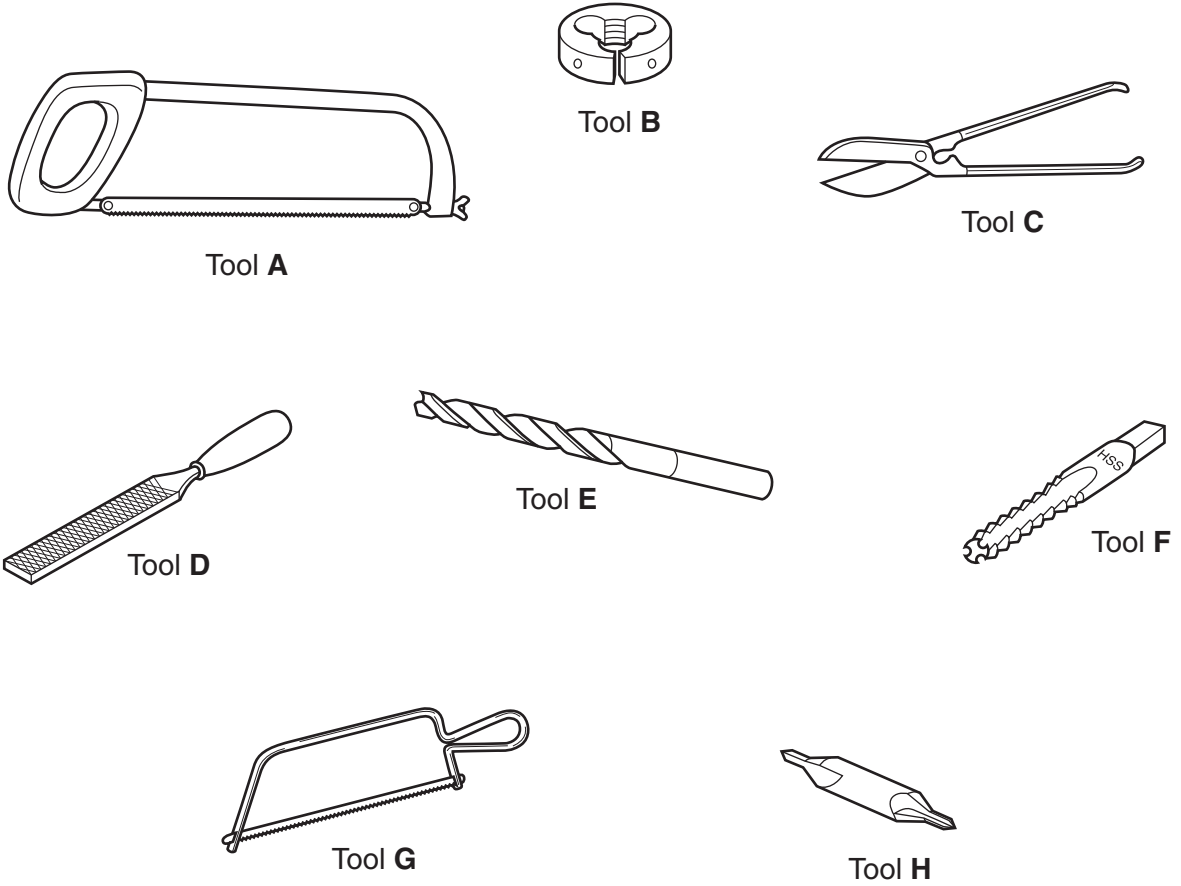
**INFORMATION FOR CANDIDATES**

- 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 (a) Fig. 1 shows tools used in the school workshop.



**Fig. 1**

(i) Give the correct names of the tools below. The first one has been done for you.

- Tool A ..... **Hacksaw** .....
- Tool B .....
- Tool C .....
- Tool D .....
- Tool E .....
- Tool F..... [5]

(ii) Complete the table below to show which tool from Fig. 1 would be used for the processes given. The first one has been done for you.

| Process                                       | Tool |
|-----------------------------------------------|------|
| Cutting through 12mm thick round bar          | A    |
| Starting off a hole on a centre lathe         |      |
| Cutting a screw thread on a round bar         |      |
| Cutting shapes out of 1 mm thick copper sheet |      |

[3]

(b) Many cutting tools are made from HSS.

State what the letters HSS stand for.

H.....S.....S..... [1]

(c) Some cutting tools need to be hardened and tempered.

Explain what is meant by hardening and tempering.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 12]

2 Fig. 2 shows a fixing plate and the mild steel blank from which it is made.

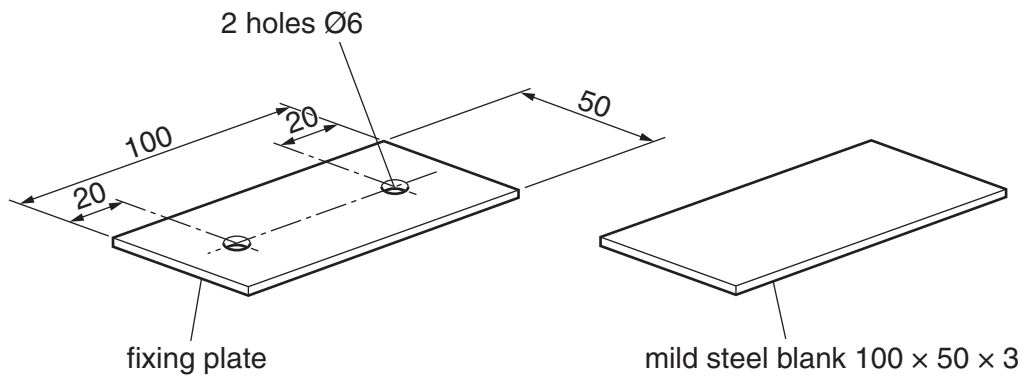


Fig. 2

(a) Complete the table below by giving the stages needed to mark out the fixing plate shown in Fig. 2 ready for drilling. Give the names of tools or equipment needed at each stage.

|   | Stage                                  | Tools or Equipment |
|---|----------------------------------------|--------------------|
| 1 | Apply layout fluid to the blank        | Brush              |
| 2 | Mark the centre line along the blank   |                    |
| 3 |                                        |                    |
| 4 |                                        |                    |
| 5 | Clean the marking fluid from the steel | Emery cloth        |

[5]

(b) The two holes in the fixing plate are drilled Ø6.

Explain why the fixing plate needs to be clamped securely before the holes are drilled.

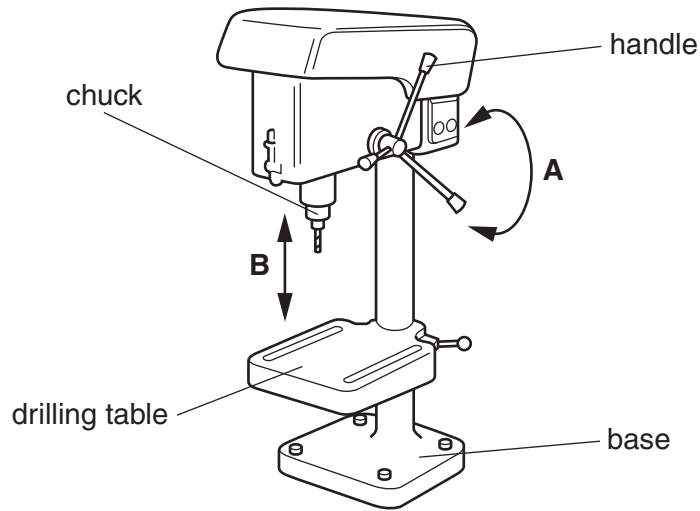
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.....

.....

..... [2]

(c) Fig. 3 shows a bench drilling machine.



**Fig. 3**

(i) The drilling table and base of the drilling machine are made from cast iron.

Give **two** reasons why cast iron is a suitable material for the drilling table and base.

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

(ii) The handle is used to move the chuck up and down as shown in Fig. 3.

State the types of motion shown by arrows **A** and **B** in Fig. 3.

- A** .....
- B** ..... [2]

(iii) Name a mechanism that could be used to change the motion at arrow **A** into the motion at arrow **B**.

..... [1]

**[Total: 12]**

- 3 A house number plate is shown in Fig. 4. The number plate has been made from brass by the sand casting process.

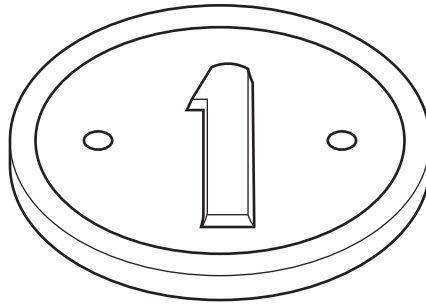


Fig. 4

- (a) Brass is a non-ferrous alloy.

Explain the term 'non-ferrous alloy'.

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

- (b) Give **two** reasons why sand casting is a suitable process for making the number plate shown in Fig. 4.

Reason 1 .....

.....

Reason 2 .....

..... [2]

- (c) A pattern is used to make the mould for sand casting.

Give **two** important features of a sand casting pattern.

Feature 1 .....

.....

Feature 2 .....

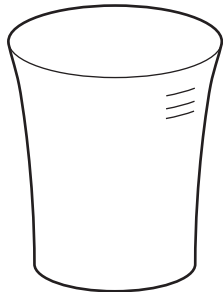
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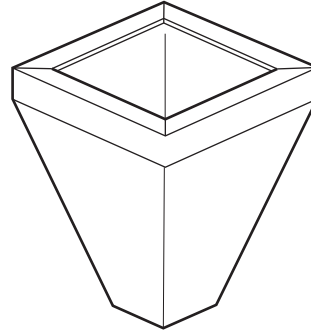
Section B

Answer **all** questions.

4 Fig. 5 shows two waste bins.



waste bin **A**  
polypropylene



waste bin **B**  
1.6 thick mild steel

Fig. 5

(a) Name **one** suitable industrial process for manufacturing bin **A** in large quantities.

..... [1]

(b) (i) Give **one** reason why polypropylene is a suitable material for making bin **A**.

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

(ii) State **one** suitable finishing process for bin **B**.

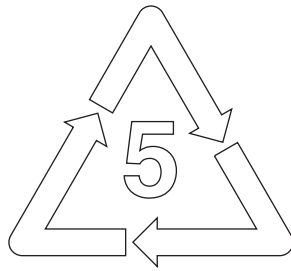
..... [1]

(c) Explain why bin **A** would be cheaper to mass produce than bin **B**.

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



(d) The symbol shown in Fig. 6 is found on waste bin **A**.



**Fig. 6**

State **two** pieces of information given by the symbol shown in Fig. 6.

- 1. ....
- 2. .... [2]

(e) Waste bin **B** is unstable and also difficult to empty.

Use sketches and notes to show how waste bin **B** can be modified to overcome these faults.

[4]

[Total: 12]

5 Fig. 7 shows a bodyshell for a child's toy car. It is made by vacuum forming.

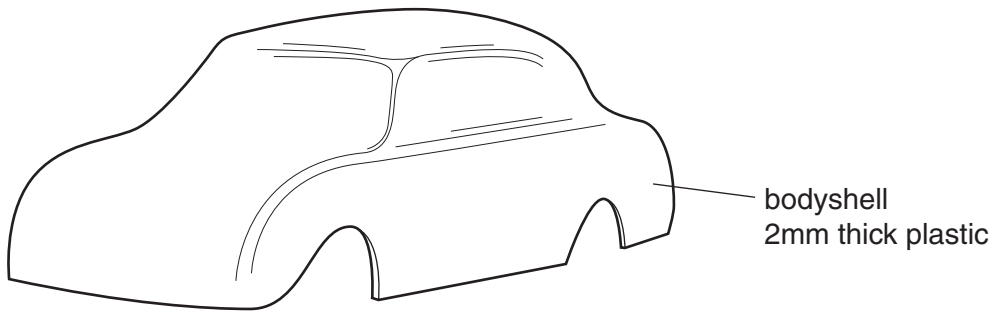


Fig. 7

(a) Explain how CAD/CAM could be used to design and make the mould for the bodyshell.

.....

.....

.....

.....

.....

..... [3]

(b) Use sketches and notes to show how the bodyshell shown in Fig. 7 could be produced by vacuum forming.

[3]



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