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**METALWORK**

**6040/01**

Paper 1 Theory, Drawing and Design

**October/November 2008**

**2 hours 45 minutes**

Additional Materials:     A2 Drawing Paper (1 sheet)  
                                  Answer Paper  
                                  Standard drawing equipment



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**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen.  
You may use a soft pencil for any diagrams, graphs or rough working.  
Do not use staples, paper-clips, highlighters, glue or correction fluid.

**Section A**

Answer any **three** questions.  
Write your answers on the separate Answer Paper provided.

**Section B**

Answer **all** questions.  
Use the A2 sheet of Drawing Paper prepared prior to the examination for your answers.  
All dimensions are in millimetres unless otherwise stated.

At the end of the examination, fasten together the separate Answer Paper for Section A and place it within your folded Drawing Paper for Section B.  
The number of marks is given in brackets [ ] at the end of each question or part question.

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This document consists of **9** printed pages and **3** blank pages.



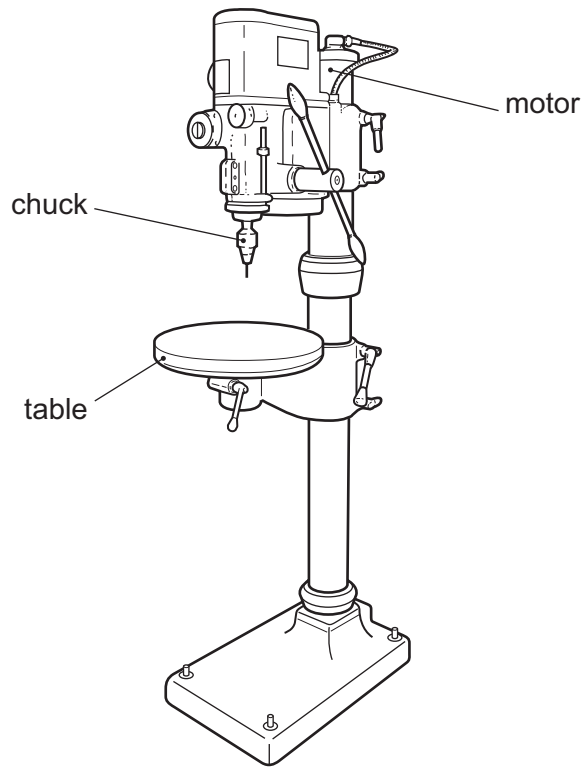
**Section A: Theory**

Answer any **three** questions in this section.

**Use bold sketches to illustrate your answers wherever possible.**

You are advised to spend 1 hour 15 minutes on Section A.

- 1 (a) Fig. 1 shows a pedestal drilling machine.



**Fig. 1**

Use notes and sketches to explain:

- (i) the way in which motion is transferred from the motor to the chuck; [6]
- (ii) **two** methods of holding work on the table so that it can be drilled. [5]

(b) Fig. 2 shows a twist drill.

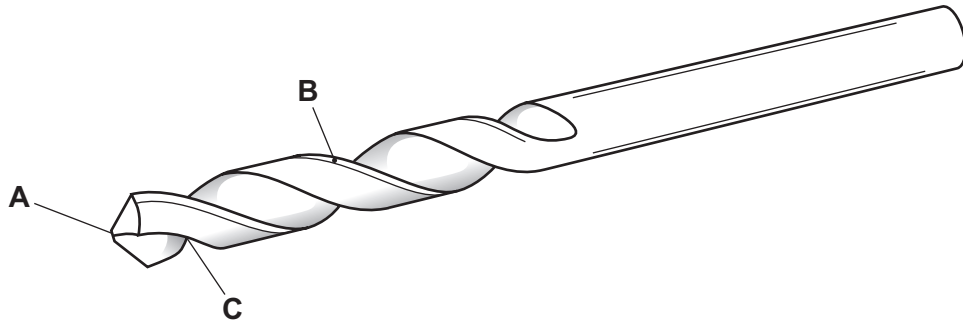


Fig. 2

Name the parts **A**, **B** and **C** and describe the function of each as the twist drill is used to bore a hole. [6]

2 Fig. 3 shows a piece of mild steel which has been marked out for cutting.

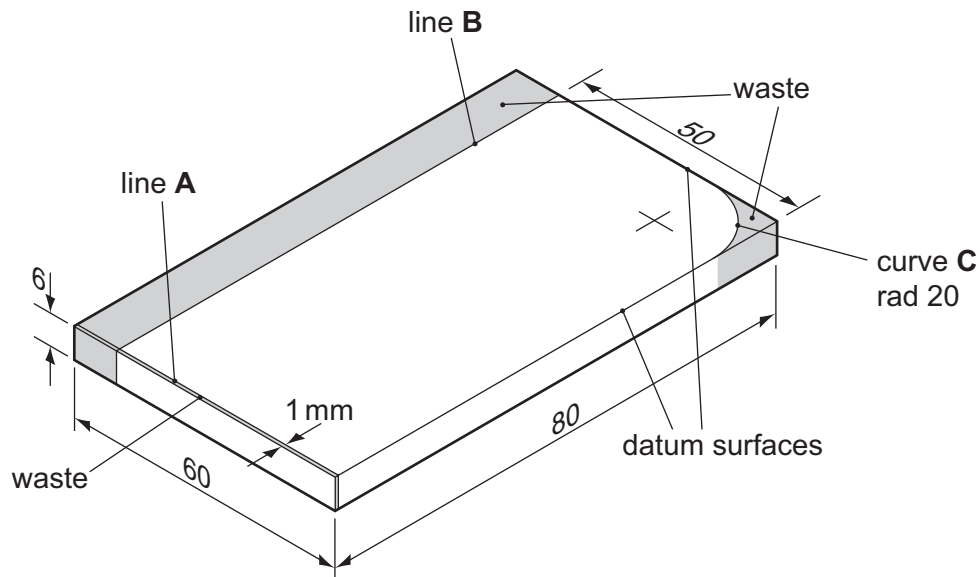


Fig. 3

(a) Use notes and sketches, naming the tools used, to describe how you would:

(i) mark out the length line **A**; [2]

(ii) mark out the width line **B**; [2]

(iii) mark out the curve which has a radius of 20 mm, curve **C**. [2]

(b) Use notes and sketches to describe how you would work to each of the lines. For each cut, show how the work would be held. [11]

- 3 (a) Fig. 4 shows a piece of tinplate which has two of the edges prepared.

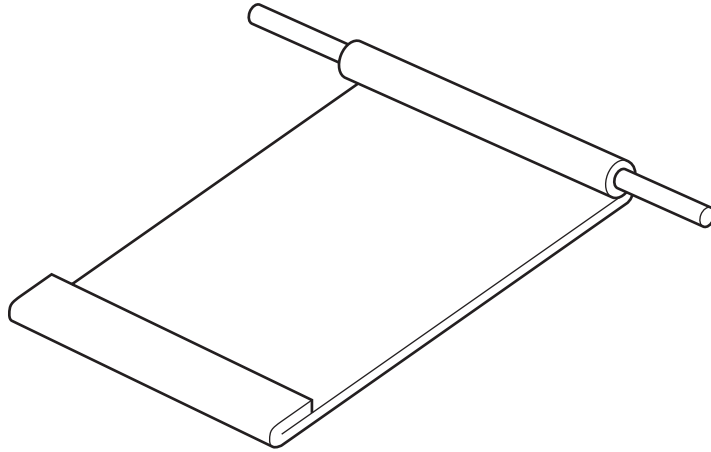


Fig. 4

- (i) Name each of the edges shown in Fig. 4. [2]
- (ii) Use notes and sketches to describe how you would work both of these edges. [7]
- (b) Fig. 5 shows a screwdriver blade which has been forged on the end of a piece of high carbon steel.

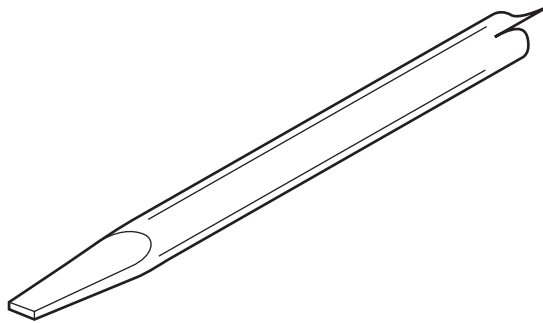
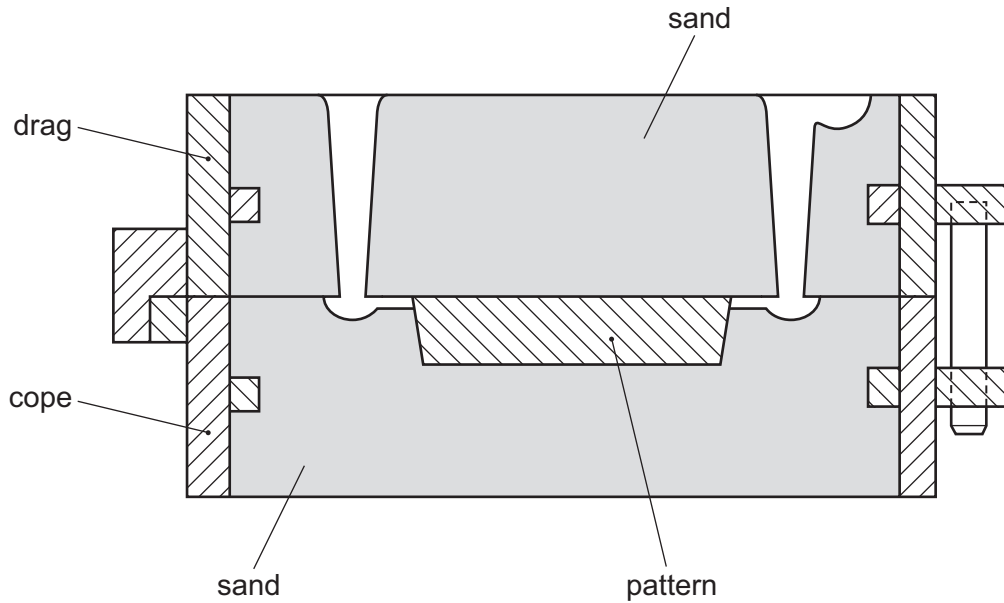


Fig. 5

- Use notes and sketches to describe how the blade would be hardened and tempered. [8]

- 4 Fig. 6 shows the section through a pair of casting boxes with a one piece pattern in place.



**Fig. 6**

Use notes and sketches to describe:

- (a) the stages of setting up the cope from empty to full, ready to receive the drag; [7]
- (b) completion of the drag; [6]
- (c) the finishing stages of the boxes to prepare for the pouring of the molten aluminium (**not** including the pouring). [4]

- 5 Fig. 7 shows a piece of aluminium which has been turned on a centre lathe in preparation for an M10 thread.

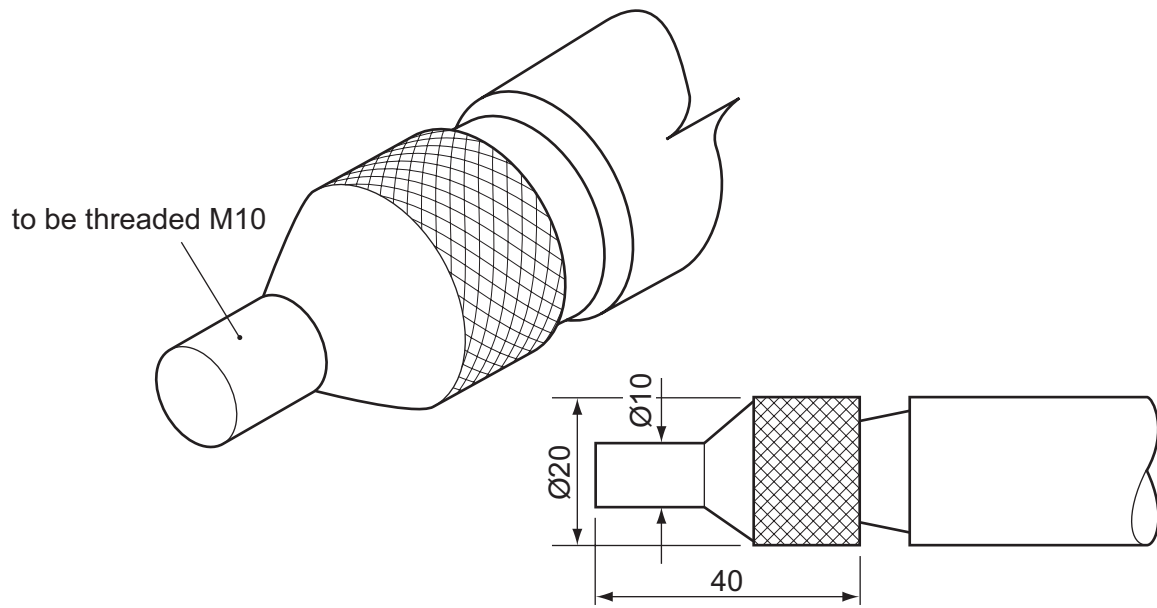


Fig. 7

Use notes and sketches to:

- (a) show how the round bar would be held on the lathe; [3]
- (b) describe how each of the following would be worked on the aluminium.
- straight turning [4]
  - taper turning [4]
  - knurling [3]
  - parting off [3]

**Questions continue on page 8.**

## Section B: Drawing and Design

Answer **all** questions in this section.

Use the sheet of A2 drawing paper prepared prior to the examination for your answers.

Set the paper with the long edge to the top of your drawing board and use the space to the right of the line for your freehand sketches in answer to Question 6.

**Use only one side of your paper.**

Dimensions not given are left for you to decide.

Fig. 8 shows details of a small bandsaw table. On top of the table is a guide which is to slide along the round bar so that work can be cut parallel on the saw. Both parts of the slide are to be made from aluminium.

- 6** To the right of the vertical line on your paper make a series of sketches leading to the solution of the design problems below. **Brief** notes should be added to identify details such as important sizes and specific materials. It should be possible for the examiner to understand your solutions from these sketches.

To solve these problems you may incorporate additional parts and make minor modifications to the given components. Methods of assembly should **not** include the use of adhesives.

### Design Problems

- (a) A method of locking the aluminium casting to the round bar so that work can be cut parallel.
- (b) Alterations, so that the slide bar can move forwards and backwards in the aluminium casting and be locked in position. The left-hand surfaces of the slide bar and aluminium casting are to remain flat.
- 7** Draw to a scale of 1:5, in either first or third angle orthographic projection, the following views of the assembled sliding arm and casting, complete with your solutions to the design problems in Question 6. Do not show details of the blade guide and blade in your views.
- (a) A sectional end view in the direction of arrow **X**
- (b) A front view in the direction of arrow **Y**

Mark allocation:  
 Communication [25]  
 Design [24]



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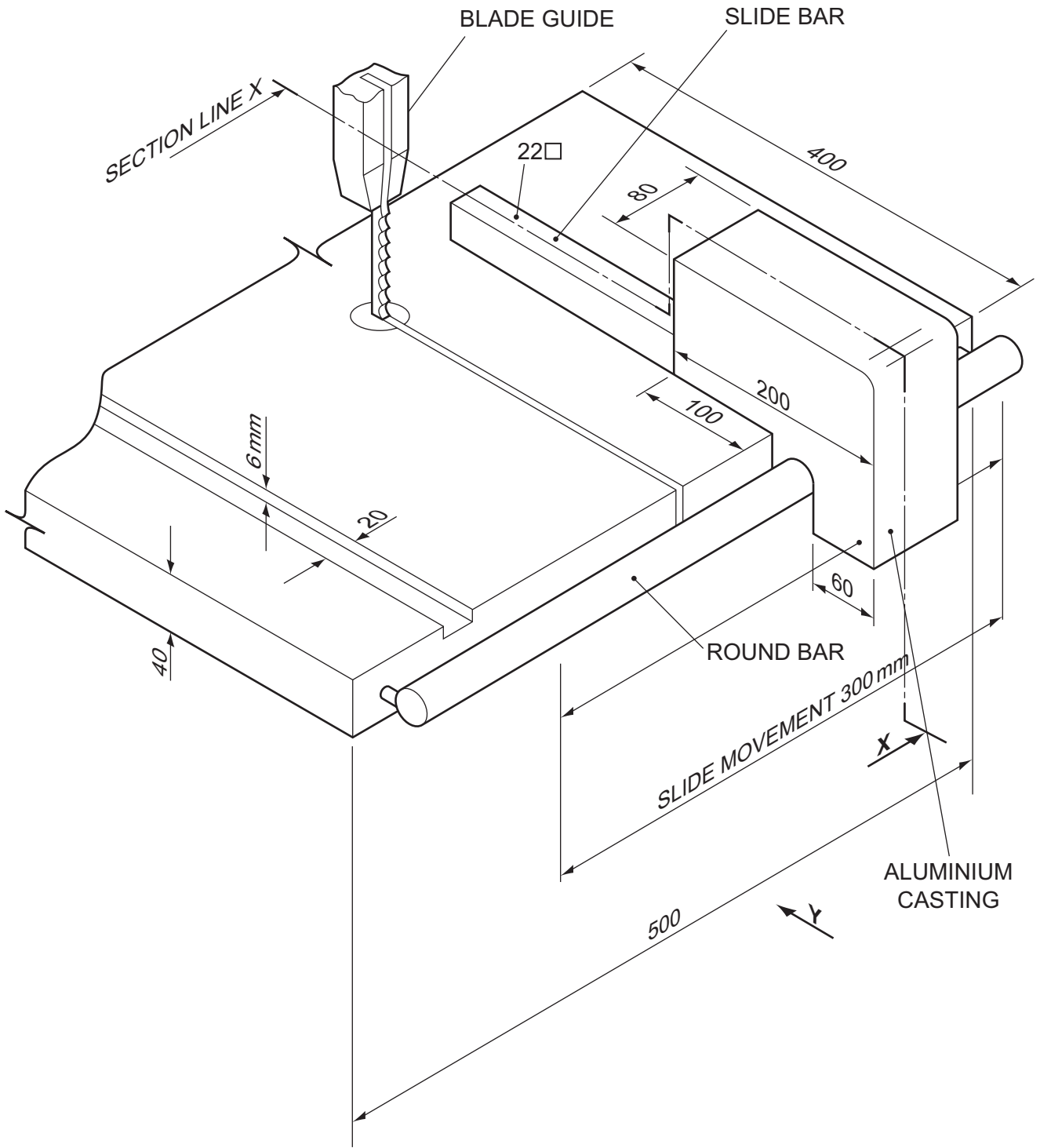


Fig. 8





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