



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**DESIGN AND TECHNOLOGY**

**0445/33**

Paper 3 Resistant Materials

**May/June 2014**

**1 hour**

Candidates answer on the Question Paper.

No Additional Materials are required.

**To be taken together with Paper 1 in one session of 2 hours 15 minutes.**

**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 an HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, glue or correction fluid.

**DO NOT WRITE IN ANY BARCODES.**

**Section A**

Answer **all** questions in this section.

**Section B**

Answer **one** question in this section.

You may use a calculator.

The total of the marks for this paper is 50.

The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
Section A	
Section B	
<b>Total</b>	

This document consists of **19** printed pages and **1** blank page.

2

## Section A

Answer **all** questions in this section.

- 1 Fig. 1 shows three types of nail.

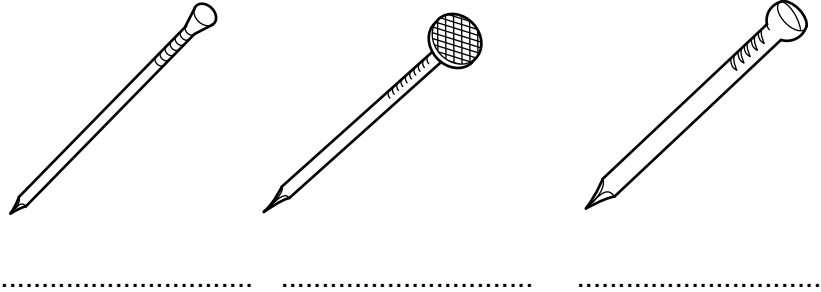


Fig. 1

Select the correct name for each nail from the list below.

cut tack

round wire

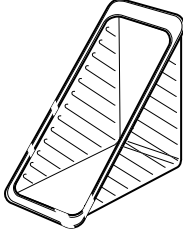
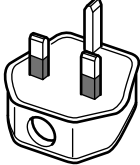
panel pin

oval wire

clout

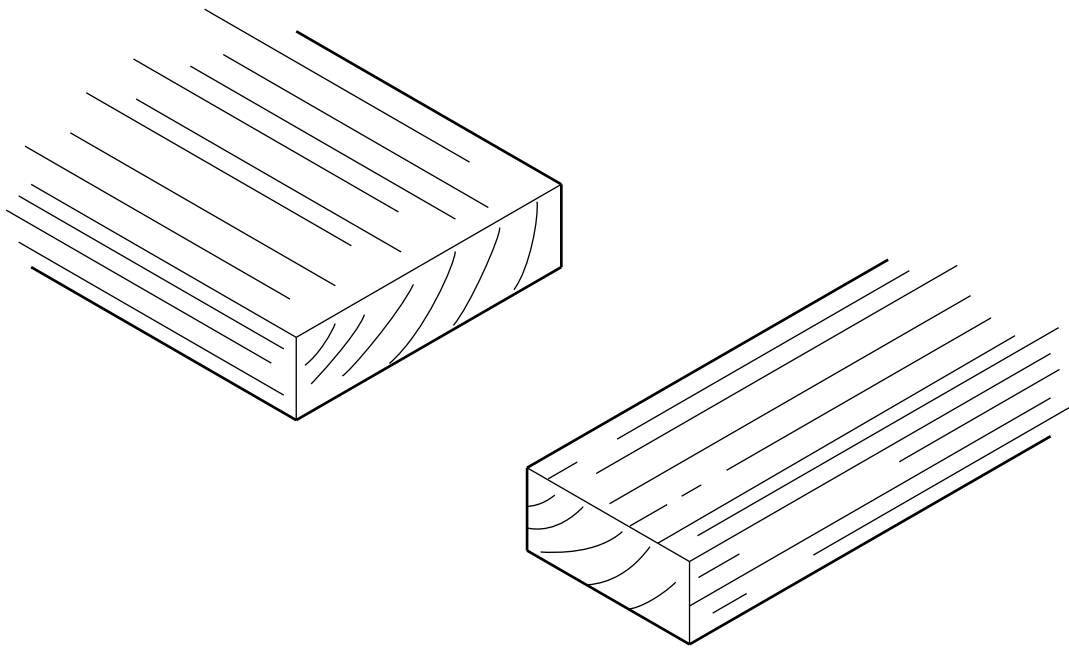
[3]

- 2 Complete the table below by naming the manufacturing process and a specific plastic for each product.

Product	Manufacturing process	Specific plastic
 <p>sandwich container</p>		
 <p>electrical plug</p>		

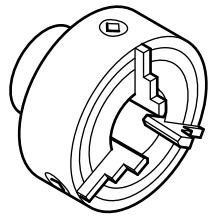
[4]

3 Complete the drawing below to show a biscuit joint.

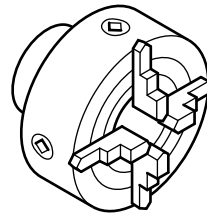


[3]

4 Fig. 2 shows a three jaw and a four jaw chuck used with a centre lathe.



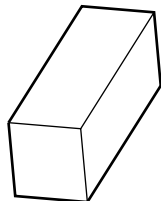
three jaw chuck



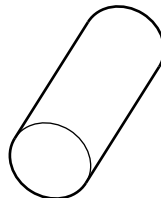
four jaw chuck

Fig. 2

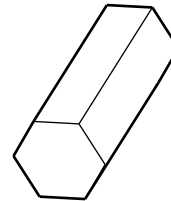
State whether a three jaw **or** four jaw chuck would be needed to hold each of the sections of metal labelled **A**, **B** and **C**.



A



B



C

A .....

B .....

C ..... [3]

5 A list of metals is given below.

**brass**

**iron**

**mild steel**

**aluminium**

From the list of metals select:

(a) a ferrous alloy .....

(b) a non-ferrous alloy ..... [2]

6 Fig. 3 shows a cutting tool.



**Fig. 3**

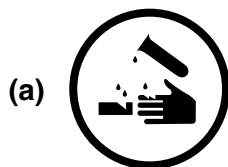
(a) Name the cutting tool shown in Fig. 3.

..... [1]

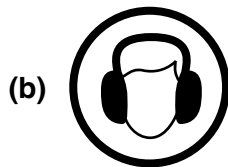
(b) Give **one** benefit of using this type of cutting tool.

..... [1]

7 State what is meant by each safety symbol shown below.



.....



..... [2]

5

8 Fig. 4 shows two types of file.

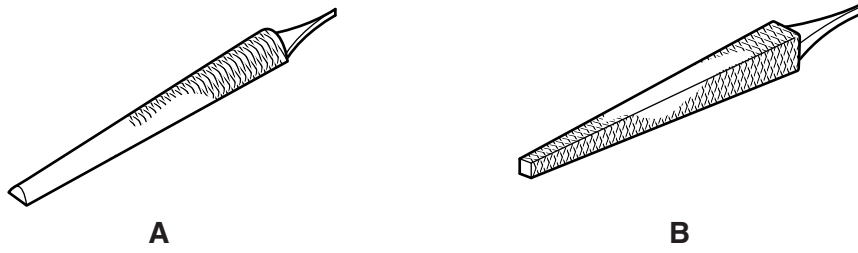


Fig. 4

Name file **A** and file **B**.

File **A** .....

File **B**.....[2]

9 Fig. 5 shows a plan view of the rails and legs of a small table.

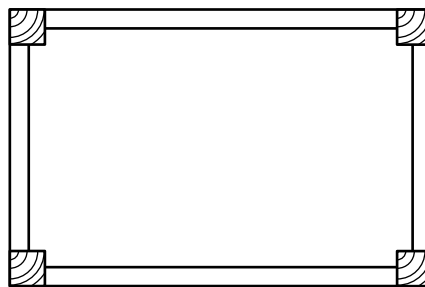


Fig. 5

Add sketches and notes to Fig. 5 to show how you would check to see if the construction was square. [2]

10 Fig. 6 shows a drawer handle.

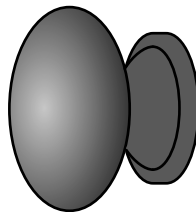


Fig. 6

Name the manufacturing process used to produce the drawer handle when made from:

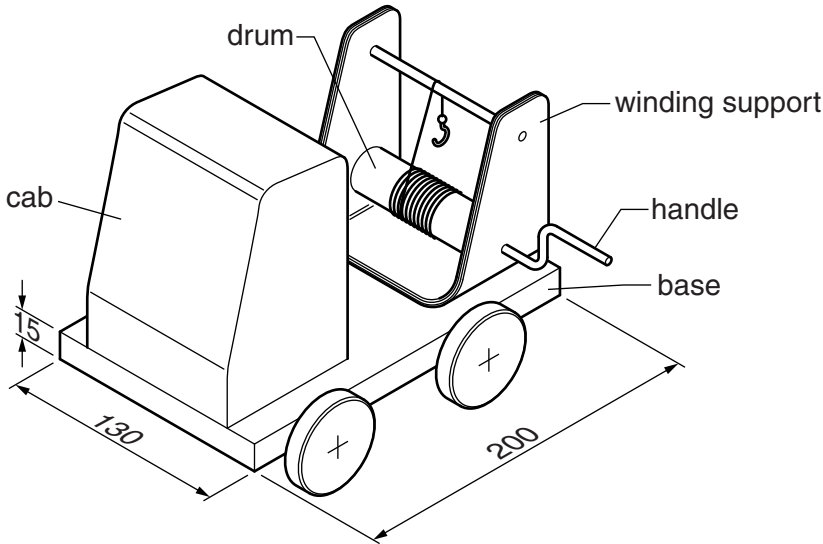
polypropylene .....

aluminium .....[2]

**Section B**

Answer **one** question from this section.

11 Fig. 7 shows a child's toy breakdown lorry.



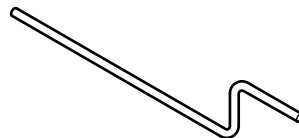
cab and base	beech
winding support	beech veneers
wheels	beech
drum	beech dowel
handle	mild steel

**Fig. 7**

(a) Give **two** properties of beech that make it suitable for the breakdown lorry.

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

(b) Fig. 8 shows the handle made from Ø5 mild steel.



**Fig. 8**

(i) Use sketches and notes to show how the handle could be shaped from a length of Ø5 mild steel.

[3]

- (ii) The end of the handle could be dangerous when held by a child. Sketch a modification to the end of the handle to make it safe in use. Include details of materials and construction.

[2]

- (iii) Name a suitable adhesive that could be used to join the handle into the drum.

.....[1]

- (iv) Describe how the adhesive would be prepared and applied.

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

- (c) The wheels will be produced using a woodturning lathe. Fig. 9 shows a length of beech set up on a woodturning lathe.

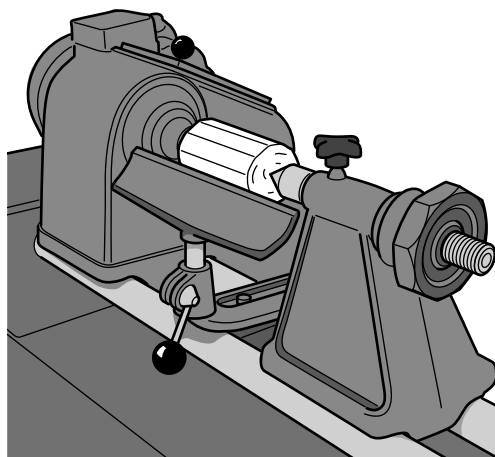


Fig. 9

- (i) Name the method of woodturning shown in Fig. 9.

.....[1]

- (ii) Fig. 10 shows a length of beech ready to be set up on the woodturning lathe. Give a reason why the corners have been removed.

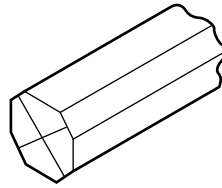


Fig. 10

.....[1]

- (iii) Name **two** cutting tools that could be used to produce a round shape on the woodturning lathe.

1 .....

2 .....[2]

- (iv) Name a tool that could be used to check the diameter of the beech when it has been made into a round shape.

.....[1]

- (d) Fig. 11 shows details of one of the wheels.

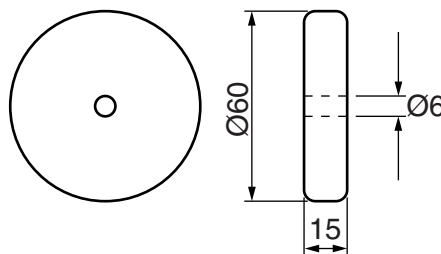


Fig. 11

Use sketches and notes to show how **one** wheel could be screwed to the base of the toy and allowed to rotate freely. Include details of the fittings used.

[3]



(e) Fig. 12 shows the winding support made by laminating beech veneers.

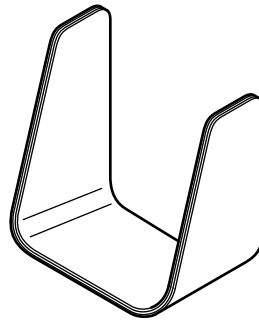


Fig. 12

Use sketches and notes to show how the winding support could be made using the process of lamination.

[4]

(f) (i) Name a suitable finish for the toy.

.....[1]

(ii) Give **two** reasons why the toy needs an applied finish.

1 .....

2 .....[2]

12 Fig. 13 shows a basic design for a child's musical instrument.

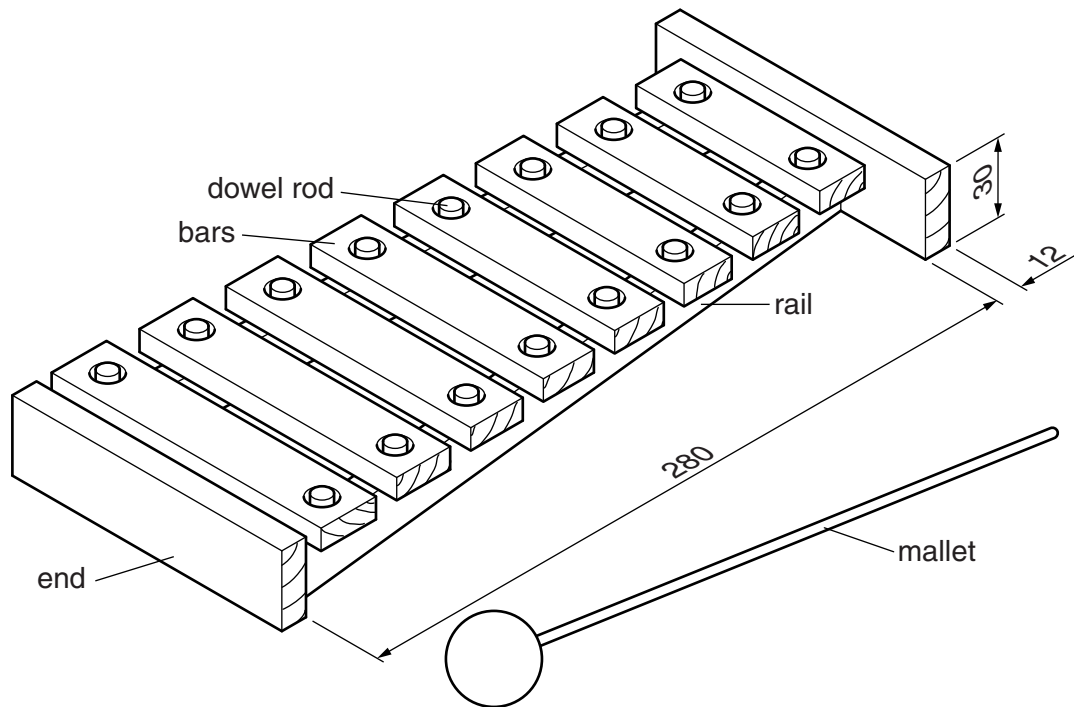


Fig. 13

- (a) The bars will be cut from a length of hardwood. Complete the table by naming the tools and/or equipment used to mark out, cut out and finish the bars.

Process	Tools / equipment
Mark to length	
Saw to length	
Make surfaces clean and smooth	

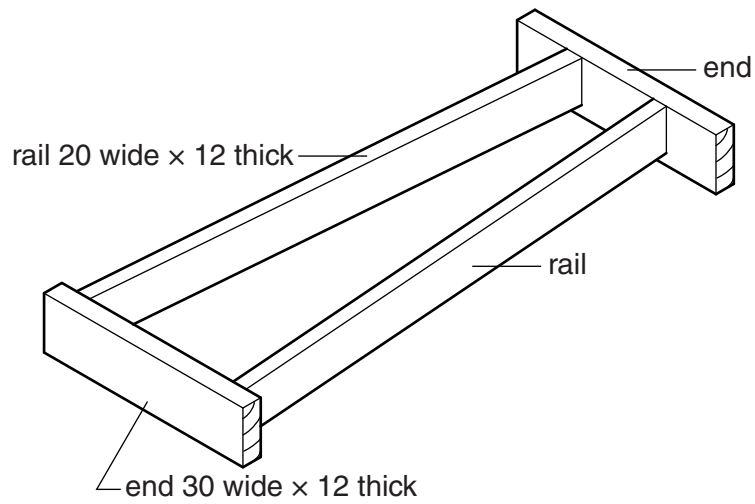
[3]

- (b) The hardwood bars could be replaced with bars made from non-ferrous metal. Complete the table by naming the tools and/or equipment used to mark out, cut out and finish the bars when made from non-ferrous metal.

Process	Tools / equipment
Mark to length	
Saw to length	
Make surfaces clean and smooth	

[3]

(c) Fig. 14 shows the rails and ends that support the bars.



**Fig. 14**

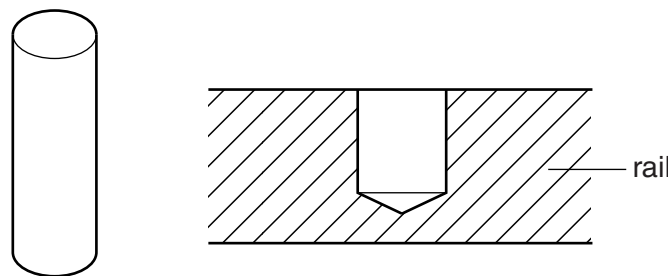
Sketch and name a suitable joint that could be used to join a rail to an end.

Name of joint .....[4]

- (d) Holes are drilled in each rail for dowel rods to support each bar.  
Use sketches and notes to show how you would make sure the holes were drilled in identical positions in both rails.

[2]

- (e) Fig. 15 shows a length of  $\text{Ø}9$  dowel that will be glued into a hole in the rail.  
Also shown is part of a rail with a hole drilled for the dowel.

**Fig. 15**

Show on Fig. 15 how the dowel could be prepared to make gluing easier and more effective. [2]

- (f) Each bar will have bevelled edges.  
Fig. 16 shows one of the bars with the bevelled edges marked out.

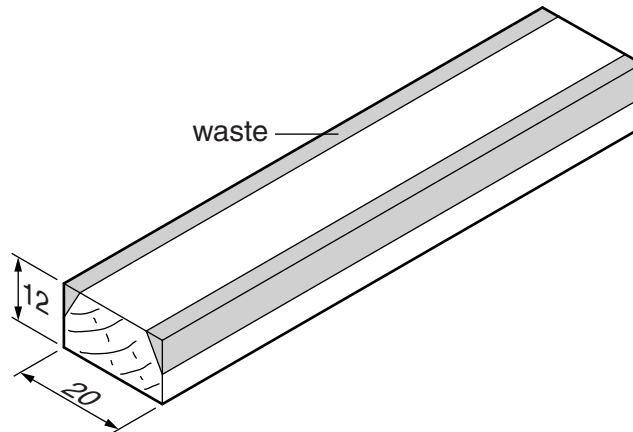


Fig. 16

- (i) Name a suitable plane that could be used to plane off the waste to produce the bevelled edge.  
.....[1]
- (ii) Use sketches and notes to show how a vice could be used to hold the bar while planing the bevelled edges.

[3]

- (iii) Give **one** disadvantage of planing off the waste against a bench stop rather than using a vice.  
.....[1]

(g) Give **two** reasons why designers often include paint in the design of children's toys.

1 .....

2 .....[2]

(h) Use sketches and notes to show a modification to the design of the musical instrument that would enable the mallet to be easily stored.  
Include details of sizes, materials and constructions used.

[4]

13 Fig. 17 shows a basic design for a DVD stand.

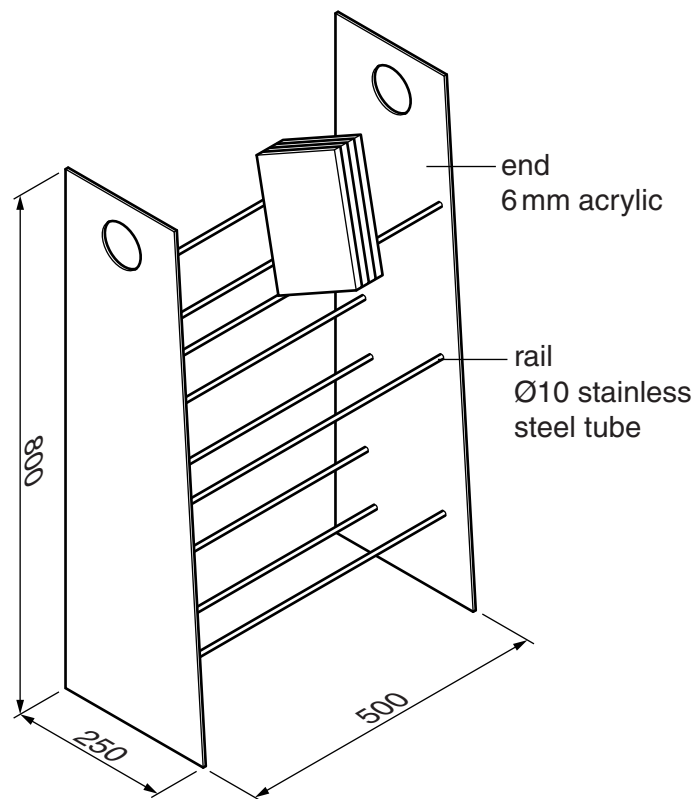


Fig. 17

(a) Fig. 18 shows one end of the DVD stand marked out ready to be cut to shape.

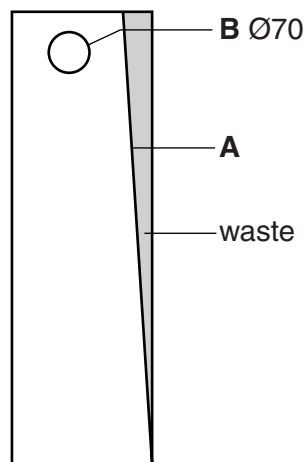


Fig. 18

(i) Name a tool that could be used against a straight edge to mark line **A**.

.....[1]

(ii) Name a tool that could be used to mark out the circle **B**.

.....[1]

(b) Use sketches and notes to show how the circular shape could be produced.

[3]

(c) Complete the table below by describing how each of the tools/items of equipment could be used to finish the edges of the acrylic to a high quality.

<b>Tools/items of equipment</b>	<b>How they will be used</b>
Scraper	
Wet and dry (silicon carbide) paper	
Polishing mop	
Polishing compound	

[4]



- (d) Use sketches and notes to show how the stainless steel rails could be attached without drilling holes in the acrylic ends.  
Include details of additional materials, sizes and constructions.

[4]

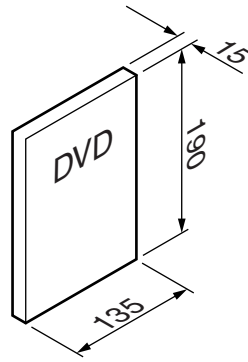
- (e) Describe **two** ergonomic considerations that a designer would include in the design of a DVD stand.

1 .....

2 .....[4]

18

(f) Fig. 19 shows details of a DVD case.



**Fig. 19**

The DVD cases can fall over when placed on the stand.  
Use sketches and notes to show a device that would overcome this problem.  
Your device must:

- prevent the DVD cases from falling over;
- fit onto the stainless steel rails;
- be capable of being moved along the rails.

Include details of additional materials and fittings used.

[6]

(g) The DVD stand could also be made entirely from wood-based materials.  
Give **two** advantages of making the DVD stand from wood-based materials rather than acrylic and stainless steel.

1 .....

2 .....[2]

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