EXAMINATIONS COUNCIL OF ESWATINI
Eswatini General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

DESIGN AND TECHNOLOGY **6902/03**

Paper 3 Resistant Materials **October/November 2023**

1 hour

Candidates answer on the Question Paper.

No Additional Materials required.

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name in the spaces provided at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, highlighters, 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 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	
Total	

This document consists of **17** printed pages and **3** blank pages.

Section A

Answer **all** questions in this section.

1 Fig. 1 shows **one** safety clothing sign.

Fig. 1

Describe a workshop process where gloves must be worn.

..... [1]

2 Fig. 2 shows the edge of a piece of wood being planed.

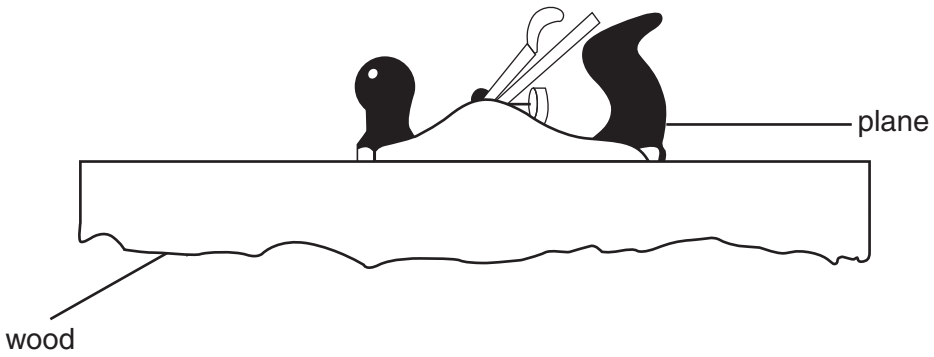


Fig. 2

(a) Name the type of plane used in Fig. 2.

..... [1]

(b) On the wood part in Fig. 2, add an arrow to show the direction of the grain. [1]

3 Fig. 3 shows a tee square made from two pieces of acrylic.

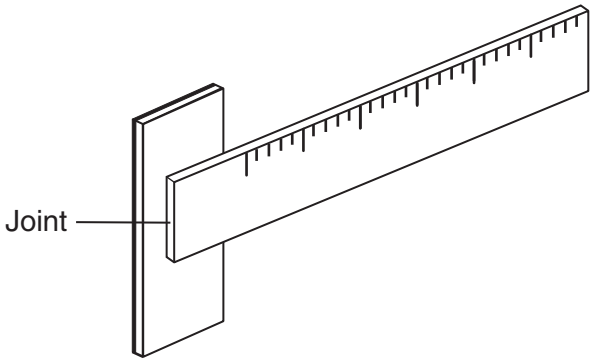


Fig. 3

Name a suitable method of joining the two pieces of acrylic together;

Temporarily ..... [1]

Permanently ..... [1]

4 Shown below are **two** metal cutting tools.

A

B

(a) Name each of the tools labelled **A** and **B** above.

Tool **A** ..... [1]

Tool **B** ..... [1]

(b) State the use of each tool.

Use of tool **A** ..... [1]

Use of tool **B** ..... [1]

[Turn over

5 Paint can be applied by brush or spray.

(a) State **one** advantage of using a spray to apply paint.

..... [1]

(b) Describe **one** safety precaution you would need to observe when spray painting.

..... [1]

6 Fig. 4 shows a measuring tool.

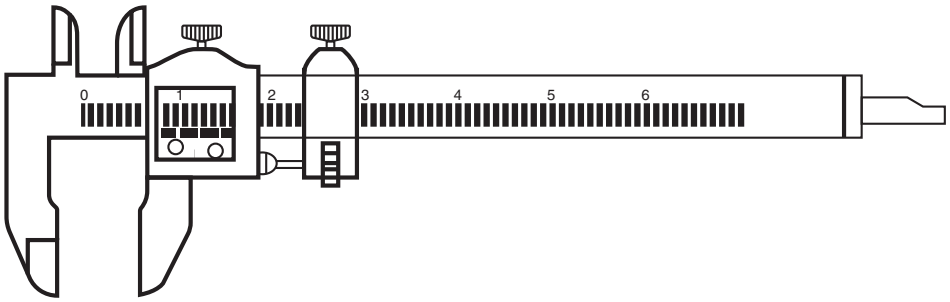


Fig. 4

(a) Name the measuring tool shown in Fig. 4.

..... [1]

(b) Give **one** specific use for the tool shown in Fig. 4.

..... [1]

7 Fig. 5 is a sketch showing a haunched mortise and tenon joint.

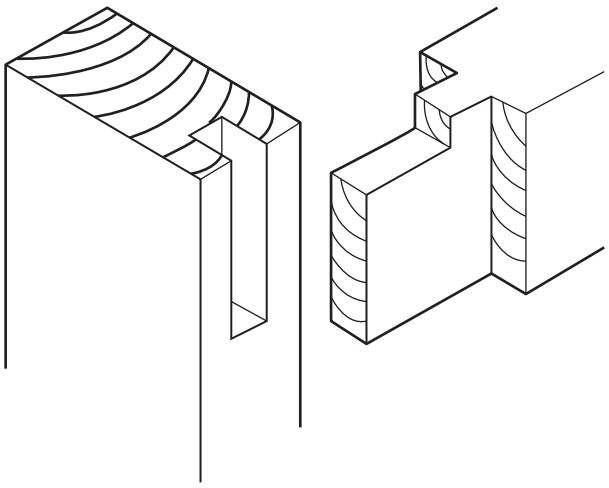


Fig. 5

Add arrows and labels to show the joint, **haunch** and **mortise** in Fig. 5. [2]

8 Give **two** uses for each of the following plastics.

(a) Nylon

1 ..... [1]

2 ..... [1]

(b) Expanded polystyrene

1 ..... [1]

2 ..... [1]

9 Fig. 6 shows a saucepan made from different materials.

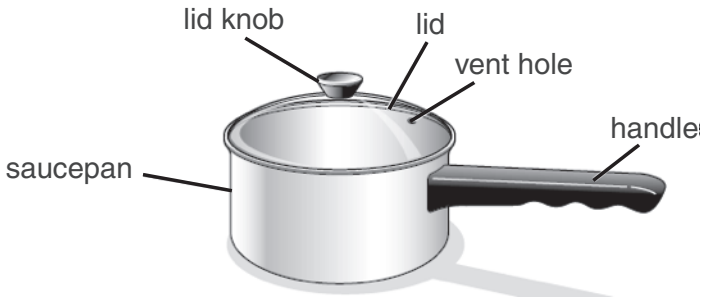


Fig. 6

Complete the table below by placing a tick (✓) for the most suitable property of the parts of the saucepan.

	Material Property	
	Heat Resistant	**Heat Conductor**
Handle		
Saucepan		

[2]

10 Fig. 7 shows **two** methods of timber seasoning.

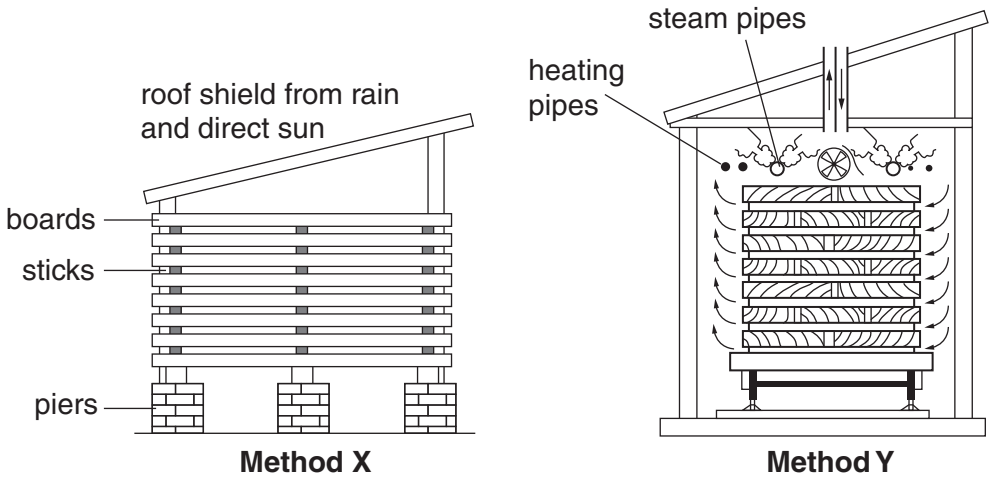


Fig. 7

(a) Name each method shown in Fig. 7.

..... [1]

..... [1]

(b) Give **one** advantage of method **X** in Fig. 7.

..... [1]

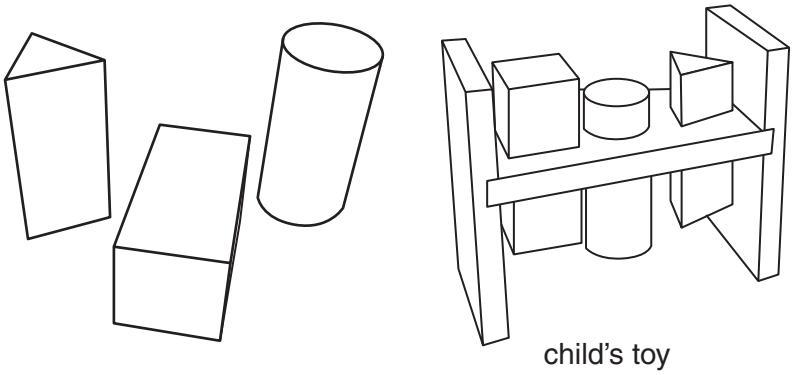
(c) Give **one** advantage of method **Y** in Fig. 7.

..... [1]

Section B

Answer **one** question in this section

11 Fig. 8 shows a child's toy.



child's toy

Fig. 8

(a) State **three** considerations that a designer would include in a design specification for the child's toy.

1 ..... [1]

2 ..... [1]

3 ..... [1]

(b) The frame of the child's toy is made from teak.

Give **two** properties of teak that make it suitable for the frame of the child's toy.

1 ..... [1]

2 ..... [1]

(c) Fig. 9 shows a joint used in the frame of the child's toy.

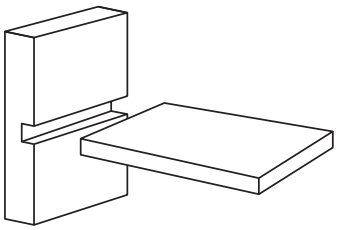


Fig. 9

(i) Name the type of joint shown in Fig. 9.

..... [1]

(ii) Give an appropriate adhesive to use when gluing the joint.

..... [1]

[Turn over

(d) Using sketches and notes, to show how the wood joint you identified at **(c)** can be:

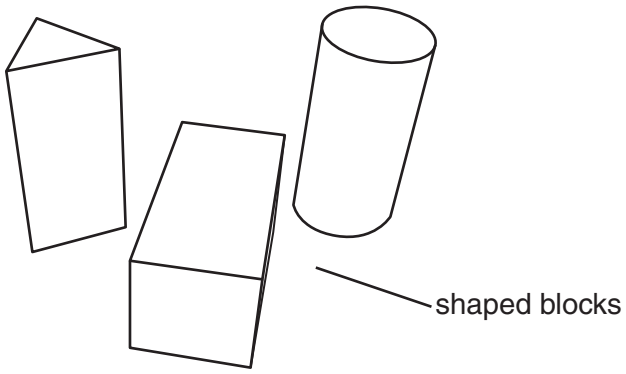
(i) Marked out

[4]

(ii) Cut out

[4]

(e) Shaped blocks of the child's toy made from polyvinyl chloride (PVC) are shown below.



(i) Give **two** properties of PVC that make it suitable for the shaped blocks.

Justify your answer for each property.

Property 1 ..... [1]

Justification ..... [1]

Property 2 ..... [1]

Justification ..... [1]

(ii) The shaped blocks are hollow.

Name **one** process that could be used to make the hollow shaped blocks.

..... [1]

[Turn over

(f) Use sketches and notes to show a modification that can be done to the child's toy rack using metal. The modification is to prevent the shaped blocks from falling.

[5]

12 Fig. 10 shows details of a wind chime. It hangs from a tree in the garden and makes a gentle noise when blown in the wind.

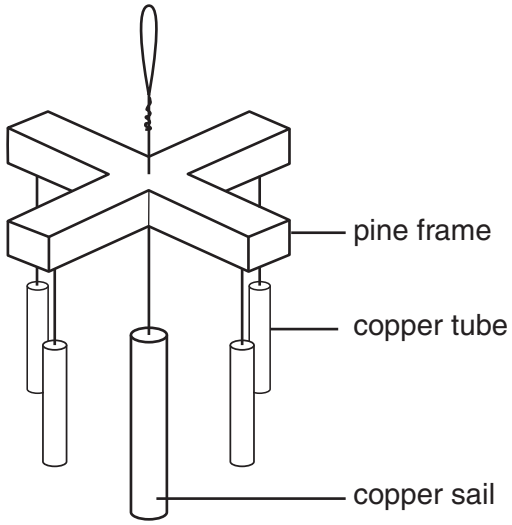


Fig. 10

(a) (i) Give **two** properties of copper that make it suitable for the sail.

1 ..... [1]

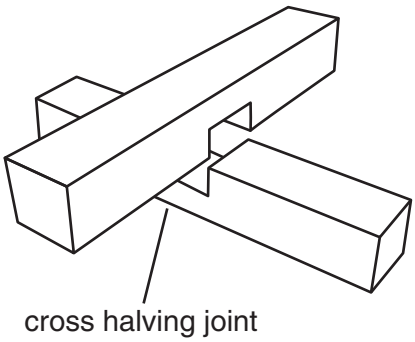
2 ..... [1]

(ii) Name **two** other non-ferrous metals / alloys that could be used for the sail.

1 ..... [1]

2 ..... [1]

(b) (i) A cross halving joint is used to join the two pieces of pine together for the frame.



Name **three** hand tools that could be used to mark the cross halving.

1 ..... [1]

2 ..... [1]

3 ..... [1]

(ii) Explain **two** advantages of using pine to make the frame of the wind chime other than MDF.

1 ..... [1]

2 ..... [1]

(c) (i) Use sketches and notes to show how the centre can be marked on one end of the sail using a surface gauge, vee blocks and clamps.

[6]

(ii) Name **one** tool that can be used to cut the length of the copper sail.

..... [1]

(d) **(i)** Name a suitable finish other than paint for the copper sail.

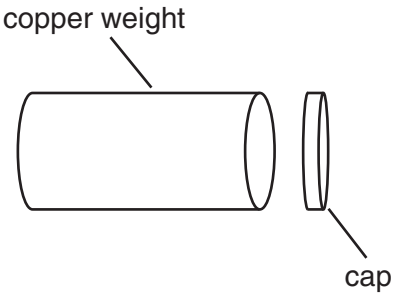
..... [1]

(ii) Describe **two** stages that you would do to prepare the copper sail before applying any finish.

1 ..... [1]

2 ..... [1]

(e) Shown below is a copper cap to be joined to the copper tube by soft soldering.



(i) Give **one** reason why soft soldering is a suitable method for joining the copper tube and cap together.

..... [1]

(ii) Use sketches and notes to show how one copper cap can be joined to the copper tube using the soft soldering method.

[5]

13 Fig. 11 shows a games controller holder made from 3 mm thick acrylic.

The holder is made in two parts, part **A** and part **B**.

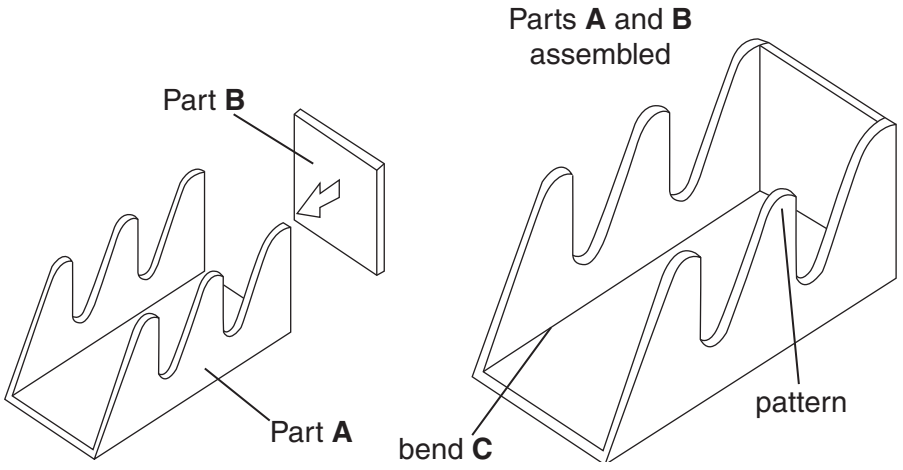
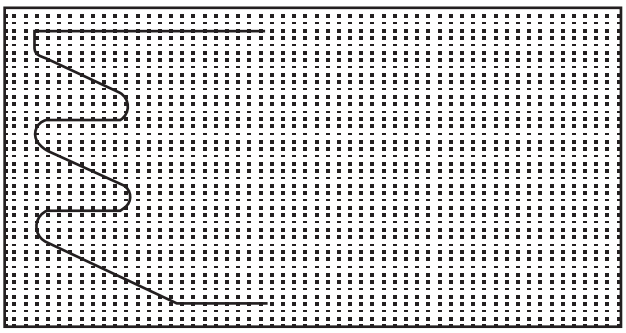


Fig. 11

(a) Add to the incomplete development (net) of part **A** of the holder all bending lines to be proportional to the given shape.



Incomplete Development

[2]

(b) **(i)** Name **two** marking out tools used to draw the development (net) on the acrylic sheet.

1 ..... [1]

2 ..... [1]

(ii) Give **two** properties of acrylic that makes it suitable for the games controller holder.

1 ..... [1]

2 ..... [1]

(iii) Name **one** thermoplastic other than acrylic that could be used to make the games controller holder.

..... [1]

(c) Use sketches and notes to show how the pattern could be cut and the edges made smooth.

[4]

(d) Use sketches and notes to show how the bend at **C** on Fig. 11 could be produced. Include:

- method of softening the acrylic
- use of a former
- method of retaining the shape while the acrylic cools.

[4]

[Turn over

(e) Part **B** of the games controller holder is to be made from 2 mm thick mild steel sheet.

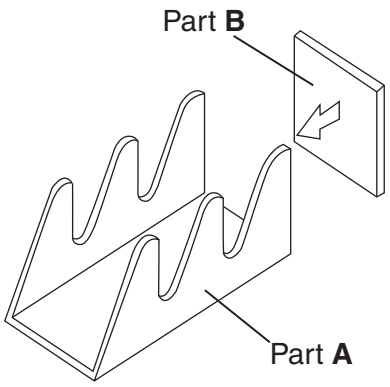


Fig. 12

The mild steel sheet (part **B**), of the holder is to be protected by bluing.

(i) Describe **four** important stages to be followed when finishing the mild steel sheet using bluing.

1 ..... [1]

2 ..... [1]

3 ..... [1]

4 ..... [1]

(ii) Part **B** (mild steel) is to be joined to part **A** (plastic).

Name a suitable adhesive that can be used to join the two parts together.

..... [1]

(f) The games controller holder is to be stored on a wall mounted stand shown in Fig. 13.

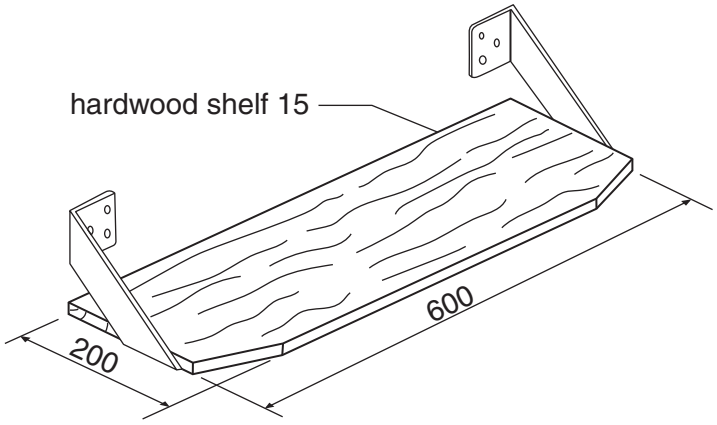


Fig. 13

Use sketches and notes to show how the stand could be fixed on the wall as well as keep the games controller securely.

Include details of materials, constructions and fittings used.

[5]

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