



Surname _____

Forename(s) _____

Centre Number _____

Candidate Number _____

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I declare this is my own work.

GCSE

DESIGN AND TECHNOLOGY

Unit 1 Written Paper

8552/W

Tuesday 18 June 2024

Morning

Time allowed: 2 hours

[Turn over]



On the front of this book, write your surname and forename(s), your centre number, your candidate number and add your signature.

MATERIALS

For this paper you must have:

- **normal writing and drawing instruments**
- **a calculator**
- **a protractor.**

INSTRUCTIONS

- **Use black ink or black ball-point pen. Use pencil only for drawing.**
- **Answer ALL questions.**
- **You must answer the questions in the spaces provided. Do not write on blank pages.**



- **If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).**
- **Do all rough work in this book. Cross through any work you do not want to be marked.**

INFORMATION

- **The marks for questions are shown in brackets.**
- **The maximum mark for this paper is 100.**
- **There are 20 marks for Section A, 30 marks for Section B and 50 marks for Section C.**

DO NOT TURN OVER UNTIL TOLD TO DO SO



SECTION A – CORE TECHNICAL PRINCIPLES

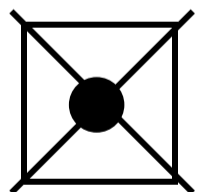
Answer ALL questions in this section.

For the multiple-choice questions,
completely fill in the lozenge alongside
the appropriate answer.

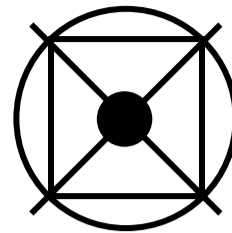
CORRECT METHOD 

WRONG METHODS    

If you want to change your answer
you must cross out your original
answer as shown.



If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.



0 1

Which ONE of the following metals is an alloy? [1 mark]

A Aluminium

B Brass

C Iron

D Tin

[Turn over]



0	2
---	---

Which ONE of the following has to be considered when organising the workplace? [1 mark]

A Fair trade

B Market pull

C Technology push

D Tools and equipment



0	3
---	---

Which ONE of the following is the definition of a dense material? [1 mark]

- A It can be stretched out into a thin length.**
- B It has a compact molecular structure.**
- C It has the ability to float in water.**
- D It is able to conduct an electrical charge.**

[Turn over]



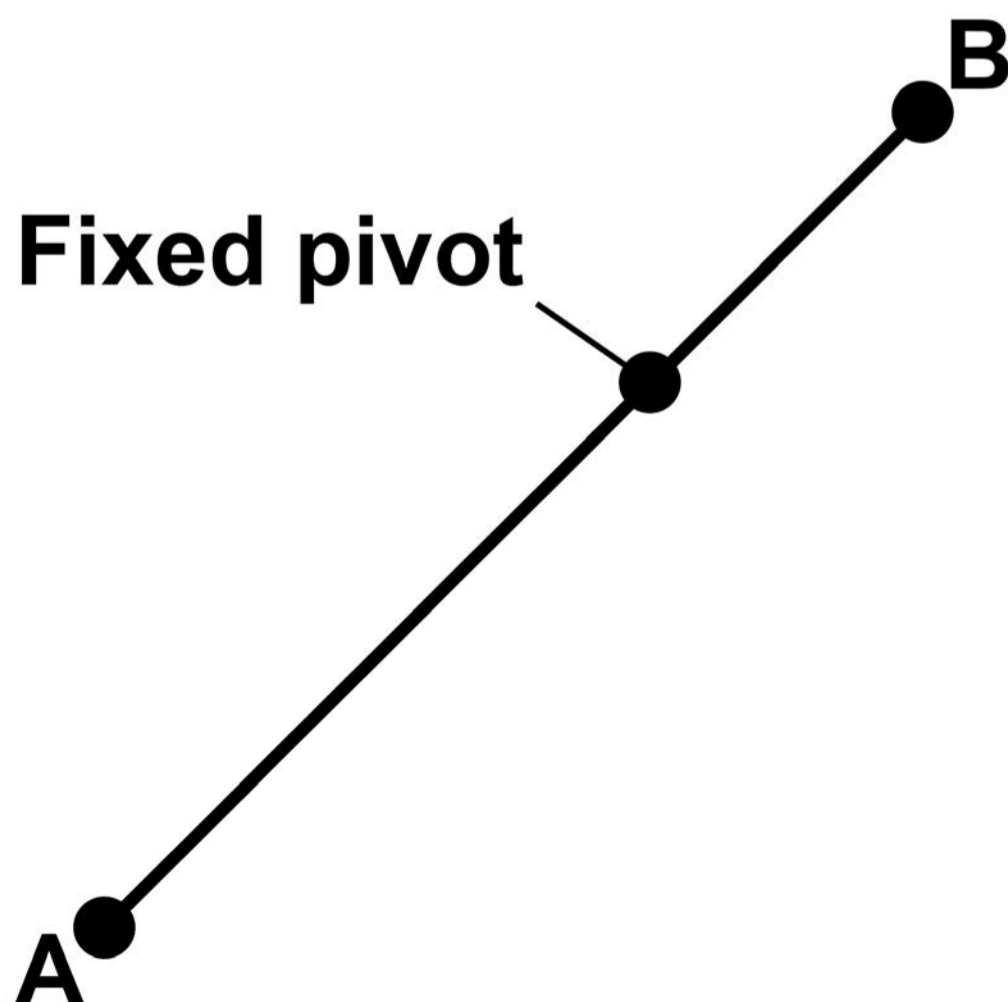
0	4
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FIGURE 1 shows a lever to be used as part of a mechanism.

The distance from point A to the fixed pivot is 80 mm.

The distance from point B to the fixed pivot is 20 mm.

FIGURE 1



If point A of the lever moves 40 mm clockwise, how far does point B move clockwise? [1 mark]

A 10 mm

B 20 mm

C 30 mm

D 40 mm

[Turn over]



0	5
---	---

Which ONE of the following is a composite material? [1 mark]

A Carbon fibre reinforced plastic (CRP)

B Graphene

C High impact polystyrene (HIPS)

D Wool



0	6
---	---

A shape has the dimensions:

Length 120 mm

Width 150 mm

Depth 170 mm

**What is the volume of the shape in mm^3 ?
[1 mark]**

A 30 600 mm^3

B 360 000 mm^3

C 3 060 000 mm^3

D 3 600 000 mm^3

[Turn over]



0	7
---	---

**Which ONE of the following is the definition of a thermoforming polymer?
[1 mark]**

A A material that becomes brittle when heated to a specific temperature.

B A material that becomes transparent when heated to a specific temperature.

C A material that does not soften when heated to a specific temperature.

D A material that softens when heated to a specific temperature.



0	8
---	---

What order (class) of lever are the scissors shown in FIGURE 2? [1 mark]

FIGURE 2



- A First order**
- B Second order**
- C Third order**

[Turn over]



0	9
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Which ONE of the following fibres is sourced from a living creature? [1 mark]

A Cotton

B Elastane

C Nylon

D Silk



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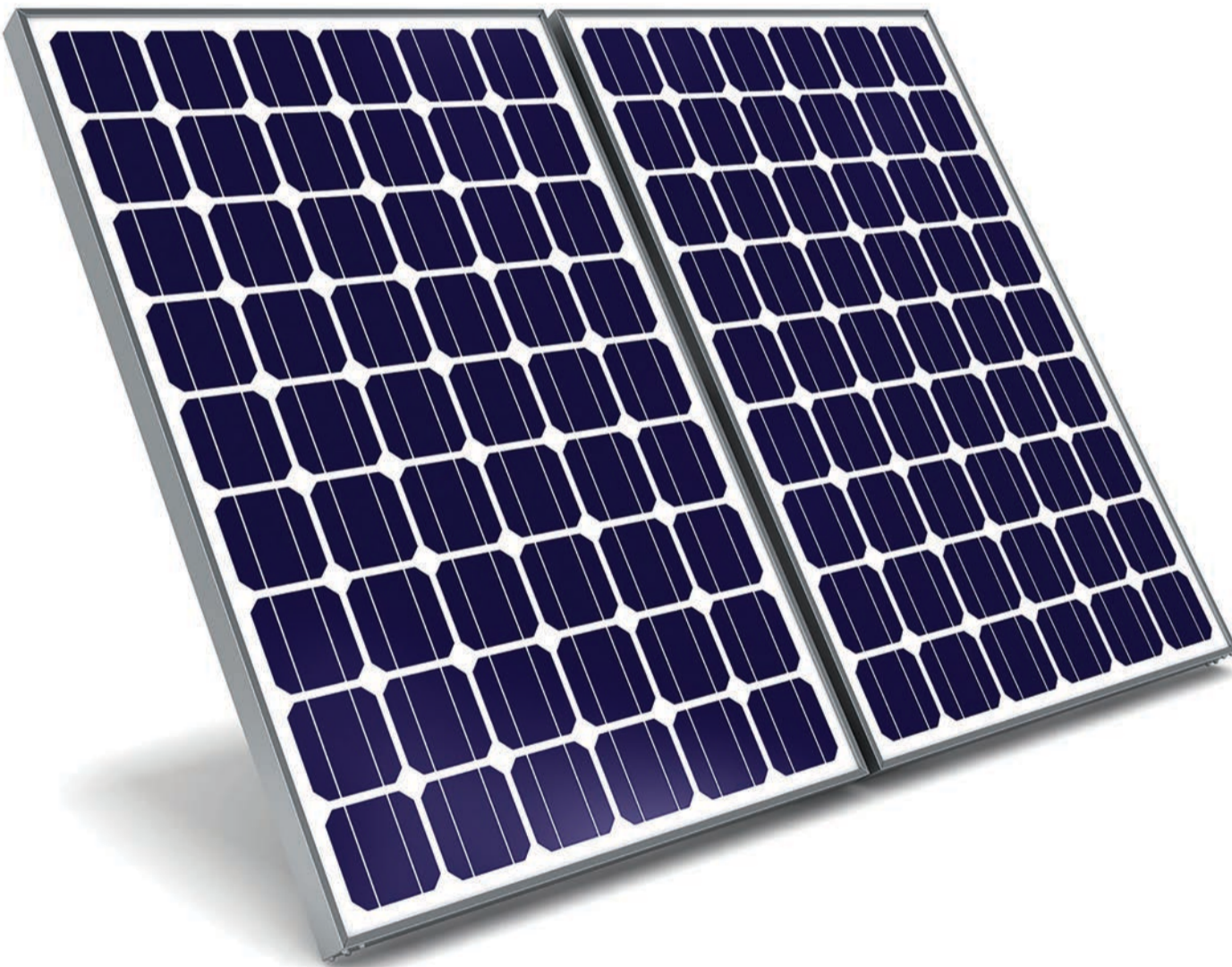
[Turn over]



1	0
---	---

**Electricity is produced from which form of energy by the device in FIGURE 3?
[1 mark]**

FIGURE 3



A Biomass

B Tidal

C Solar

D Wind

[Turn over]



1 1

**Give TWO properties of natural timbers.
[2 marks]**

Property 1 _____

Property 2 _____

BLANK PAGE

[Turn over]



1 2

Outline TWO reasons why foil lined cardboard is used in the packaging of the takeaway food container shown in FIGURE 4. [4 marks]

FIGURE 4



Reason 1 _____

Reason 2 _____

[Turn over]





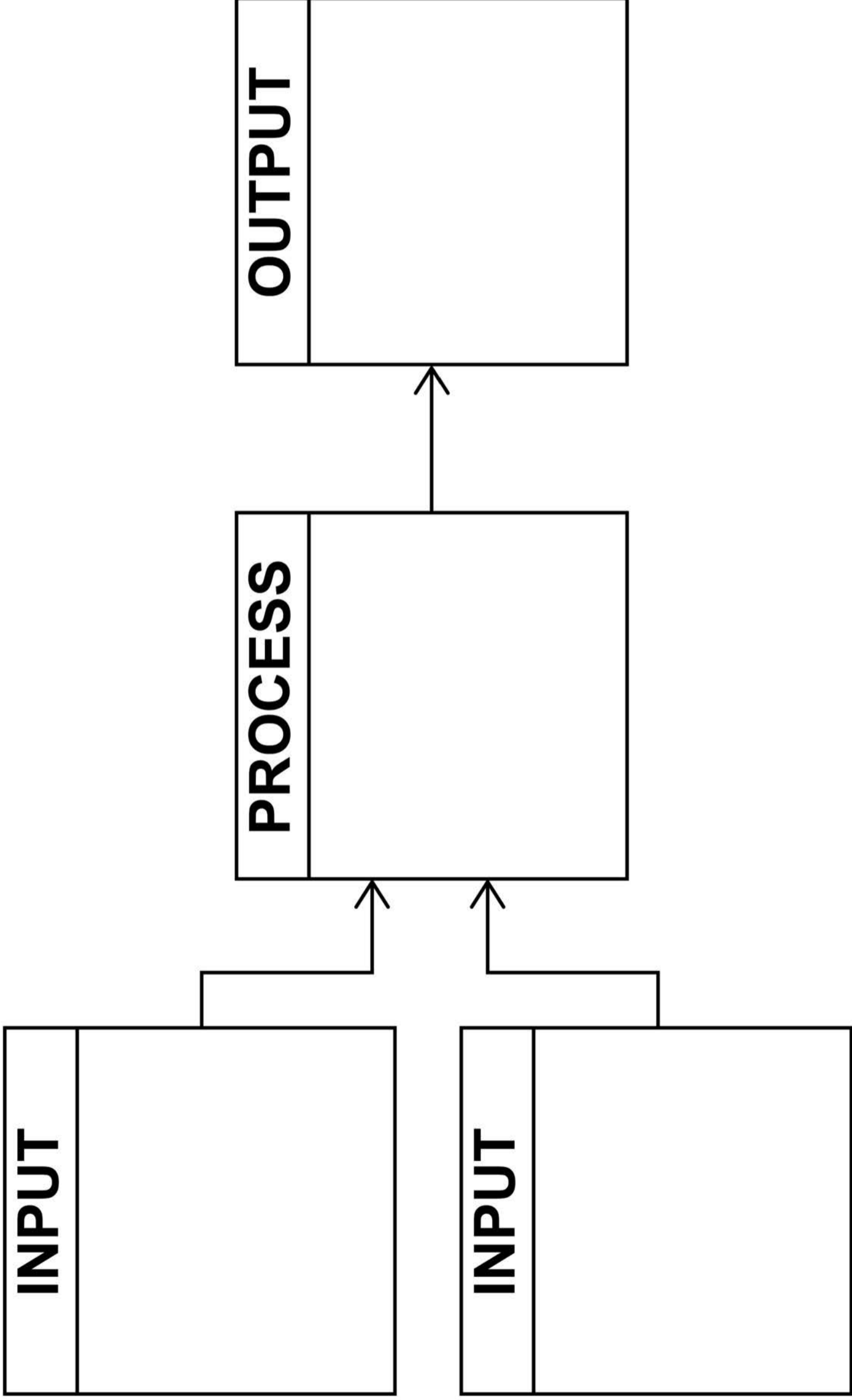
1	3
---	---

FIGURE 5, on the opposite page, shows a system block diagram for a laptop computer.

Complete the diagram by adding ONE component that could be used in EACH box. [4 marks]



FIGURE 5



SECTION B – SPECIALIST TECHNICAL PRINCIPLES

Answer ALL questions in this section.

1 4

A homeowner is building a garden patio with an area 28 m^2

The patio uses paving stones measuring $0.6 \text{ m} \times 0.6 \text{ m}$. [4 marks]



Number of paving stones needed =



BLANK PAGE

[Turn over]





1 5

TABLE 1 shows a range of specific materials.

TABLE 1

Aluminium	Cartridge paper	High impact Polystyrene (HIPS)	Oak	Silk
------------------	------------------------	---------------------------------------	------------	-------------

Choose one material from the table above.

My chosen material is _____



1 5 . 1

Name ONE property of your chosen material. [1 mark]

[Turn over]



1 5 . 2

**Give ONE product that uses your chosen material.
[1 mark]**



1 5 . 3

Describe why your chosen material is used in the product given in QUESTION 15.2. [2 marks]

31

[Turn over]

1 6

All materials are available in stock forms.

1 6 . 1

**Name ONE specific material stock form.
[1 mark]**

1 6 . 2

**Outline the benefits of using stock forms
for designers and manufacturers.
[4 marks]**



[Turn over]



17

A manufacturer needs to purchase 1000 electric motors at a cost of £6.95 per 10 motors.

The manufacturer is then offered a discount of 15%.

What is the total price the manufacturer will have to pay for the 1000 motors?

Give your answer to the nearest pence.

Show your working. [3 marks]

£ _____

[Turn over]



1	8
---	---

Choose ONE of the surface treatments or finishes from TABLE 2.

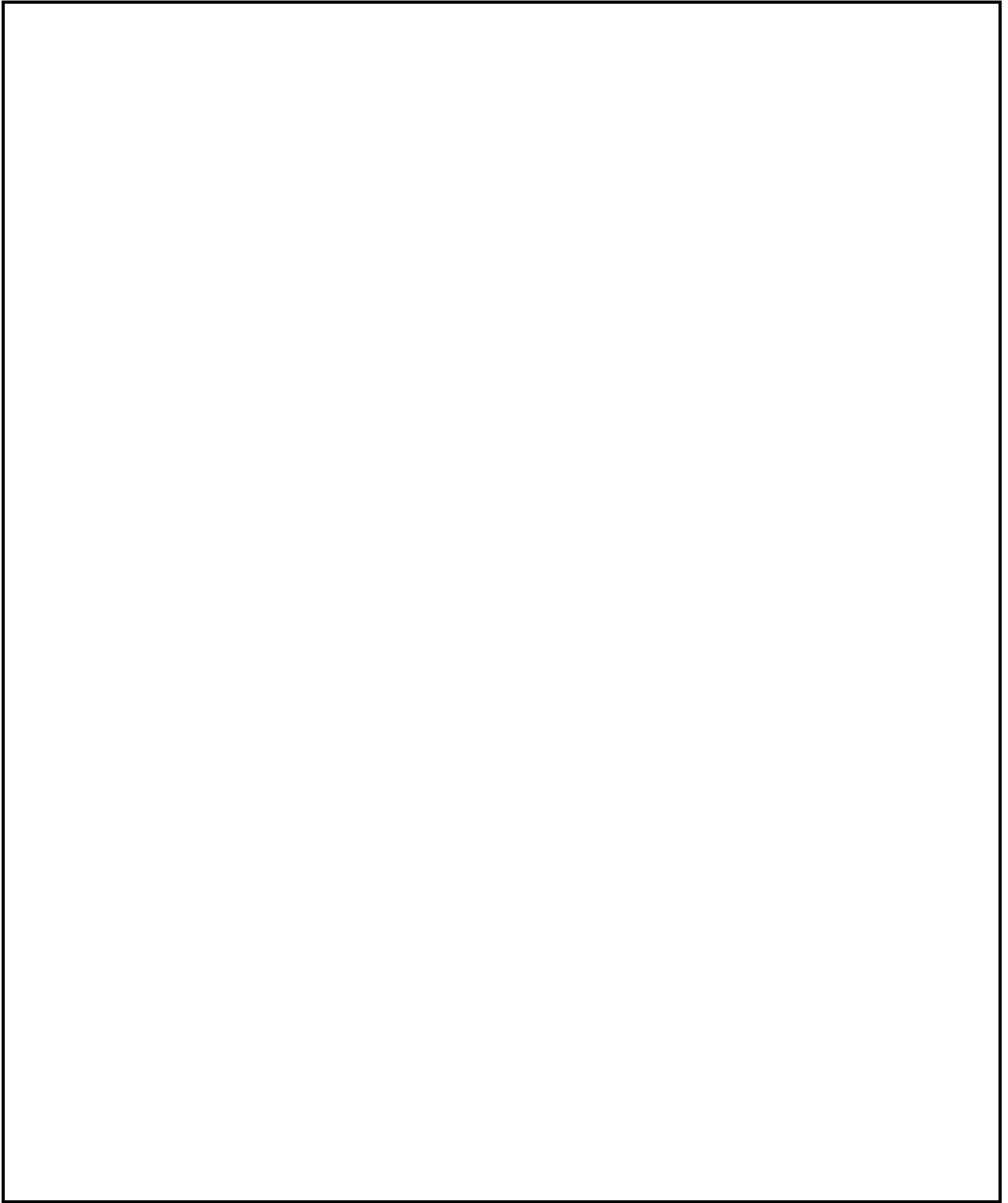
TABLE 2

Dip coating
Painting
Printing
Lubrication
Vinyl decals

Using notes and/or sketches, on the opposite page, describe how your chosen surface treatment or applied finish is produced. [6 marks]

My chosen surface treatment or finish is:





[Turn over]



19

Analyse and evaluate the ecological issues that have to be considered in the sourcing and extraction of raw materials to make products.

**Give examples to support your answer.
[8 marks]**

**SECTION C –
DESIGNING AND MAKING PRINCIPLES**

Answer ALL questions in this section.

20

**Study the different bus stops shown in
FIGURE 6, on pages 41–44.**



FIGURE 6

A



[Turn over]



B



C



[Turn over]



D



21.1

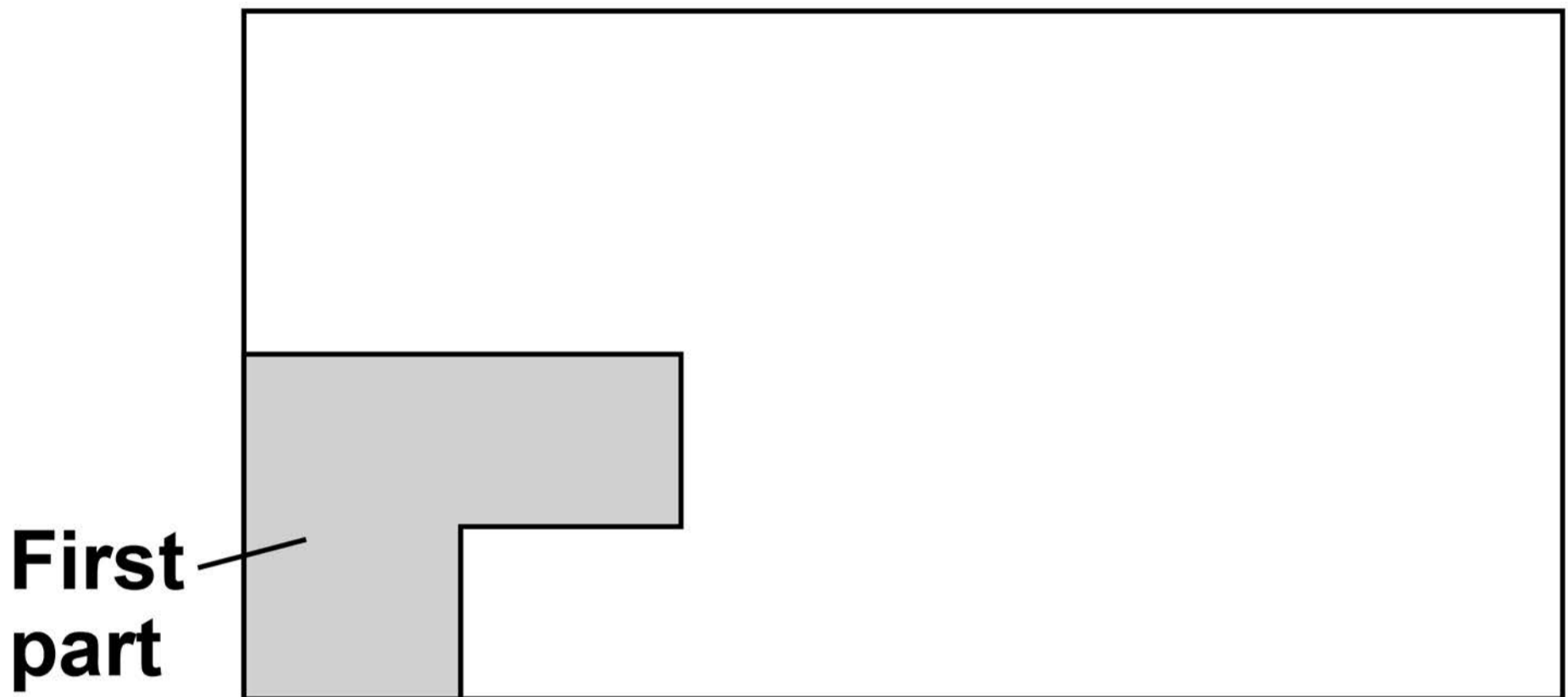
Explain the term ‘nesting/tessellating’ when cutting materials. [2 marks]

21.2

A series of identical parts are to be cut out from a sheet material using a laser cutter to ensure that no waste is created by the cuts.

The position of the first part is shown in FIGURE 7, on the opposite page.



FIGURE 7

Draw on FIGURE 7 to show where all the other parts need to be placed to use the material efficiently. [2 marks]

[Turn over]



2 2

Give FIVE safety precautions a user needs to consider when using tools and equipment that use heat. [5 marks]

Safety precaution 1 _____

Safety precaution 2 _____

Safety precaution 3 _____

Safety precaution 4 _____



Safety precaution 5 _____

[Turn over]

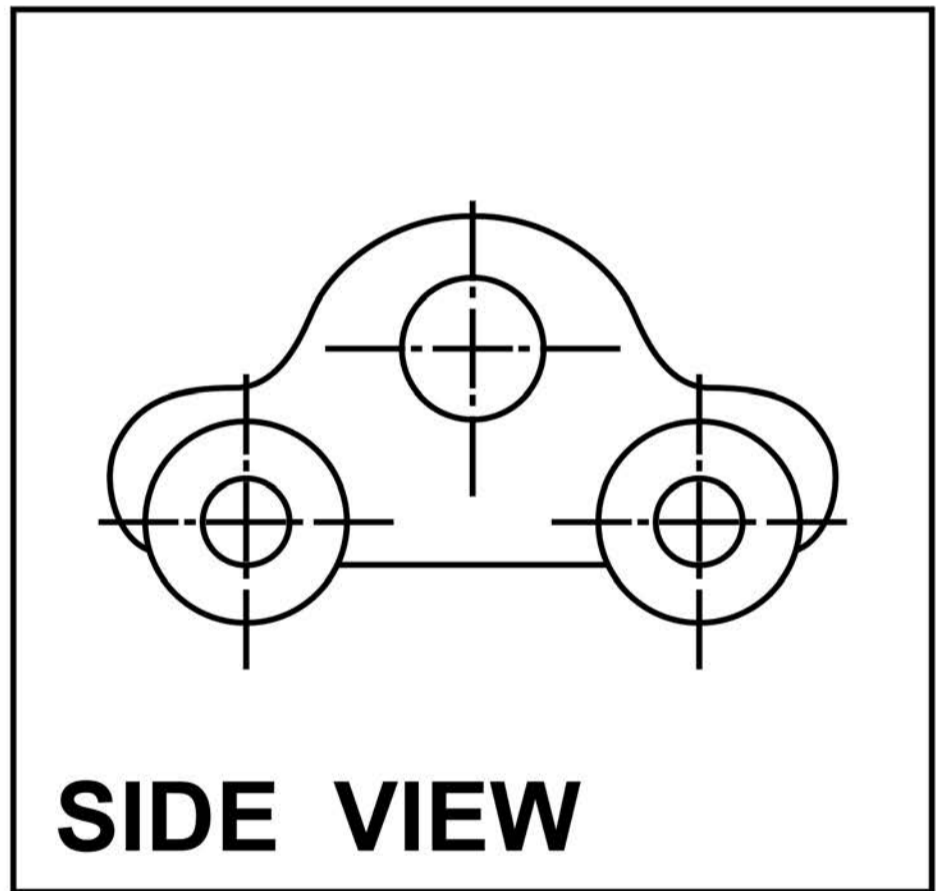
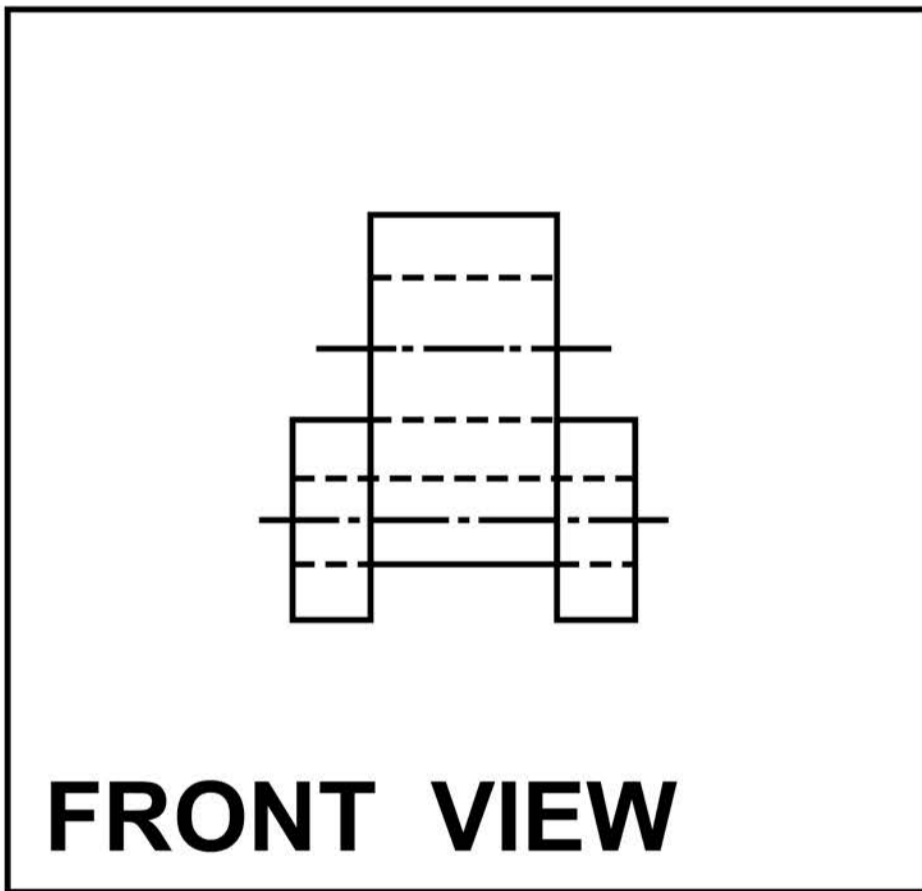
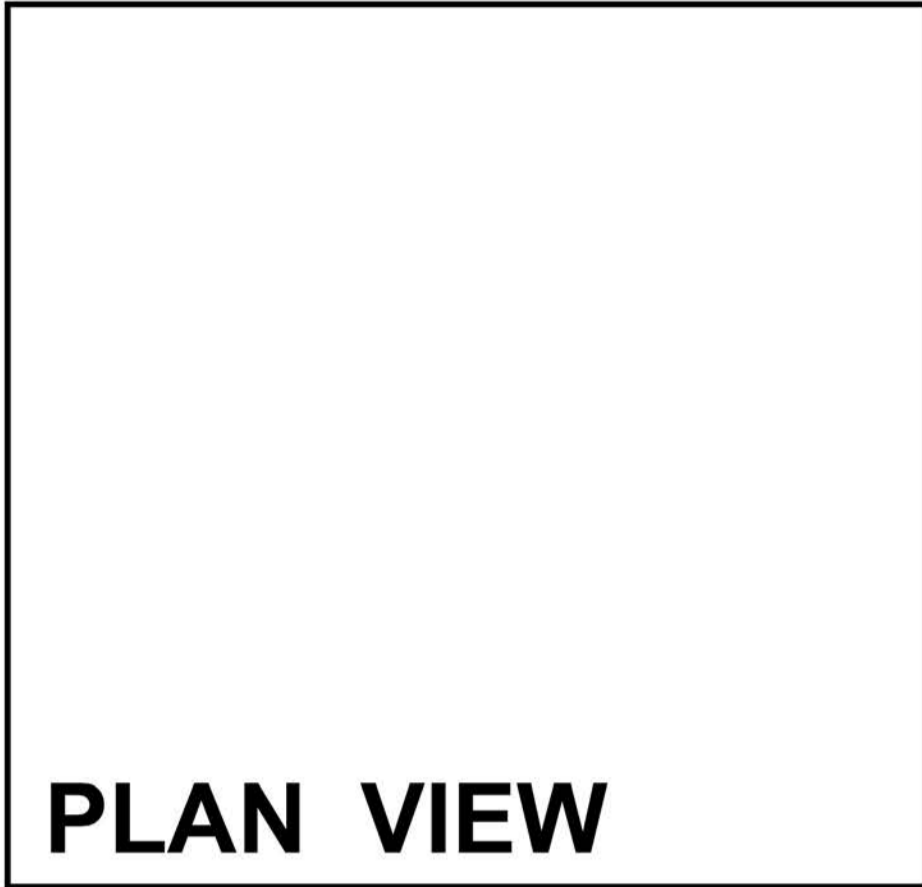


2	3
---	---

On the opposite page, there is a drawing of a toy car.

Complete a third angle orthographic projection by adding a PLAN VIEW in the box provided. [6 marks]





[Turn over]

24.1

Two pieces of fabric are to be joined together by stitching.

The length of the join is 960 mm.

A sewing machine will stitch at a rate of 1050 stitches per minute and each stitch will be 3 mm long.

Calculate how many SECONDS it will take to join the two pieces of material.

Give your answer to the nearest whole second.

Show your working. [4 marks]



24.2

Calculate how many MINUTES it will take to complete 30 joins.

Show your working. [2 marks]

_____ **minutes**

25

Explain what is meant by avoiding design fixation.

Give examples to support your answer. [4 marks]

26.1

Explain what is meant by the term 'tolerance' when measuring a component. [2 marks]

26.2

Describe how tolerances are used as part of Quality Control.

Give examples in your answer. [4 marks]

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For Examiner's Use	
Section	Mark
A	
B	
C	
TOTAL	

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6 4



2 4 6 G 8 5 5 2 / W