



Surname _____

Forename(s) _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

GCSE

DESIGN AND TECHNOLOGY

Unit 1 Written Paper

8552/W

Monday 19 June 2023

Morning

Time allowed: 2 hours

[Turn over]



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At 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.**

[Turn over]



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



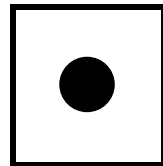
SECTION A – CORE TECHNICAL PRINCIPLES

Answer ALL questions in this section.

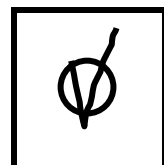
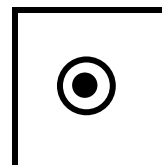
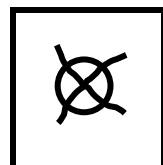
Each of Questions 01 to 10 is followed by four responses, A, B, C and D.

For each question completely fill in the circle alongside the appropriate answer.

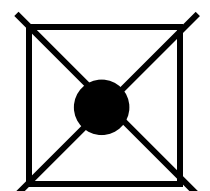
CORRECT METHOD



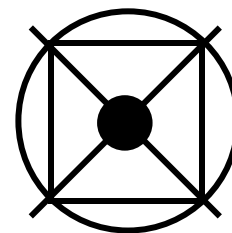
WRONG METHODS



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.



[Turn over]



0	1
---	---

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

☐

A Carbonfibre reinforced plastic (CRP)

☐

B Graphene

☐

C High impact polystyrene (HIPS)

☐

D Titanium



0	2
---	---

Which ONE of the following statements is true? [1 mark]

☐

A Coal is used to generate hydro-electric power.

☐

B Fossil fuels produce argon when they burn.

☐

C Gas is a renewable resource extracted from the ground.

☐

D Oil is extracted from the ground to produce petroleum.

[Turn over]



0	3
---	---

Which ONE of the following statements is true? [1 mark]

☐

A Batteries can be safely thrown away with household rubbish.

☐

B Rechargeable batteries can only be used ten times.

☐

C Toys that use batteries do not have any safety features.

☐

D Zinc carbon batteries leak and corrode.



0	4
---	---

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

☐

A Epoxy resin (ER)

☐

B High density polythene (HDPE)

☐

C Melamine formaldehyde (MF)

☐

D Polyester resin (PR)

[Turn over]



0	5
---	---

**Which ONE of the following is a
WORKING property of a material?
[1 mark]**

☐

A Absorbency

☐

B Density

☐

C Fusibility

☐

D Malleability



0	6
---	---

When manufacturers focus on the reduction of waste during production, it is called

- ☐ **A batch manufacture.**
- ☐ **B flexible manufacture.**
- ☐ **C lean manufacture.**
- ☐ **D mass manufacture.**

[1 mark]

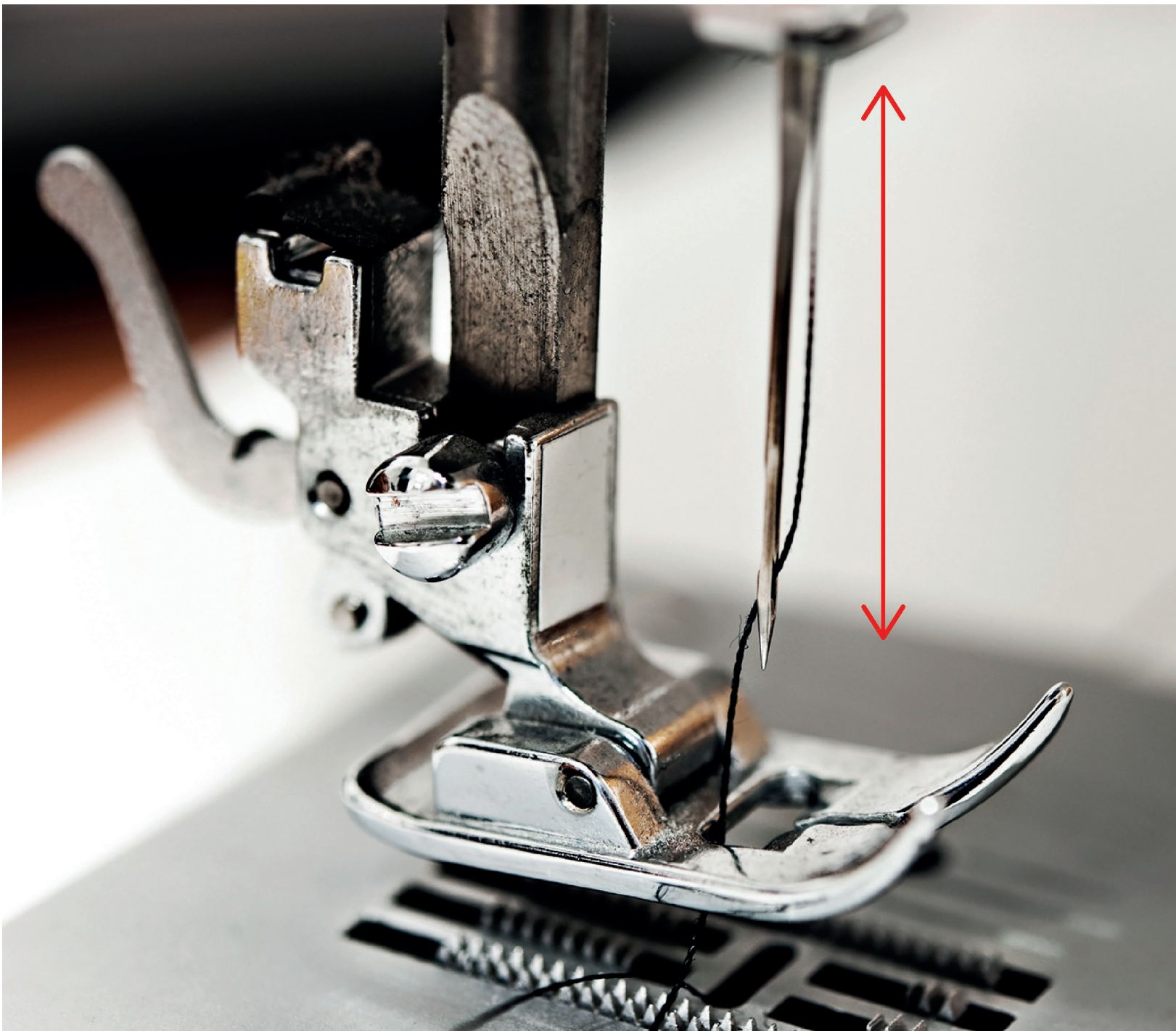
[Turn over]

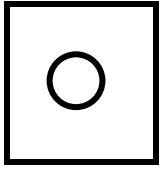


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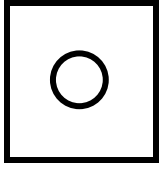
What type of motion best describes the action of the sewing machine needle in FIGURE 1 when in operation? [1 mark]

FIGURE 1

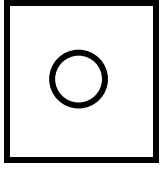




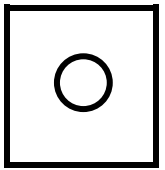
A Linear



B Oscillating



C Reciprocating



D Rotary

[Turn over]



0	8
---	---

Which ONE of the following is a feature of design in society? [1 mark]

☐

A Focus on machines

☐

B Focus on materials

☐

C Focus on people

☐

D Focus on resources



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[Turn over]

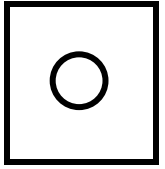


0	9
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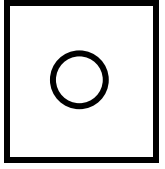
**Name the renewable energy source in
FIGURE 2. [1 mark]**

FIGURE 2

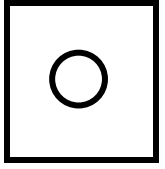




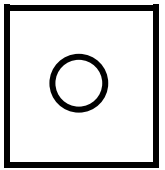
A Solar



B Tidal



C Wave



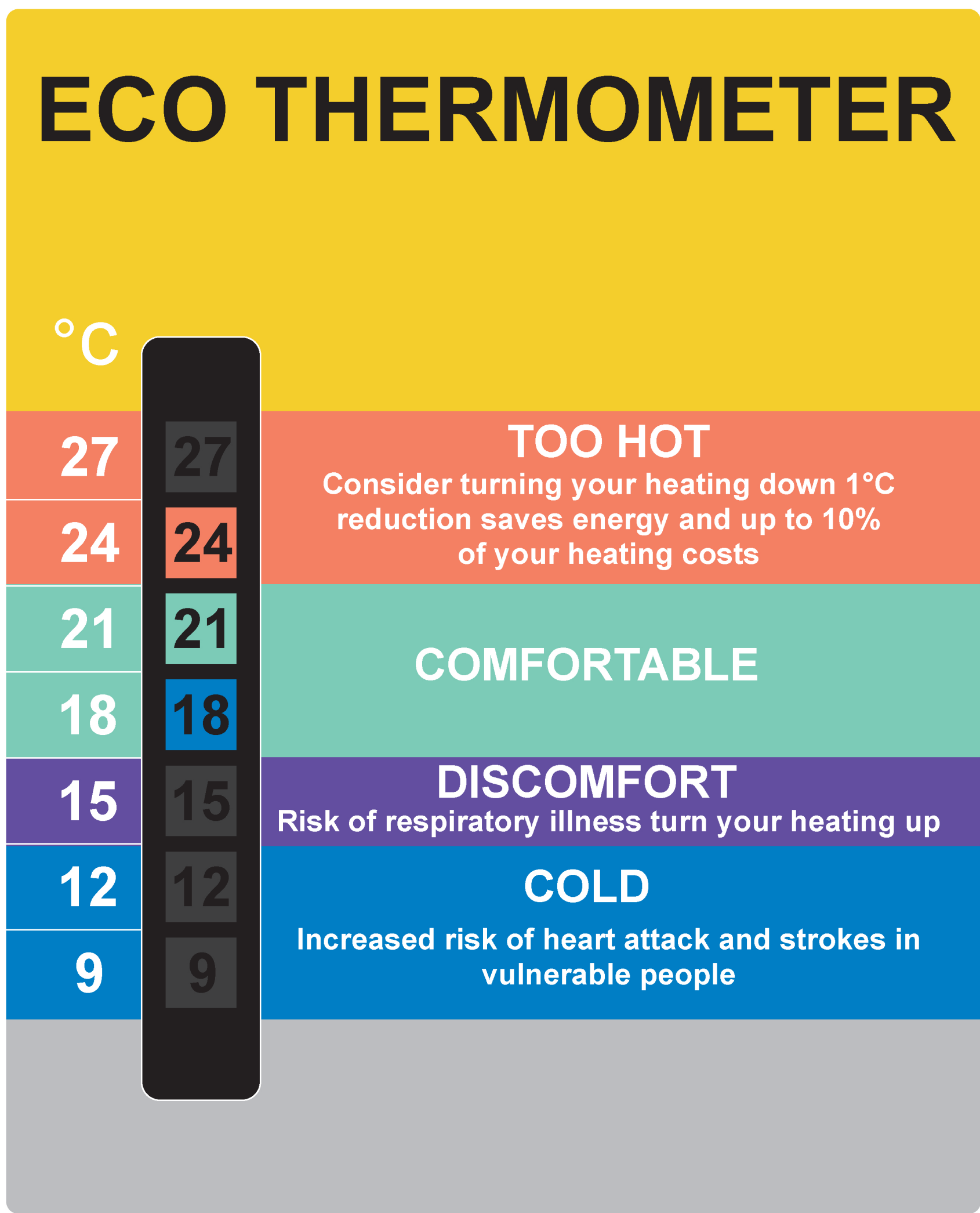
D Wind

[Turn over]



10

Identify the colour-changing smart material used in the thermometer below.
[1 mark]



☐

A Liquid crystal display

☐

B Nanomaterial

☐

C Photochromic pigment

☐

D Thermochromic pigment

[Turn over]



1	1	.	1
---	---	---	---

Name ONE manufactured board.
[1 mark]

1	1	.	2
---	---	---	---

**Explain ONE advantage of using
manufactured boards. [2 marks]**



1	2
---	---

Explain the term ‘planned obsolescence’.

Give an example of a product designed for ‘planned obsolescence’ in your answer. [3 marks]

[Turn over]



1	3
---	---

Give TWO advantages of ‘crowd funding’. [2 marks]

Advantage 1 _____

Advantage 2 _____



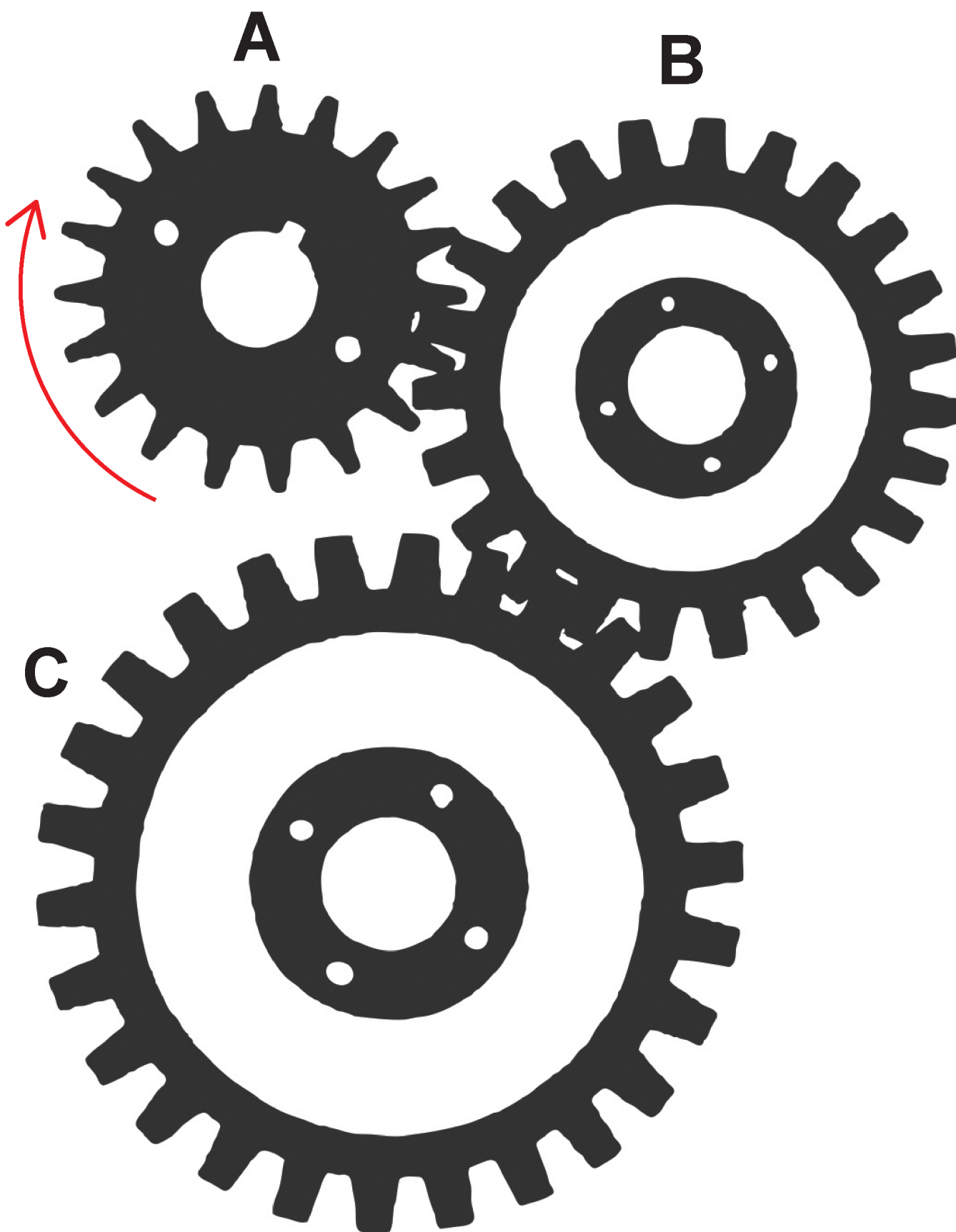
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[Turn over]



1	4
---	---

Describe the direction and speed of movement of PART C in the gear train shown below when gear A turns clockwise. [2 marks]



[Turn over]

20



SECTION B – SPECIALIST TECHNICAL PRINCIPLES

Answer ALL questions in this section.

1	5
----------	----------

A clothing manufacturer is producing 1500 coats for retail. Each coat will need four buttons and one extra for a spare. Each button costs 14 pence.

What is the total cost of the buttons required to complete the order?

Show your working.

Give your answer in £s. [3 marks]



Answer £ _____

[Turn over]

BLANK PAGE



1	6
---	---

Give TWO aesthetic considerations when selecting materials and/or components to make prototypes. [4 marks]

Consideration 1 _____

Consideration 2 _____

[Turn over]



17

The data in the table below shows the approximate percentage of vehicles sold in the UK in 2021 by the type of fuel/power they use.

Percentage of vehicles sold in 2021 by fuel/power type	
Petrol	54%
Diesel	10%
Hybrid	17.5%
Plug-in hybrid	7.5%
Electric	11%



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[Turn over]

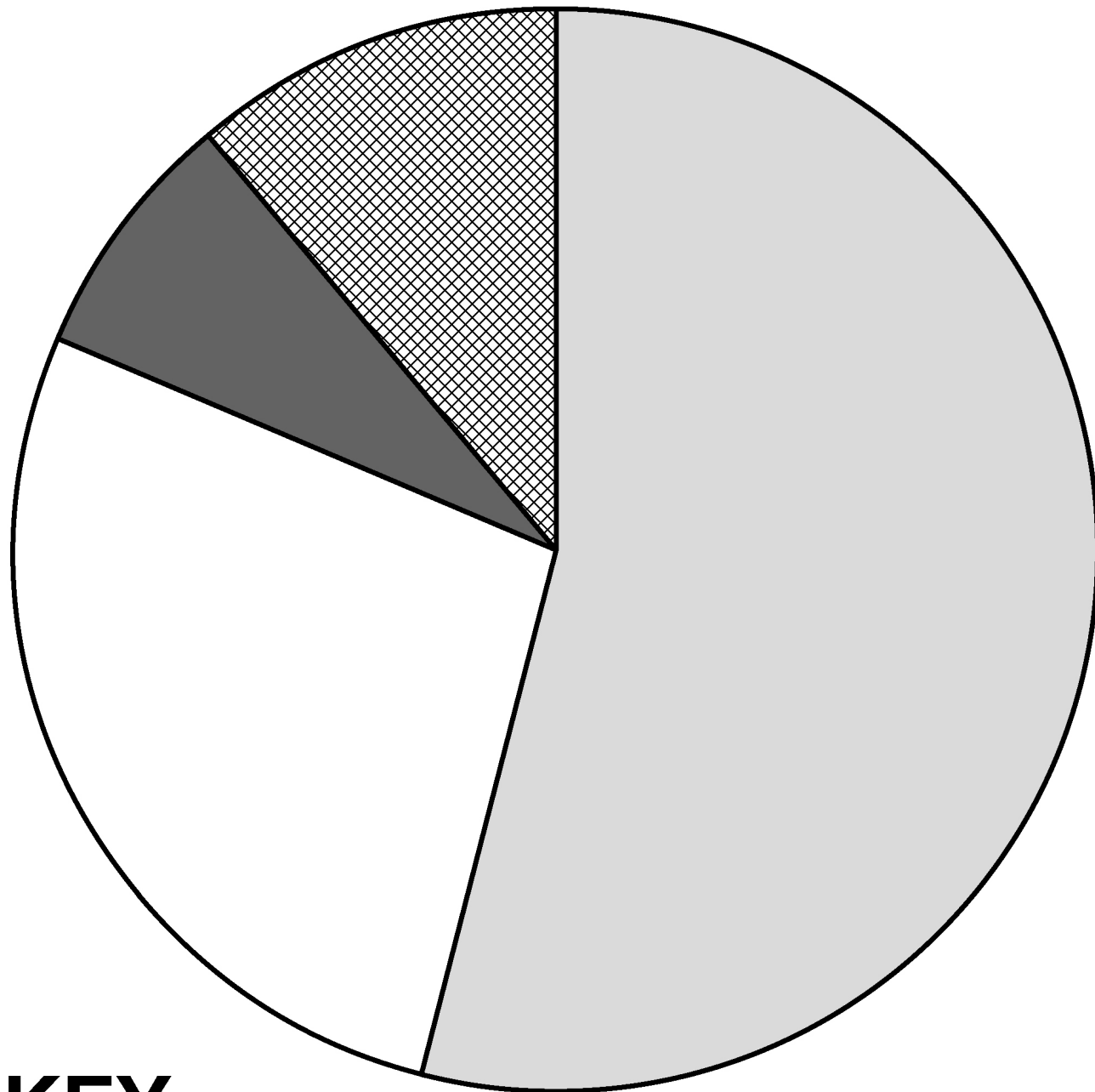


Use the information in the table, on page 32, to complete the pie chart on the opposite page.


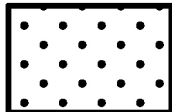
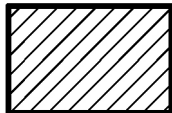

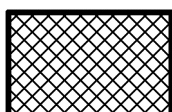
Show your working. [4 marks]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

35



KEY

-  **Petrol**
-  **Diesel**
-  **Hybrid**
-  **Plug-in hybrid**
-  **Electric**

[Turn over]



1	8
---	---

Choose ONE commercial process from the list below.

- **Paper and board die cutting**
- **Wood turning**
- **Metal casting**
- **Polymer extrusion**
- **Textile weaving**
- **Electronic pick and place assembly**

My chosen process is _____



1	8	.	1
---	---	---	---

Name a SPECIFIC main material used with this process. [1 mark]

1	8	.	2
---	---	---	---

Name a stock form of the material used in your chosen process. [1 mark]

[Turn over]



18.3

Give TWO reasons that make your chosen process suitable for commercial manufacture. [4 marks]

Reason 1 _____

Reason 2 _____

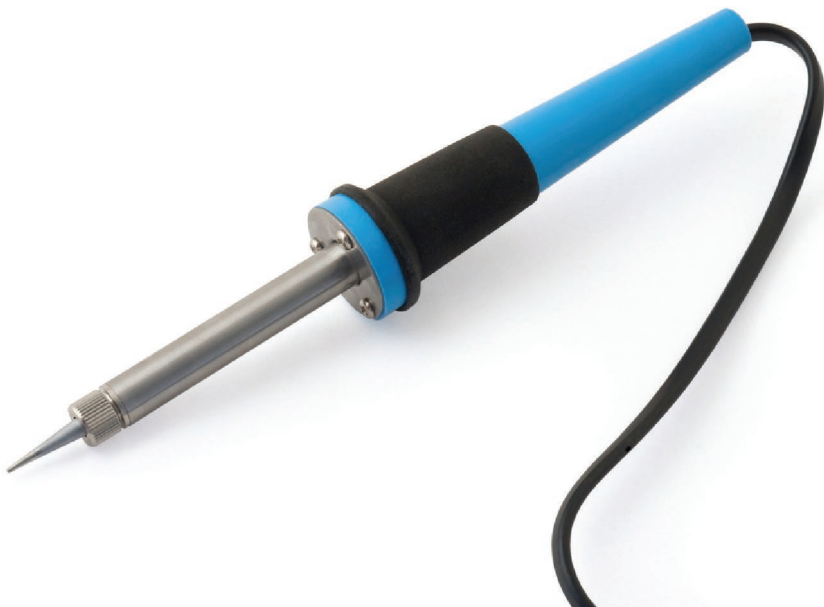
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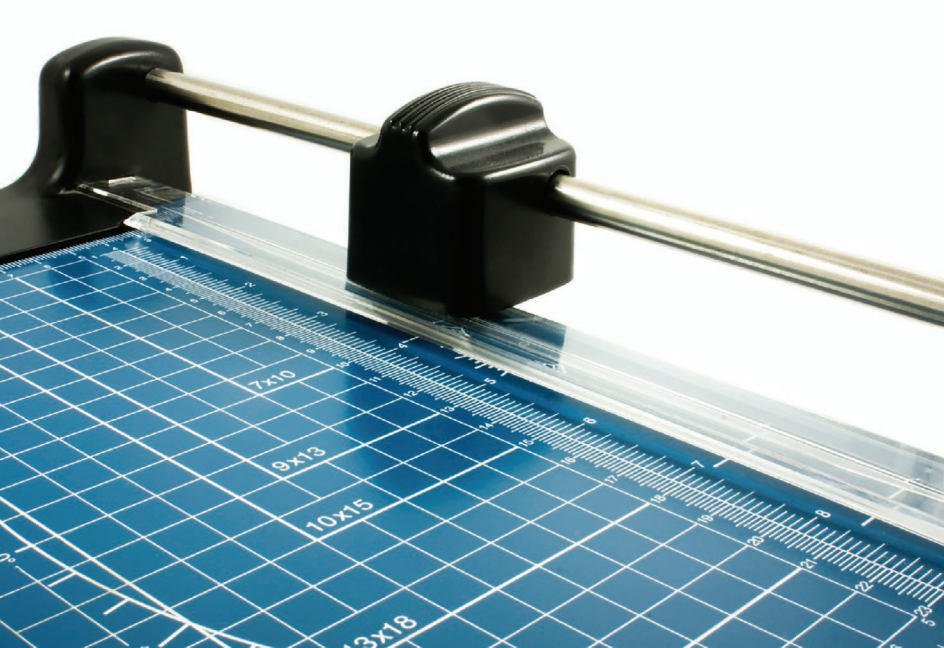
[Turn over]



1	9
---	---

Five tools are shown below and on the opposite page.





[Turn over]

1	9	.	1
---	---	---	---

Name ONE of the tools shown on pages 40 and 41. [1 mark]

1	9	.	2
---	---	---	---

Explain what the tool you have named in Question 19.1 is used for. [2 marks]

1	9	.	3
---	---	---	---

Give TWO safety points that need to be considered when using the tool you have named in Question 19.1. [2 marks]

Safety point 1 _____

Safety point 2 _____

[Turn over]



2	0
---	---

Different products are made in different volumes using the production methods in the list below.

- **Prototype/one-off**
- **Batch**
- **Mass**
- **Continuous**

Discuss the advantages and disadvantages of manufacturing in quantity compared to producing a one-off item.

You should refer to the production methods in the table and give examples in your answer. [8 marks]



This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[Turn over]



46

30



SECTION C – DESIGNING AND MAKING PRINCIPLES

Answer ALL questions in this section.

2	1
----------	----------

Describe how prototypes help designers to ensure a product is fit for its intended purpose.

Give examples in your answer. [6 marks]

[Turn over]



The TWO bags, on pages 49 and 50, are used by children to carry belongings and equipment.



RUCKSACK



SPECIFICATION:

- lightweight
- waterproof
- high visibility
- adjustable straps
- carrying handle
- compartments.

[Turn over]



DRAWSTRING BAG



SPECIFICATION:

- **lightweight**
- **compact design**
- **large single storage space**
- **simple construction**
- **waterproof.**



Analyse and evaluate both products in terms of:

2 2 . 1

The suitability for the user. [6 marks]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[Turn over]



22.2

Ergonomics and anthropometrics.
[6 marks]



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[Turn over]



2	3
---	---

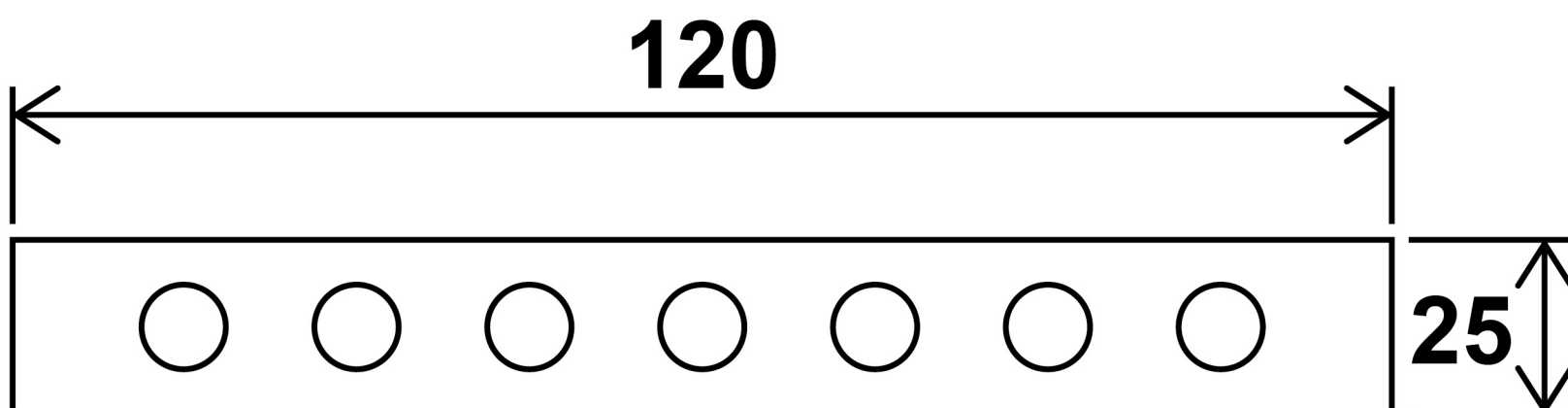
The component below is to be manufactured with seven circular holes.

Each hole is:

- **7 mm in diameter**
- **equally spaced from each other AND from each end of the component**
- **equally spaced from the top and bottom of the component.**

The diagram is not drawn to scale.

All dimensions in mm



2	3	.	1
---	---	---	---

What distance will the centre line need to be from either long side? [1 mark]

Answer _____ **mm**

[Turn over]



2	3	.	2
---	---	---	---

What is the required distance from the centre of one hole to the centre of the next hole to ensure the holes are equally spaced?

Show your working. [2 marks]

Answer _____ **mm**



2	3	.	3
---	---	---	---

Work out the shortest distance between the circumferences of any two holes.

Show your working. [2 marks]

Answer _____ **mm**

[Turn over]



2	3	.	4
---	---	---	---

The holes are to be drilled 7 mm with a tolerance of ± 0.5 mm. State the maximum and minimum acceptable diameters of the holes. [1 mark]

<hr/>	Max mm
<hr/>	Min mm

2	4
---	---

**Explain why designers look at the work of others before creating new designs.
[3 marks]**

[Turn over]



2	5
---	---

Explain how a user-centred design approach can ensure that products are fit for purpose.

Give examples in your answer. [6 marks]

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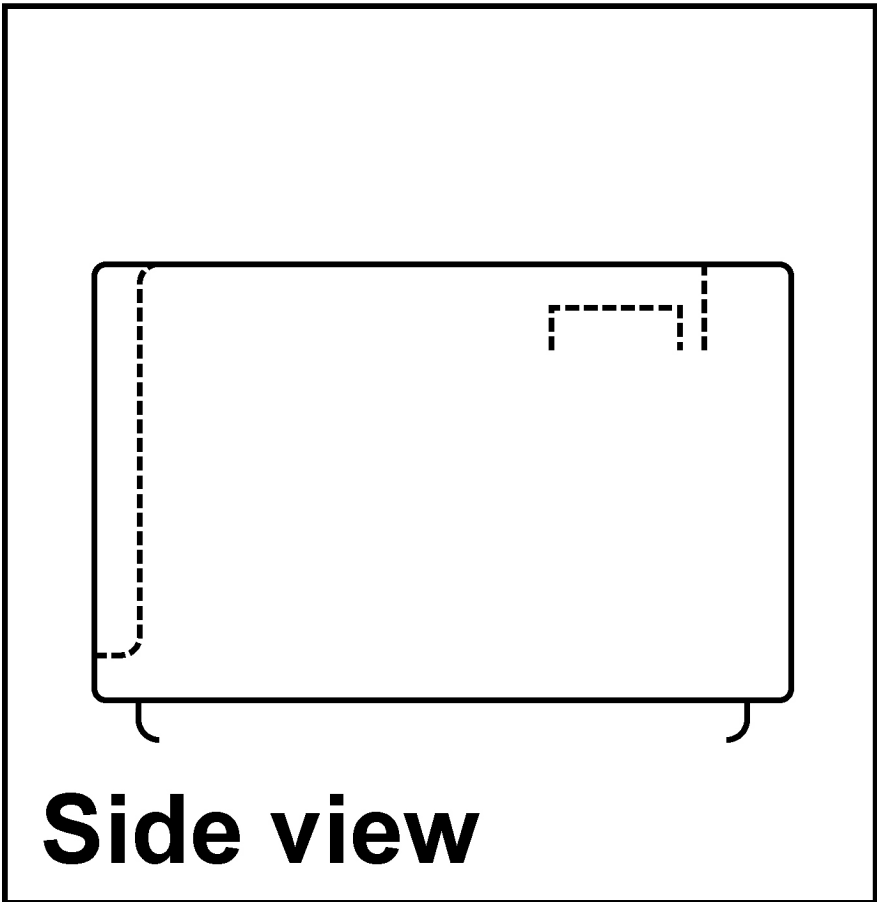
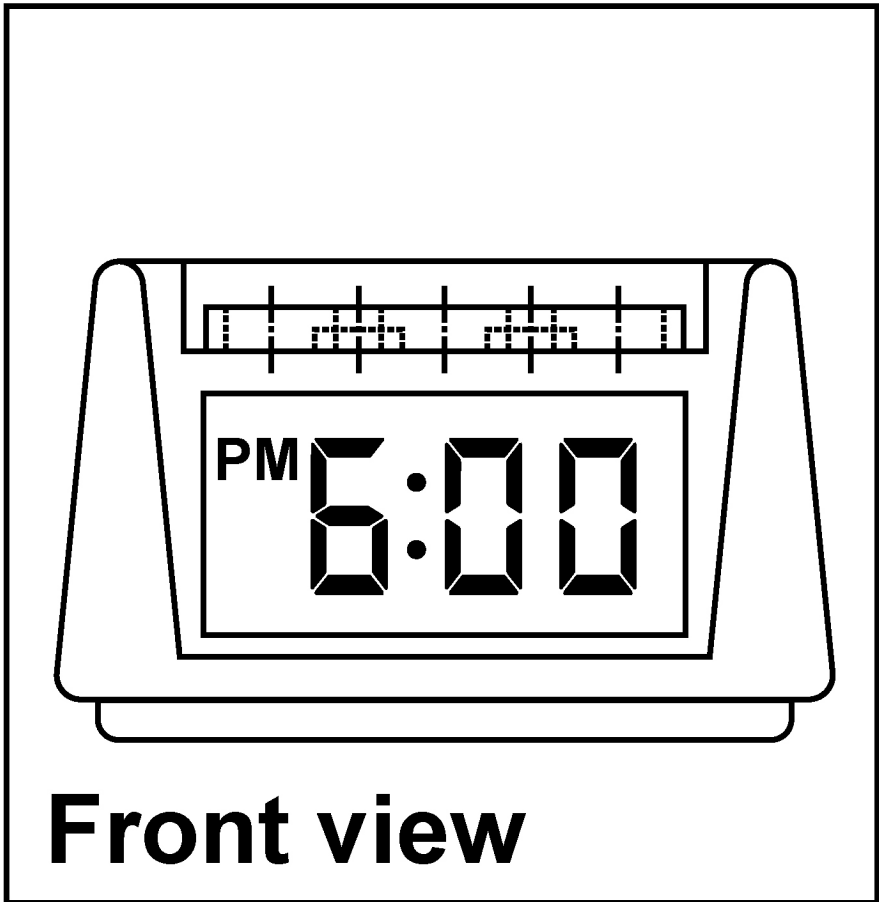
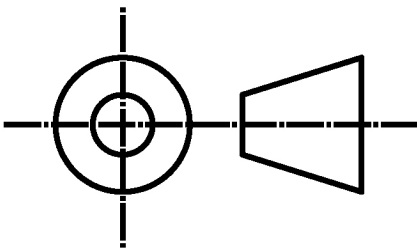
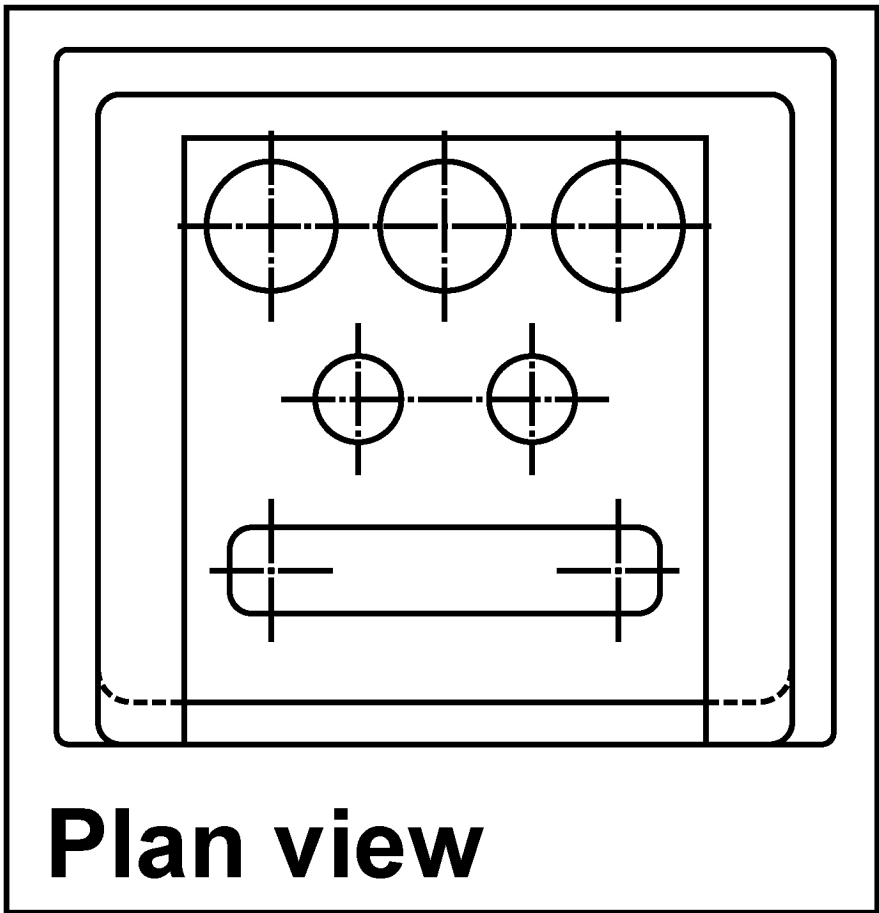
[Turn over]



26

FIGURE 3, shown below, is a drawing of a radio alarm clock.

FIGURE 3



2	6	.	1
---	---	---	---

Name the drawing technique in FIGURE 3 used to show details of the radio alarm clock. [1 mark]

2	6	.	2
---	---	---	---

Complete the drawing in FIGURE 3 by adding the correct detail to the side view. [4 marks]

[Turn over]

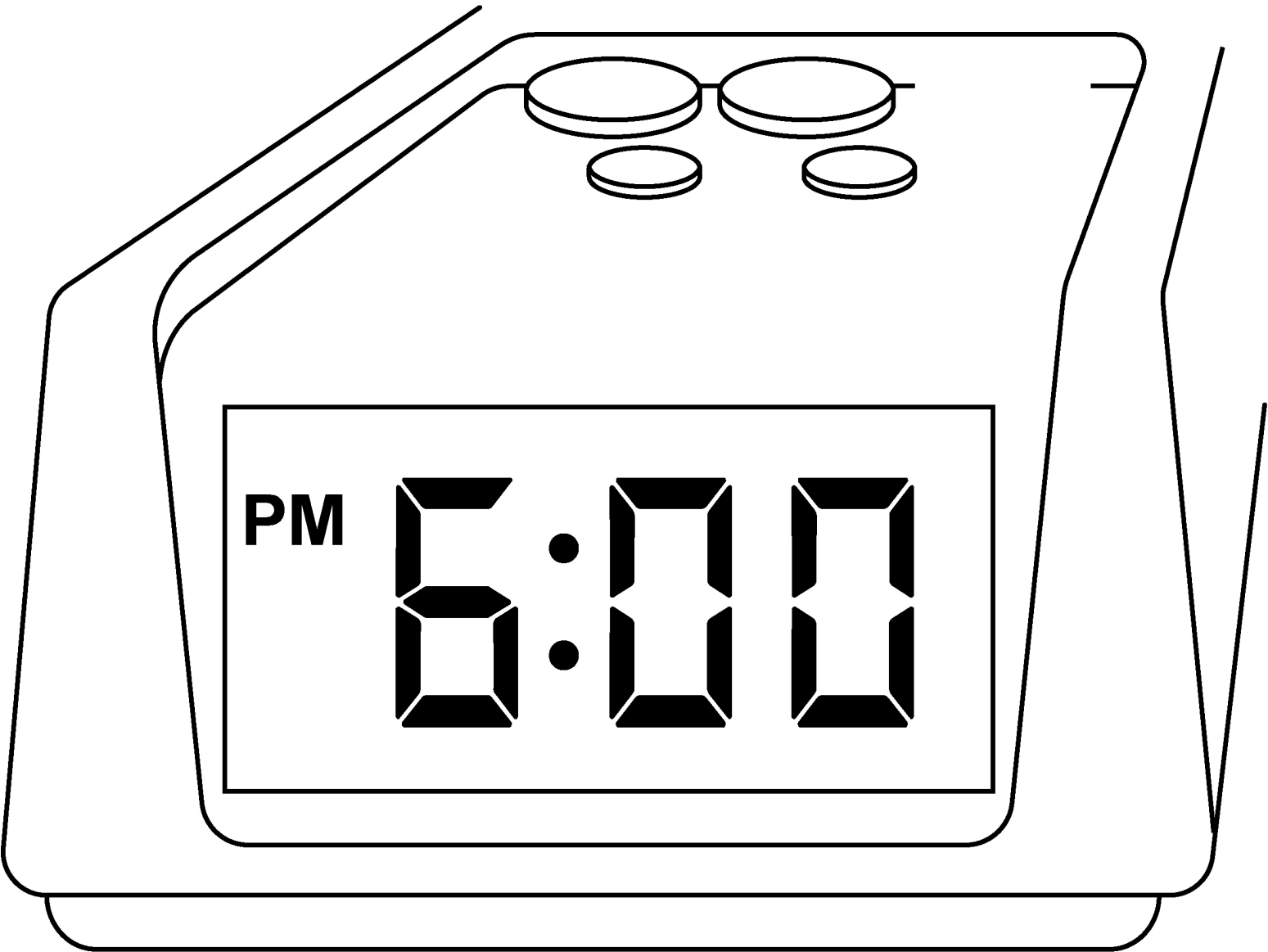
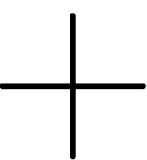


2	6	.	3
---	---	---	---

FIGURE 4, on the opposite page, shows a partially completed one-point perspective drawing of the radio alarm clock.

**Complete the drawing using the given vanishing point marked by a cross.
[4 marks]**

FIGURE 4



[Turn over]



27

Explain TWO advantages of using audio and/or visual recordings when developing design ideas. [4 marks]

Advantage 1 _____

Advantage 2 _____



28

Explain how EACH of the following issues may be considered before designing and manufacturing new products. [4 marks]

Fair trade _____

Global warming _____

END OF QUESTIONS



Additional page, if required.

Write the question numbers in the left-hand margin.

This image shows a blank sheet of white paper with horizontal ruling lines. A single vertical line runs down the left side, creating a margin. There are 20 horizontal lines in total, evenly spaced across the page. The lines are thin and black.

Additional page, if required.
Write the question numbers in the left-hand margin.

Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

Additional page, if required.

Write the question numbers in the left-hand margin.



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Section	Mark
A	
B	
C	
TOTAL	

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