



FOR OFFICIAL USE

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National
Qualifications
2017

Mark

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X735/75/01**Graphic Communication**

WEDNESDAY, 10 MAY

1:00 PM – 2:30 PM



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Fill in these boxes and read what is printed below.

Full name of centre

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Town

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Forename(s)

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Surname

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Number of seat

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Date of birth

Day

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Month

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Year

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Scottish candidate number

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Total marks — 60

Attempt ALL questions.

All dimensions are in mm.

All technical sketches and drawings use third angle projection.

You may use rulers, compasses or trammels for measuring.

In all questions you may use sketches and annotations to support your answer if you wish.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting.

Use **blue** or **black** ink.

Before leaving the examination room you must give this booklet to the Invigilator; if you do not, you may lose all the marks for this paper.



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-
- A 3D rendering of a green handle with a grey base. The handle is cylindrical and has a grey, conical section at its base, which is shown in a cross-section view. The base is a square plate with a circular hole in the center. The handle is inserted into this hole. The image is a 3D model, likely created using CAD software, showing the handle and base in a perspective view. The handle is green, and the base is grey. The cross-section of the handle shows a grey, conical shape, which is likely a representation of the handle's internal structure or a specific design feature. The base has a circular hole, and the handle is inserted into it. The image is a 3D model, likely created using CAD software, showing the handle and base in a perspective view. The handle is green, and the base is grey. The cross-section of the handle shows a grey, conical shape, which is likely a representation of the handle's internal structure or a specific design feature. The base has a circular hole, and the handle is inserted into it.

-
- This exploded view diagram illustrates the components of a door hinge. It includes two rectangular mounting plates, each with two circular screw holes. Four screws are shown, intended to secure the plates to the door and frame. A cylindrical pin is positioned to connect the two plates, and a wedge-shaped piece is shown at the end of the pin to lock it in place.

- 1

- 3

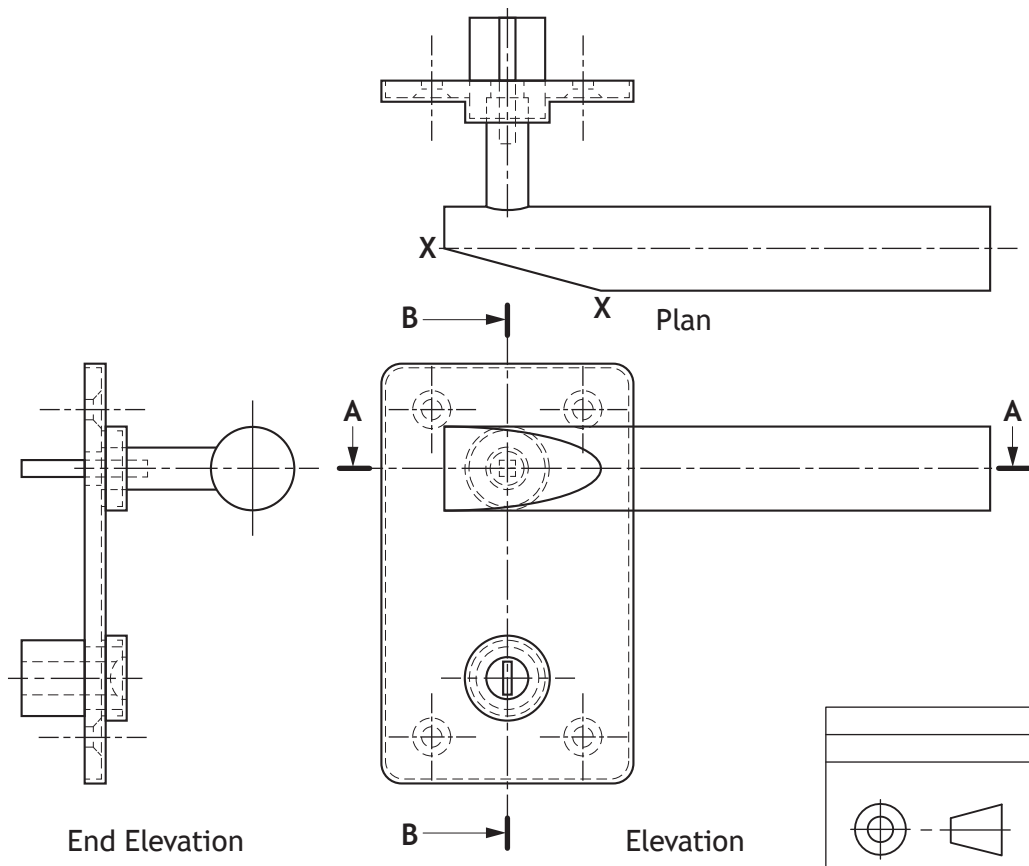


1. (continued)

MARKS

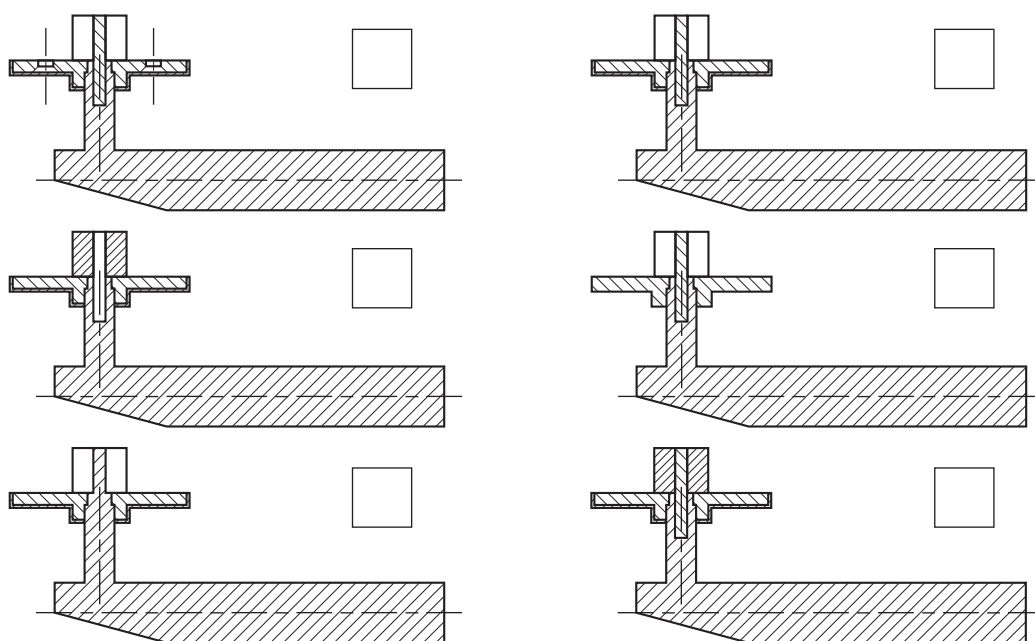
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Orthographic sectional views, shown below, were produced for manufacture. The fixing screws have been removed for clarity.



(b) Identify the correct sectional plan A-A by ticking (✓) a box below.

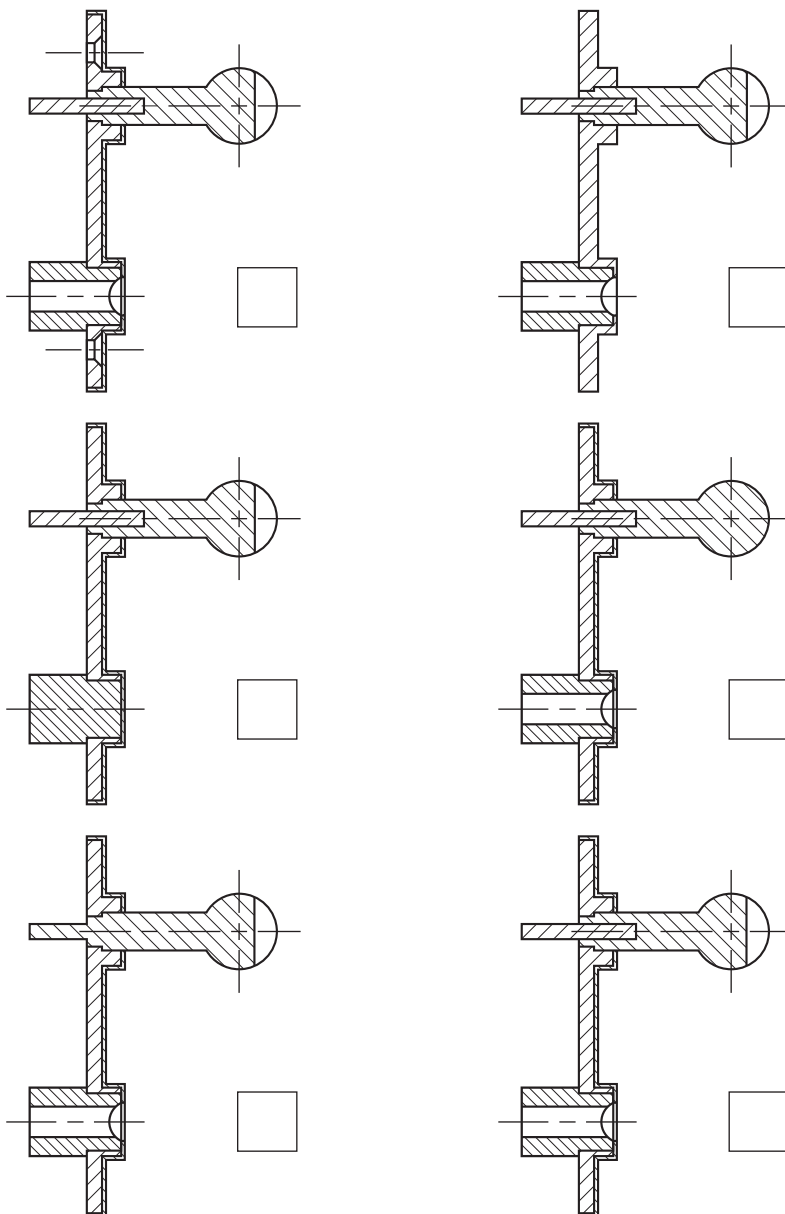
1



* X 7 3 5 7 5 0 1 0 4 *

1. (continued)

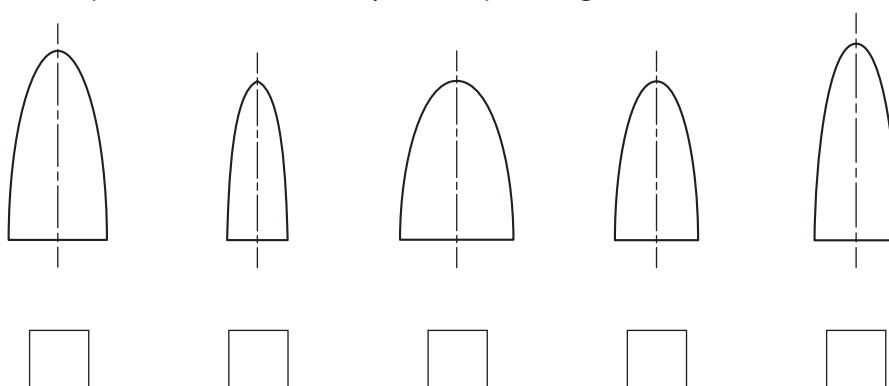
(c) Identify the correct sectional end elevation **B-B** by ticking (✓) a box below. 1



(d) A true shape of cut surface **X-X** was required.

Identify the correct true shape **X-X** by ticking (✓) a box below.

1



* X 7 3 5 7 5 0 1 0 5 *

1. (continued)

MARKS

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- (e) When producing sectional drawings, different component parts are identified through the use of hatching.

Describe two ways that hatching can be **varied** to aid the identification of different component parts.

2

- (f) When producing sectional drawings there are certain components and features that are not normally hatched.

State two components or features that are **not** normally hatched in a sectional view.

2



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[Turn over for next question

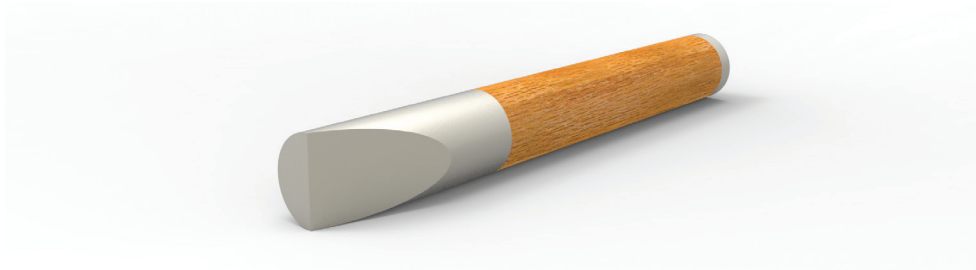
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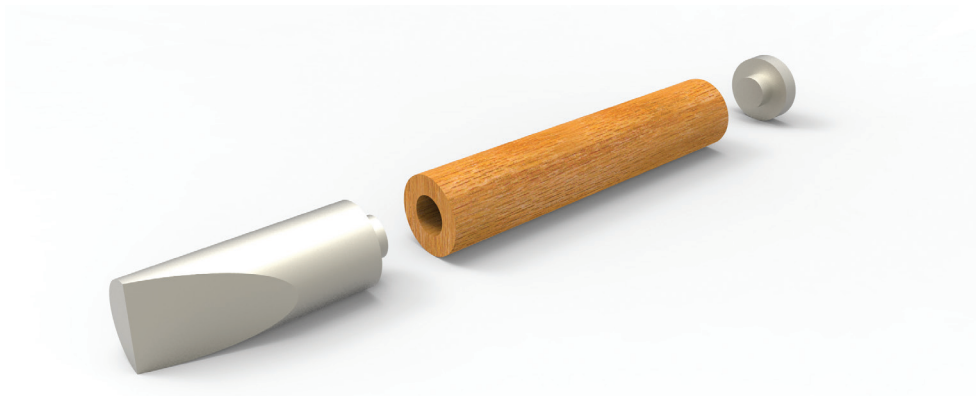
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1. (continued)

- (g) “Portal” want to expand their range of door handles. They have developed an interchangeable design that allows a handle to be removed and replaced.

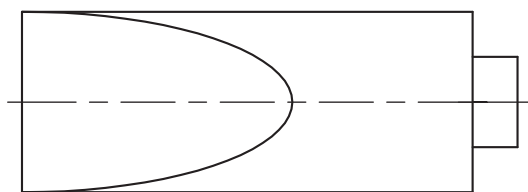


Assembled CAD illustration

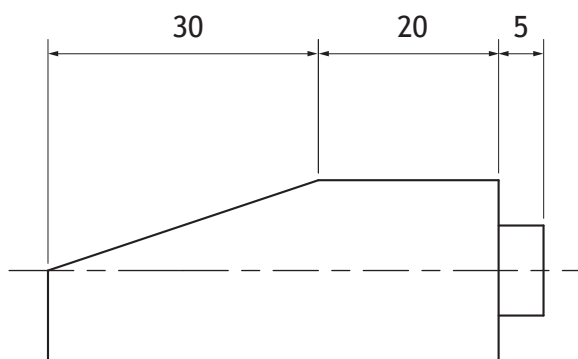


Exploded CAD illustration

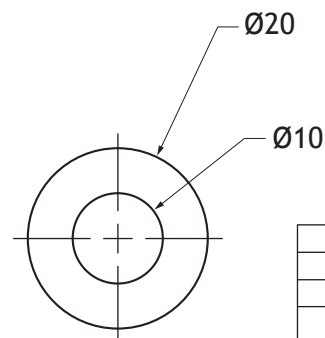
An orthographic drawing for one of the handle components is shown below.



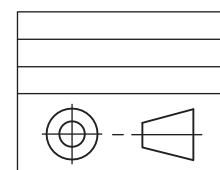
Plan



Elevation



End elevation



* X 7 3 5 7 5 0 1 0 8 *

1. (g) (continued)

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Describe, using the correct dimensions and 3D CAD modelling terms, how you would use 3D CAD software to model the handle component in the orthographic drawing, shown opposite. You may use sketches to support your answer.

4



* X 7 3 5 7 5 0 1 0 9 *

2. An architectural company have designed a new modular seating system that will be the focal point of a city centre redevelopment. A billboard display will be placed at the site, communicating the design to the public.

Before arriving at the final layout the graphic designer first produced the draft layout, shown below.



Draft layout

The draft layout was then developed. The final layout is shown below.



Final layout



2. (continued)

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(a) Describe how the graphic designer has applied each of the design elements and principles, listed below, to produce the **final layout**.

(i) Alignment

1

(ii) Unity

1

(iii) Contrast

1

[Turn over



* X 7 3 5 7 5 0 1 1 1 *

2. (continued)

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- (b) The billboard is to be placed on a busy street where pedestrians and traffic will pass by.

Explain how the location of the billboard has influenced the design of the final layout.

1

- (c) When the graphic designer produced the final layout, the following DTP features were used: **Grid** and **Snap to grid**.

Describe two ways these DTP features assist the graphic designer.

2



* X 7 3 5 7 5 0 1 1 2 *

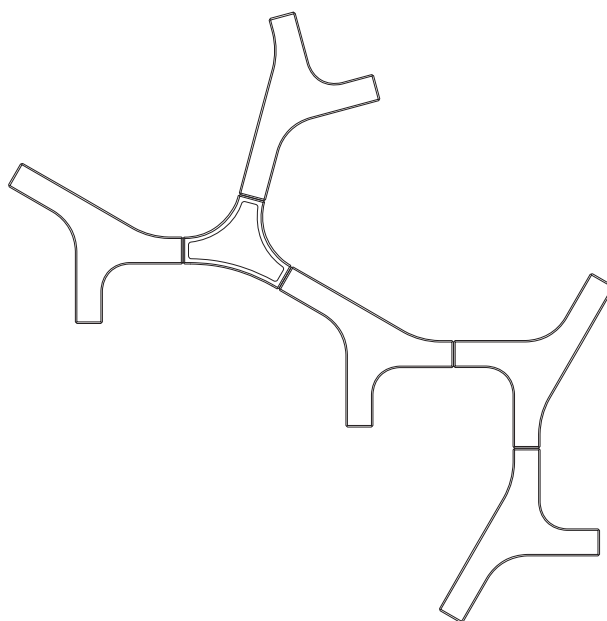
2. (continued)

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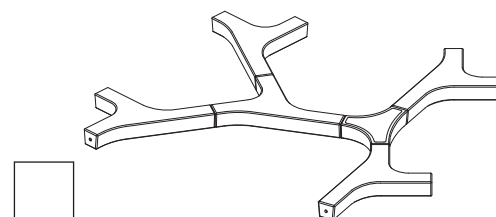
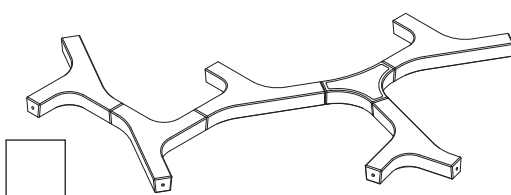
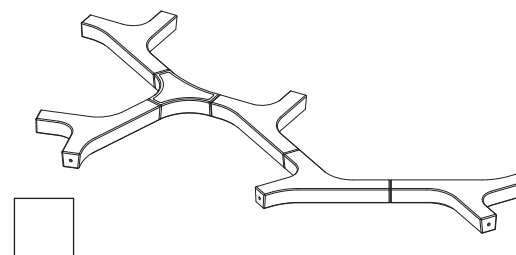
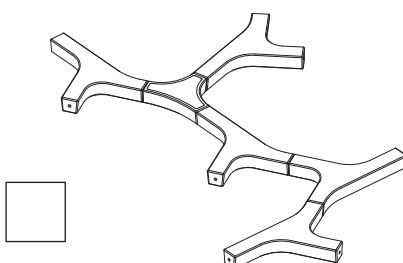
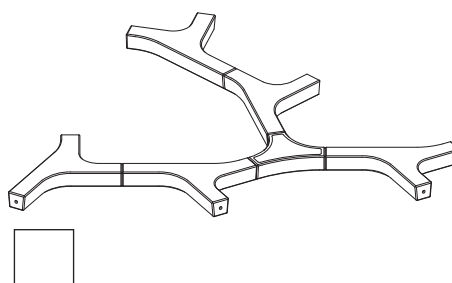
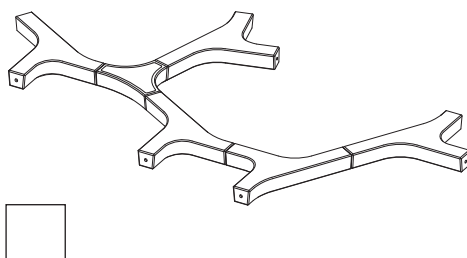
- (d) The design of the seating system allows a number of different arrangements to be created.

An orthographic assembled plan of one arrangement is shown below.



Identify the **two** pictorial assembly drawings that match the arrangement shown above in the orthographic assembled plan, by ticking (✓) two boxes below.

2

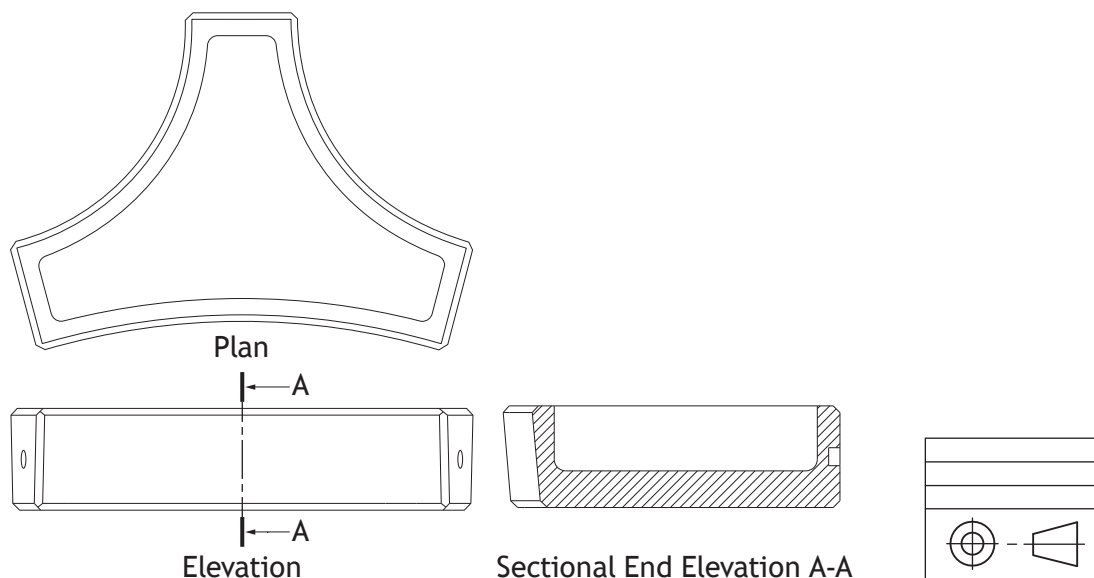


2. (continued)

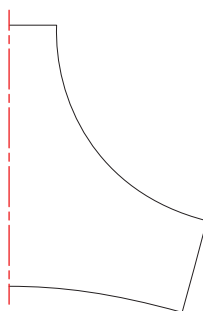
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The planter component of the seating system was modelled using 3D CAD software. Orthographic drawings of the planter component are shown below.



- (e) A CAD technician created a sketch of the planter profile. The first stage of the sketch is shown below.



- (i) State the name of the 2D CAD command that would be used to complete the sketch above.

1

- (ii) Describe one benefit of using this CAD command in creating this sketch.

1



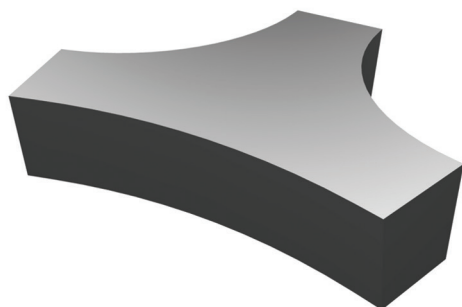
2. (continued)

MARKS

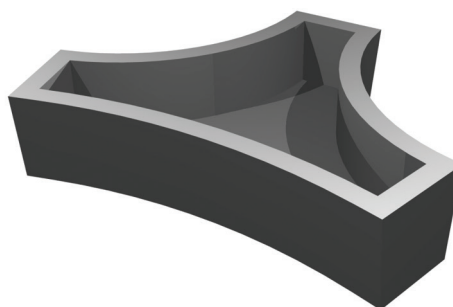
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- (f) From the 2D sketch, Stage 1 was produced. Further stages of the 3D CAD model are shown below.

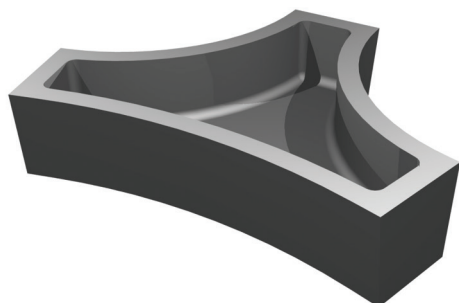
Stage 1



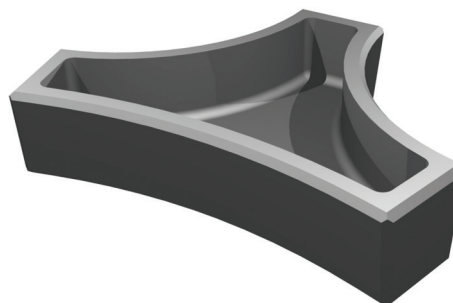
Stage 2



Stage 3



Stage 4



At each stage a 3D CAD modelling **feature** or **edit** has been used.

State the 3D CAD modelling **feature** or **edit** used in creating each stage.
Stage 1 is already given.

You should refer to the orthographic drawings shown opposite.

Stage 1 Loft

(i) Stage 2 _____ 1

(ii) Stage 3 _____ 1

(iii) Stage 4 _____ 1

[Turn over

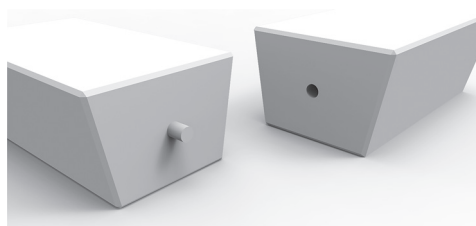


2. (continued)

MARKS

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Illustrated views of two of the seating modules are shown below.



Locating peg

Socket

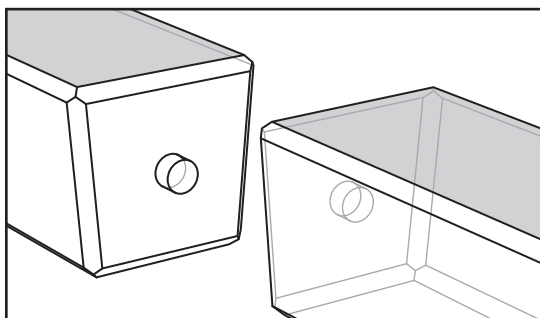
(g) The components are connected by locating pegs and sockets.

- (i) Indicate, by **shading**, the relevant **surfaces** and state, using 3D CAD terms, how you would assemble and constrain the given components.

5

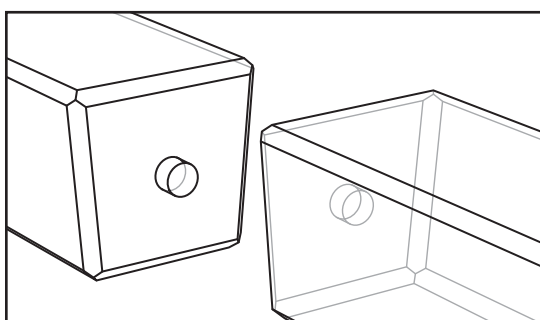
Stage one has been shaded for you.

Stage one



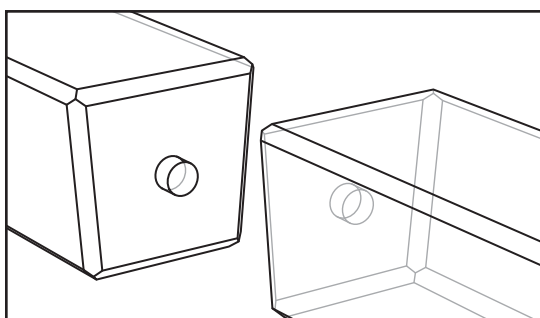
Constraint used

Stage two



Constraint used

Stage three



Constraint used



2. (g) (continued)

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The seating system was added to a library of standard components.

(ii) Describe two ways a CAD library can assist the design process.

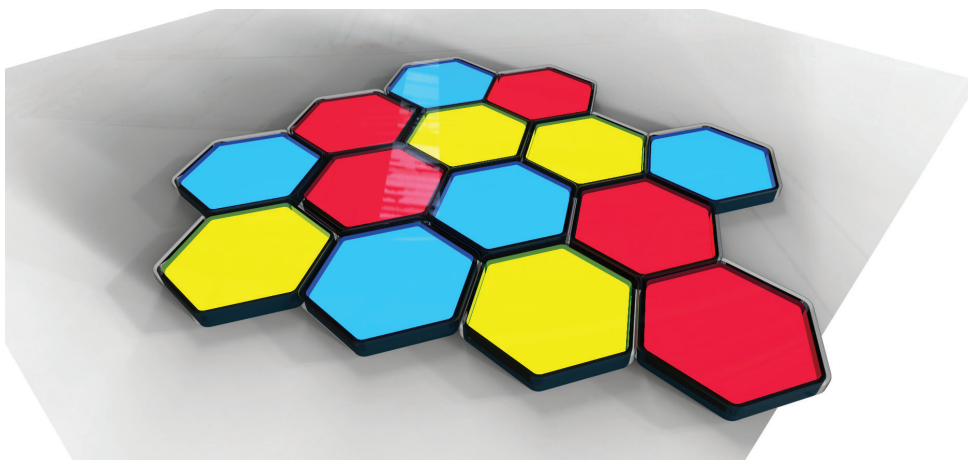
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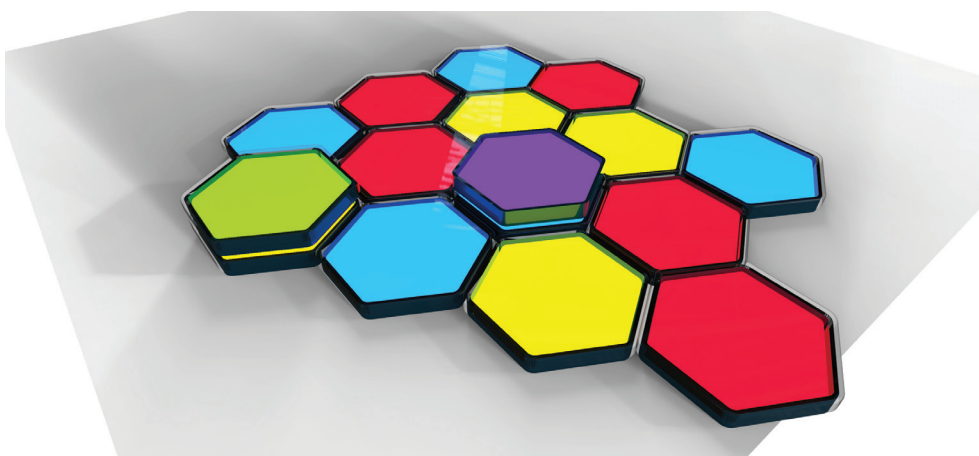


* X 7 3 5 7 5 0 1 1 7 *

3. “Colour Hive” is an educational toy designed to teach children about colour mixing. Each toy is a hexagonal tile that emits a primary colour. The colour is controlled through the use of a smartphone app.



The tiles are designed to be stackable. When a second coloured tile is stacked on top of the first, the colours of each tile are mixed to produce a secondary colour.



- (a) Complete the table below to show the top tile and resultant colours.

3

Bottom Tile	Top Tile	Resultant Colour
Red	Yellow	
Yellow		Green
Blue		Violet

3. (continued)

MARKS

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The smartphone app used to control the tiles is shown below.



- (b) The tints and shades of the tiles can also be controlled by using the smartphone app.

State how to create a shade of a colour.

1

- (c) Contrasting colours were used in the colour scheme of this smartphone app.

Explain why **contrast** is important in the design of the smartphone app.

1

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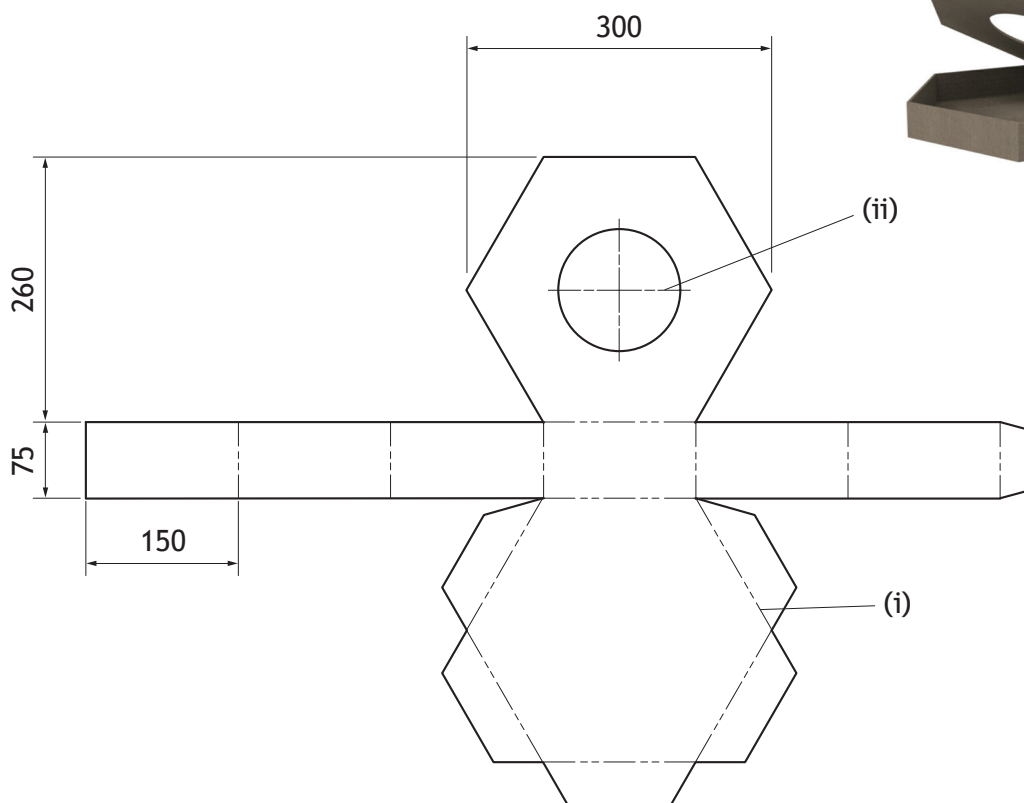


3. (continued)

MARKS

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- (d) The surface development for the packaging of one “Colour Hive” tile is shown below.



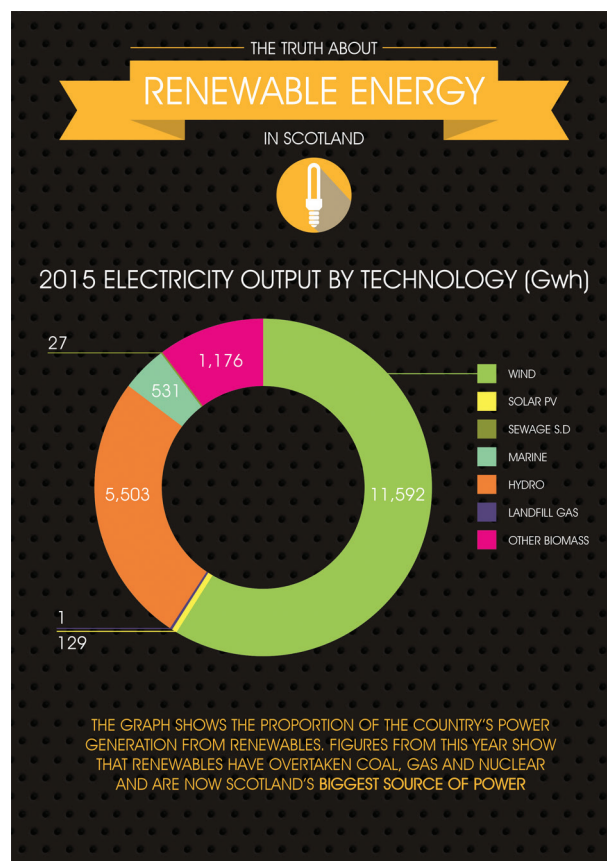
State the line types shown at (i) and (ii).

(i) _____ 1

(ii) _____ 1



4. A company, “Eco Future”, has created sets of educational cards that teach children about renewable energy in Scotland. One of the cards is shown below.



Card 1

- (a) State the name of the type of chart used on the card. 1
- _____
- (b) Explain, giving two reasons, why this choice of chart is appropriate for communicating this type of information. 2
- _____
- _____
- _____
- _____

[Turn over



4. (continued)

MARKS

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The designer used DTP software to produce the graphics on the cards. The same colour scheme was used for all of the cards.

- (c) Describe two ways the designer could use the DTP software to ensure the same colour scheme was used on every card.

2

The packaging and printed cards, prior to trimming, are shown below.



Cards prior to trimming



Trimmed cards and packaging

- (d) Describe three ways the cards and packaging could be produced to reduce the impact on the environment.

3

You should refer to both materials **and** printing methods in your answer.



5. “(S)TABLE” is a flat-pack stool/table designed using 3D CAD modelling software. A promotional graphic that includes a 3D CAD illustration of the product is shown below.

You should refer to the **Supplementary Sheets** for use with Question 5 before answering all parts of this question.



The product is designed to fit together without any gaps in the joints.

- (a) State the following missing dimensions on the orthographic drawing shown on **Supplementary Sheet 1** for use with Question 5.

- | | | |
|-----------------|-------|---|
| (i) Diameter A: | _____ | 1 |
| (ii) Height B: | _____ | 1 |
| (iii) Length C: | _____ | 1 |
| (iv) Length D: | _____ | 1 |

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5. (continued)

MARKS

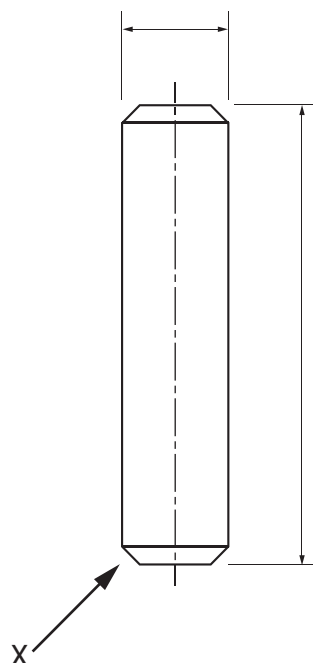
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- (b) The dowel is made to the exact dimensions in order to fit tightly into the Seat and Leg 2.

You should refer to the Supplementary Sheets for use with Question 5.

- (i) Add the dimensions, correct to British Standard conventions, to the dowel below.

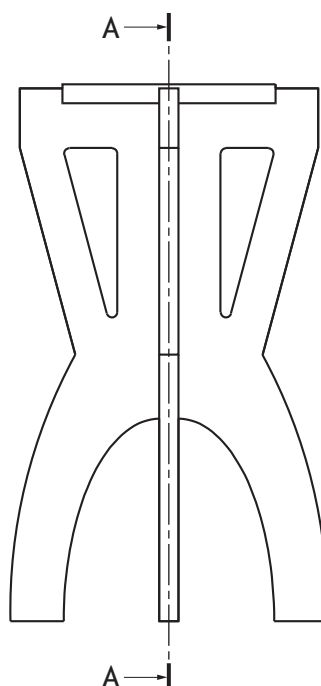
2



- (ii) State the name of the feature shown at X.

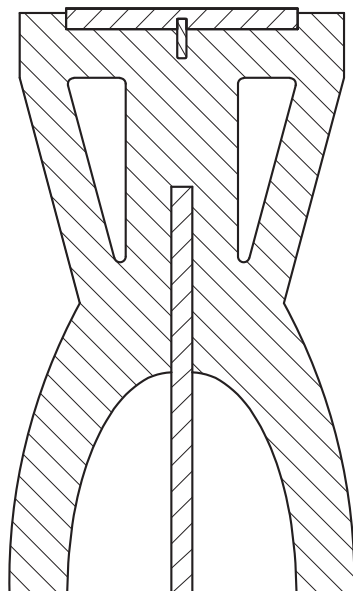
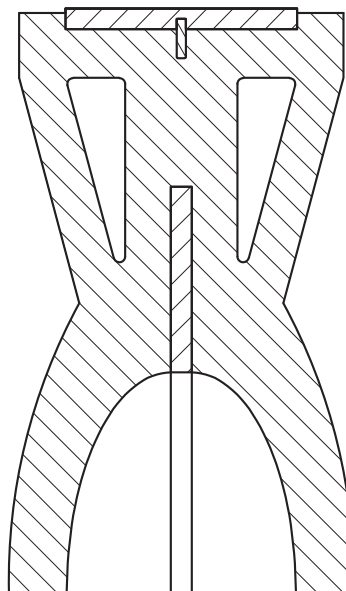
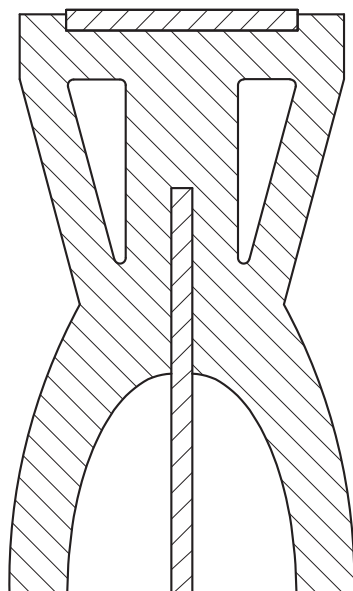
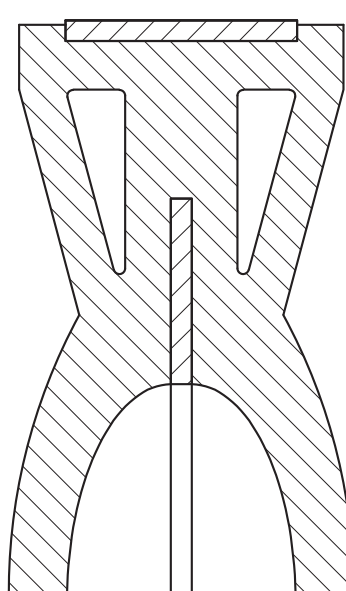
1

- (c) An elevation of the assembled product with a cutting plane is shown below.



Identify the correct sectional end elevation A-A by ticking (✓) a box below. 1

You should refer to the elevation shown opposite and the **Supplementary Sheets** for use with Question 5.

☐☐☐☐

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* X 7 3 5 7 5 0 1 2 5 *

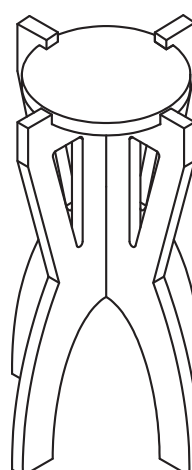
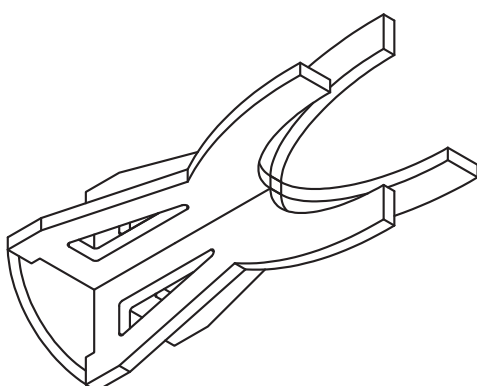
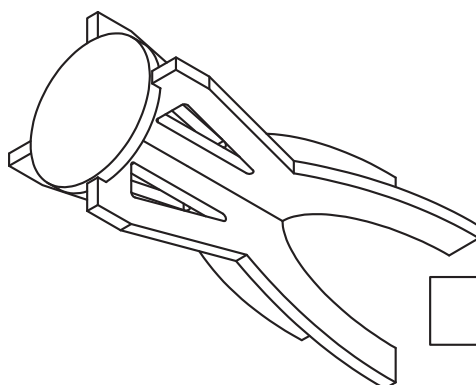
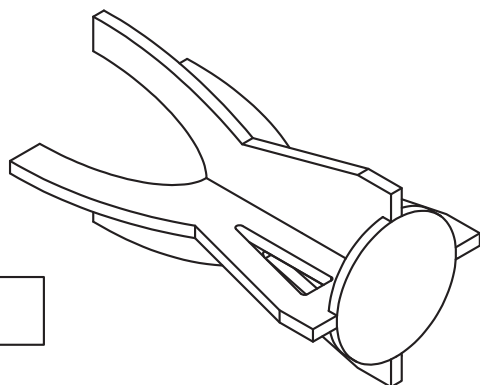
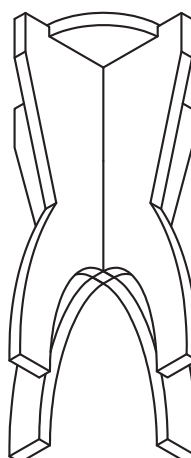
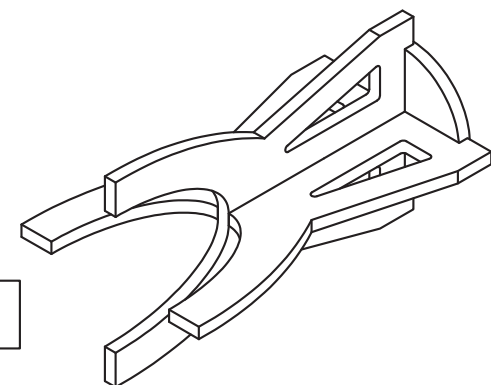
5. (continued)

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- (d) Identify the **two** correct pictorial views of the product by ticking (✓) two boxes below.

2



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ADDITIONAL SPACE FOR ANSWERS



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ADDITIONAL SPACE FOR ANSWERS

Acknowledgement of Copyright

Question 3(b) Suradech Prapairat/shutterstock.com





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Graphic Communication Supplementary Sheets

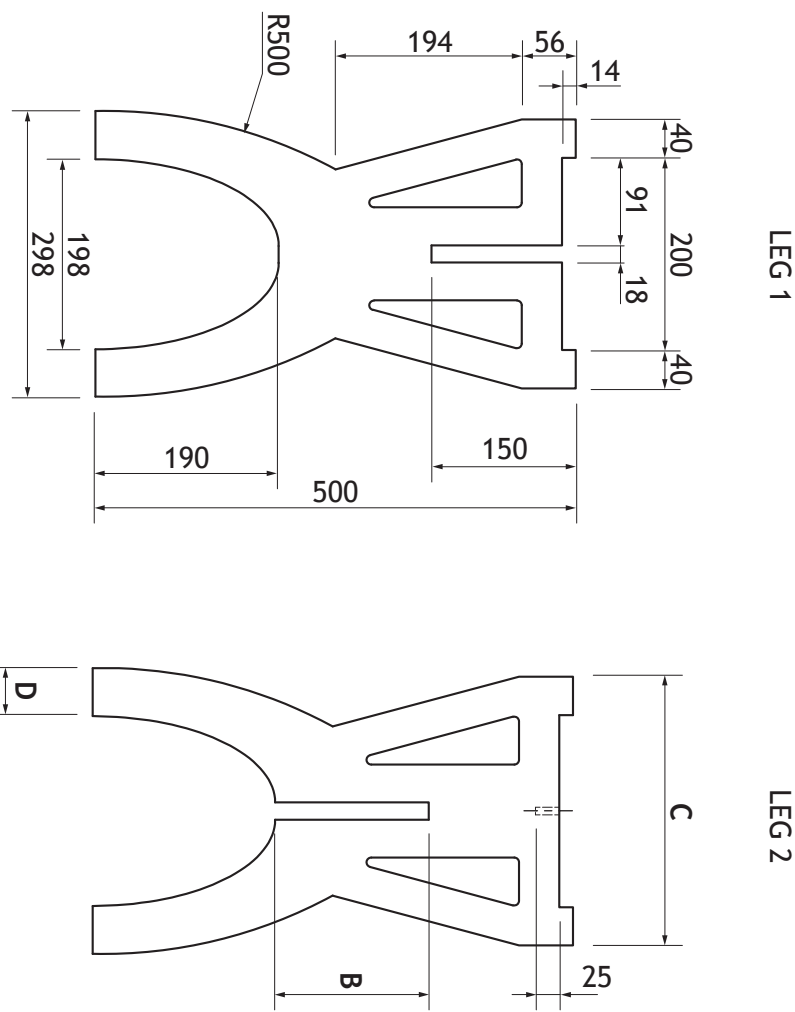
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1:00 PM – 2:30 PM

Supplementary Sheets for use with Question 5.

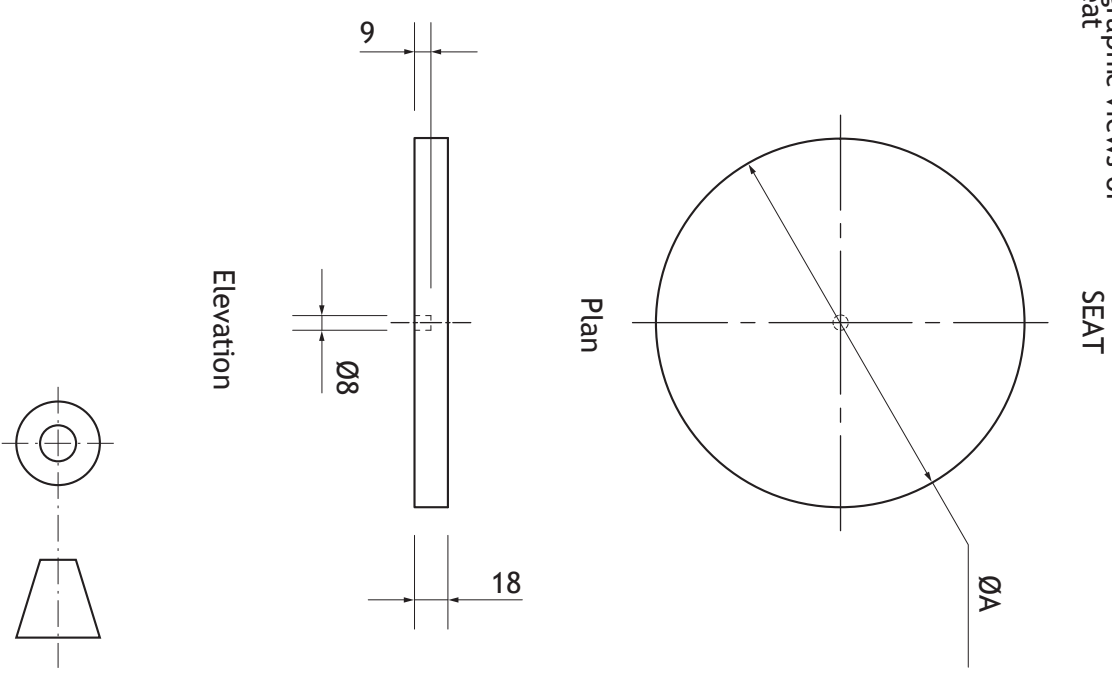


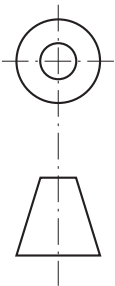
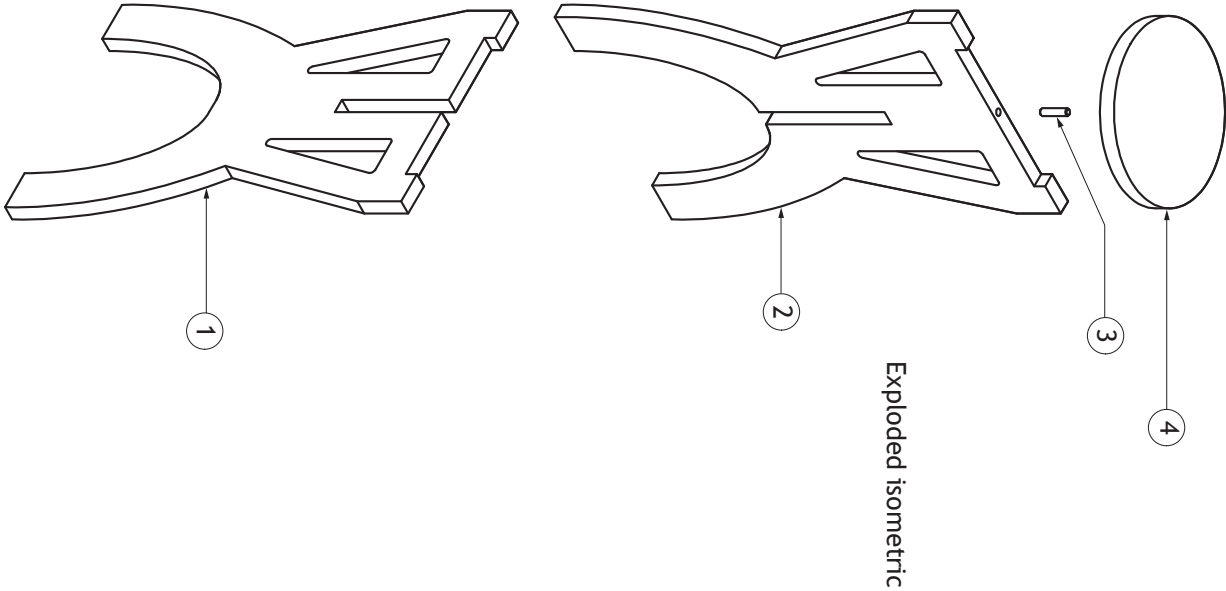
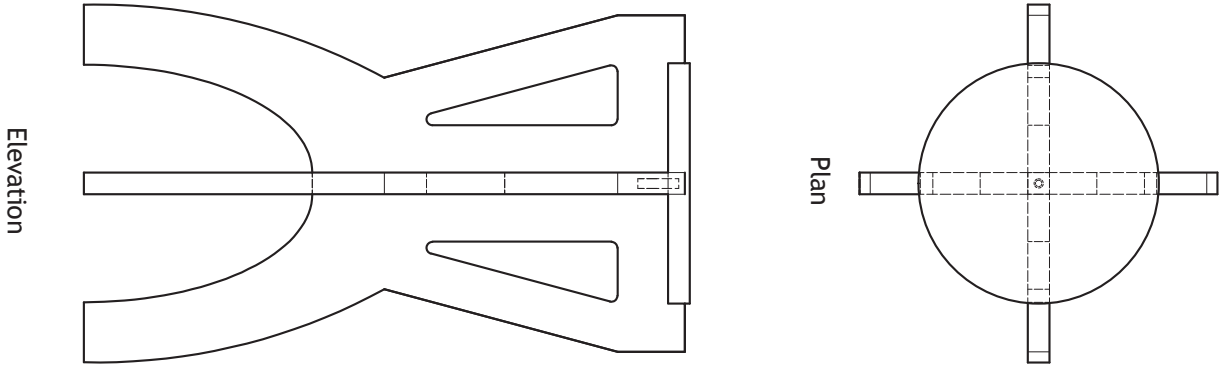
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Elevations of both leg 1 and leg 2
Both have identical dimensions with the
exception of the length of the slots.

orthographic views of
the seat





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