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Duration — 2 hours

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Number of seat

Date of birth
Day
Month
Year

Scottish candidate number

Total marks — 70

Attempt ALL questions.

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.

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.

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.
1. A CAD technician has created a 3D CAD model of a water pistol, shown above.

The CAD technician used "Top Down Modelling" to create the two halves of the water pistol body.

i. Describe the process of using "Top Down Modelling" to create the two component halves of the case from the initial solid 3D model.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
1. (continued)

Component design for plastic stopper to seal the water reservoir.

ii. Describe the 3D CAD modelling techniques used to create the stopper component. Take measurements from the sketch.
The designer sketched one of the components for holding a pipe inside the water pistol.

iii. Describe the 3D CAD modelling techniques used to create the component. Take measurements from the sketch.
The CAD technician modelled the pipe that carries water from the pump to the nozzle.

iv. Describe the 3D CAD modelling techniques used to create the component. Take measurements from the information above.
1. (continued)

The CAD technician was asked to create a physical model from the 3D CAD model.

v. State the term used when computer designs are used with machines to manufacture items.

The CAD technician created the foam prototype from the CAD model, above.

vi. Explain one advantage and one disadvantage of physical models compared to 3D CAD models.
Component details

The Eco Greenhouse has four main components. These are shown below. The only dimensions shown are the main sizes of the perspex components. The metal frames are built to fit around the perspex components snugly. The greenhouse is modular and can have as many sections as are required. Dimensions of the metal frames are shown on page nine.
ASSEMBLY DETAIL DRAWINGS 1

The drawings show details of the end frame and the middle frames.

END FRAME - cross section
Note: there is a left-hand and a right-hand end frame in each greenhouse.

Curved Perspective

MIDDLE FRAME - cross section
The greenhouse shown has four middle frames

Curved Perspective
Curved Perspective
2. (continued)

ASSEMBLY DETAIL DRAWINGS 2

The perspex is fixed securely to the frames using two different methods.

- The curved perspex is slotted into the end frame and secured using an M8 machine screw.
- The perspex end panels are a neat fit into the end frames where they are secured with an M8 nut and bolt.

Detailed assembly drawings showing assembled components have been drawn to support on-site assembly. Section A-A, below, is incomplete.

i. Complete section A-A by cross-hatching it according to BS Drawing Standards and Conventions.
2. (continued)

Study the four pages of Component Drawings and the Assembly Detail Drawings carefully.

The overall dimensions after the greenhouse is assembled are important to provide planning information.

ii. Calculate the overall assembled length of the 5 panel Eco Greenhouse. Give your answer in millimetres.

Overall assembled length ______ mm

In the Assembly Detail Drawings, a line type called line "X" is used. It is described in Drawing Standards and Conventions as a 'Continuous, thin, irregular line'.

iii. Explain the function of this type of line in the assembly detail drawings.

The Eco Greenhouse is a large structure and it was important to show assembly details.

iv. State two of the graphical methods (types of drawings) that the designer has used to clarify the assembly details.

Justify the graphical methods used by describing the benefits they provide.

1 Graphical Method used to clarify the assembly details: ________

   Benefits of using this method

2 Graphical Method used to clarify the assembly details: ________

   Benefits of using this method
2. (continued)

The Eco Greenhouse is being installed against a wall of the bungalow shown below. The plan view and elevation of the bungalow are given.

v. Identify the missing end elevations from the eight views shown below. (You may sketch solutions to help you work out your answers).

LEFT END ELEVATION is view ____________________________

RIGHT END ELEVATION is view ____________________________
2. (continued)

Additional (auxiliary) elevations are required for the planning application.

vi. Identify the two missing auxiliary elevations from the eight views shown below.

(You may sketch solutions to help you work out your answers).

AUXILIARY ELEVATION 1 is view _______________________
AUXILIARY ELEVATION 2 is view _______________________

Page thirteen
2. (continued)

SITE PLAN

ROUNDHOUSE ROAD

MOUNTFIELD STREET

FLOOR PLAN

Room 3  Room 4  Room 5

Room 1  Room 2

Garage
2. (continued)

The bungalow is a two bedroom house. The site plan and a part completed floor plan are shown on the previous page. Study them both before answering the questions below.

The Eco Greenhouse is to be assembled against a wall of the bungalow. For best results the wall should face in a south-west direction.

vii. Identify the wall that best meets the requirements of the Eco Greenhouse.

Sketch or annotate the position of the Eco Greenhouse on the site plan. 1

The content of rooms is in the process of being finalised but the function of each room has been decided.

viii. Identify the position of the kitchen and bathroom in the bungalow.

The kitchen is planned for room number ___________________________ 1

The bathroom is planned for room number ___________________________ 1

ix. Explain how you identified these rooms as the kitchen and bathroom.

I identified the kitchen because: ____________________________________ 1

I identified the bathroom because: ____________________________________ 1
3. Adventure Plus sell outdoor camping and walking equipment. A freelance graphic designer has been asked to create a promotional advert to be published in “THE GREAT OUTDOORS” magazine. The company decides what text and images will be used and the graphic designer creates a layout using this material. The designer’s approach is to put together a draft layout. He then applies his knowledge of design elements and principles and DTP features to create a layout that has visual impact.

The draft layout and the final published layout are shown below.

First Draft layout
The draft layout shows the components of the layout in their original size and form.

Published layout
The published layout is the final layout that is published in the magazine.
3. (continued)

Design elements and principles are often applied in a layout by using DTP techniques. The following questions ask you to identify the DTP features that are used when the designer applies design elements and principles to the published layout.

The graphic designer had to establish unity in the layout and used DTP techniques to achieve this.

i. Describe two DTP techniques the designer used to create unity in the published layout.

ii. Emphasis is important in any promotional layout.

Describe two ways in which the designer has created emphasis in the published layout.

iii. The use of contrast can make or break a layout; the use of red and green colours achieves contrast.

Describe two methods, other than using colour, which the designer has used to create contrast in the layout.

iv. Despite incorporating different shapes and positioning, the layout looks well organised and flows well from the top to the bottom.

Explain how the designer achieved an organised and structured look to the layout.
3. (continued)

The text in the published layout has been arranged in a hierarchy (level of importance).

v. Discuss how this hierarchy (level of importance) is achieved and how it makes the layout easier to navigate through.

___________________________________________________________________________

The typefaces used in the layout have been chosen for a particular purpose.

vi. Describe how the choice of typeface supports the function of each section of text

Title: ______________________________________________________________________

Sub-Head: __________________________________________________________________

Body text: __________________________________________________________________

The published layout makes use of a “partial-bleed”.

vii. Explain the term “partial-bleed”.

___________________________________________________________________________

The promotional layout is designed to help sell “Adventure Plus” products but it also encourages people to adopt a healthy lifestyle.

viii. Describe how the layout puts this message across to potential customers.

___________________________________________________________________________

ix. State one method the company have employed to make the activity inclusive.

___________________________________________________________________________
4. A national UK charity called “Make a home for Bees”, has commissioned a poster for a campaign to raise awareness of the decline of bumblebees and honey bees. The campaign encourages ordinary people to create habitat for our declining bee population. The poster will be displayed on roadside and high street billboards.

Study the poster and answer the following questions.

For more information on how to make a home for bees visit our website

www.makeahomeforbees.org.uk
4. (continued)

The designer has established a connection between the health of the bee population and maintaining our own way of life.

i. Explain how the designer achieved this connection in the poster.

Contrast is often used to make a layout more eye-catching.
Contrast can also be used to deliver a message, in this case an ecological and environmental message.

ii. Explain how contrast in graphics and images have been used to put a strong environmental message across.

The designer felt it was important to make the poster as 3-dimensional as possible and made an effort to create depth in the poster.

iii. Describe three DTP techniques that have been used to achieve depth in the layout.

In promotional posters a balance is struck between the amount of text and the extent of the images used.

iv. Explain why the textual information in this poster has been kept to a minimum

The designer has made full use of his DTP skills by editing the text used in the slogans.

v. Describe and justify a DTP editing technique used on the slogans in the layout.

Description of text editing technique

Justification
1 (i) Create a rectangular profile that intersects the water pistol along the length.
    Extrude subtract in one direction and save file.
    Edit modelling tree to extrude subtract in the opposite direction and save file.

2 (i) Three components cross hatched in the right areas (1 mark each).
    Correct changes of direction of cross-hatching (1 mark).
    Correct staggering of cross hatching (1 mark).
    No cross-hatching on any other areas (1 mark).

(v) CAD/CAM
    Computer Aided Design Computer Aided Manufacture

(vi) Physical models allow people to appreciate the proportions of a particular item.
    Physical models can be used to test particular features.
    Physical models cannot be altered easily.
    3D CAD models can be emailed around the world.
    3D CAD models can be illustrated and animated.
    3D CAD models can be used to manufacture the final item.

Any two of the above.

(Answers can be explained or sketched or a combination of both).

(ii) Overall assembled length is 7536.

(iii) It is used to indicate that the object has been shortened to fit on the page. It is called a break line and the view it creates is an interrupted view.
<table>
<thead>
<tr>
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<th>Comments</th>
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| (iv) | Any two from the following for two marks each. 
Graphical Method used to clarify the assembly details: Exploded views. 
Benefits of using this method: Shows exactly how the parts line up ready for assembly. 
Graphical Method used to clarify the assembly details: Enlarged views. 
Benefits of using this method: Gives a clear, scaled-up, picture of small assembly details. 
Graphical Method used to clarify the assembly details: Illustrations. 
Benefits of using this method: It is more easily understood by non-technical people, it is less complicated to understand. 
Graphical Method used to clarify the assembly details: Sectional views. 
Benefits of using this method: Shows the assembly details that cannot normally be seen. 
Graphical Method used to clarify the assembly details: Interrupted views. 
Benefits of using this method: Enables large or scaled-up drawings to fit on the page. 
Graphical Method used to clarify the assembly details: Dimensioned drawings. 
Benefits of using this method: Allows the user to check and compare sizes when assembling the greenhouse. Acceptable: orthographic (showing true faces or sizes) or pictorial drawings (easier for the less technical user to understand) with a correct explanation of their benefits. |
| Marks | 4 |

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| (v) | LEFT END ELEVATION is view 5 
RIGHT END ELEVATION is view 8 |
| (vi) | AUXILIARY ELEVATION 1 is view C 
AUXILIARY ELEVATION 2 is view F |
| (vii) | The external wall of room 1 that has no window and faces south west. |
| Marks | 2 |

<table>
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| (viii) | The kitchen is planned for room 3. 
The bathroom is planned for room 5. |
| Marks | 2 |
| (ix) | I identified the kitchen because: It has waste removal plumbing and it has a back door (any one). 
I identified the bathroom because: It has waste removal plumbing and no outside door (any one). 
Note: if both answers only refer to the waste removal pipes only one mark is awarded. |
| Marks | 2 |
| (i) | Overlapping the layered components (images breaking over the background image etc) using the red underlines to match the red jacket. 
* The red lines connect the title to the background image. 
* The red line at the foot connects the background image with the products and the web address. 
* The body text wraps around the circular image creating unity. Any two at 1 mark each. |
| Marks | 2 |
| (ii) | Increasing the size of the product image, using a drop shadow to bring the images forward. 
* Using a drop shadow to bring the title forward. 
* Underlining the title, using layers to position crucial components to the front. 
* Creating circular and cropped shapes to make the images stand out. Any two at 1 mark each. |
| Marks | 2 |
| (iii) | Creating a circular crop to contrast with the rectangular layout (not enough to state the circle without mentioning how the contrast is achieved). 
* Using layers to create a near and far (foreground/background) effect. 
* The use of horizontal lines against a vertical background. Any two at 1 mark each. |
| Marks | 2 |
| (iv) | By creating accurate alignment down the right and the left margins. 
* The title, sub-head, body text, red line and the bottom and web address are all accurately aligned. 
* The title, circular image and text are all accurately aligned right. Any one of the above. |
<p>| Marks | 1 |</p>
<table>
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<tr>
<td>(v) The large title is the dominant text in the layout. It signals the starting point of the layout. The sub-head size is just a little larger than the title and body text. It creates a visual link or bridge.</td>
<td>2</td>
</tr>
<tr>
<td>(vi) The body text is smaller. The table and the sub-head are expected to be read after the title.</td>
<td>2</td>
</tr>
<tr>
<td>(vii) The title is in a serif font in a stylised, distressed style. It has impact and supports the design of the image. The body text is in a non-serif, sans serif font. This creates a link between the title and body text. This is suitable for a sound bite or slogan.</td>
<td>3</td>
</tr>
<tr>
<td>(viii) The text is easier to read because the serif helps the letters flow. (1 mark)</td>
<td></td>
</tr>
<tr>
<td>(ix) A ‘bleed’ is when an item extends to the edge of the page. A partial ‘bleed’ occurs when only part of the text or image reaches the edge.</td>
<td>1</td>
</tr>
<tr>
<td>(x) By incorporating an active (or passive) voice.</td>
<td>1</td>
</tr>
<tr>
<td>(xi) By referring to the relationship in the image. The inclusion of a male and a female in the greenery.</td>
<td>1</td>
</tr>
<tr>
<td>(xii) By contrasting the natural environment with the man-made in the distance.</td>
<td>1</td>
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<td>(vi) Text - add a white outline to the letters/her size of words in the section. (1 mark)</td>
<td></td>
</tr>
<tr>
<td>(vii) The larger size will be travelling somewhere when reading it. It may not have time to read lots of detail. A short slogan is more memorable. The logo includes a link to more information. (1 mark)</td>
<td></td>
</tr>
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<td>(viii) The logo is part of the company's branding and identity. It helps to reinforce the company's message. (1 mark)</td>
<td></td>
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<tr>
<td>(ix) Text - add a drop line to 'OUR' (any one for mark).</td>
<td></td>
</tr>
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<td>(x) ANY THREE of the above.</td>
<td>2</td>
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<td>(vi) Incorporate elements of the company's branding and identity. The logo is part of the company's branding and identity. It helps to reinforce the company's message. (1 mark)</td>
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