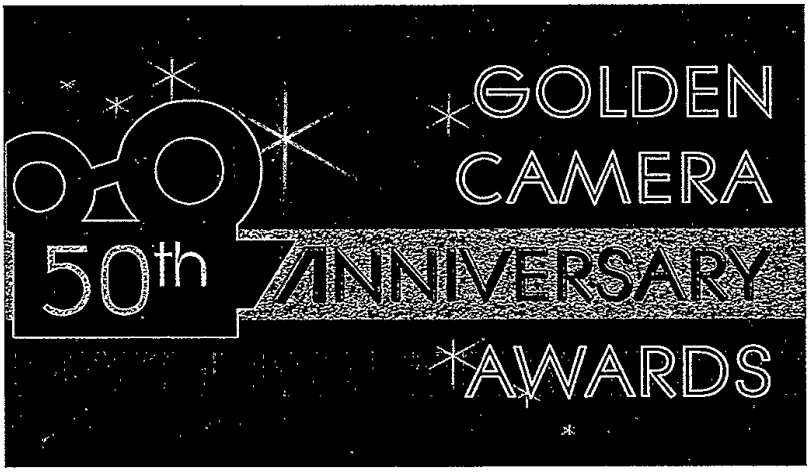
Candidate 2 evidence

Total marks — 80

Attempt ALL questions

1. An invitation to the 50th anniversary of the Golden Camera film and television awards is shown below.

front of invitation



back of invitation

This is an extract of the invitation design brief:

> The invitation must be made eye-catching through the use of contrast, exude luxury and link clearly with the 50th anniversary celebration. The design should show that the event is relevant to the modern era but pay homage to the golden age of film. The black silhouette is to be embossed with the brand logo and the gold areas should include matt, gloss and textured finishes.

1. **(continued)**

(a) Describe four ways the invitation meets the design brief. 4

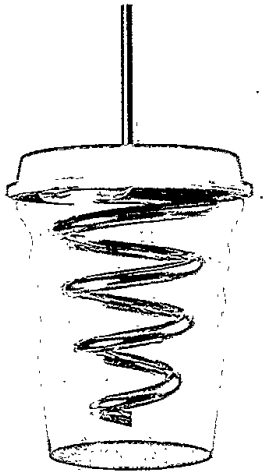
The design uses sans-serif font typefaces to communicate it's relevance with modern society. The use of gold & black creates contrast to grab the readers attention, as shown in brief. The logo shows a traditional film camera, showing a link to the traditional golden age of film, in the past where film was used mainly. The use of sparkles & flashes creates a link with luxury as it represents camera flashes & expensive ~~disc~~ gold shiny materials often seen at such events.

(b) Explain why it is important that each of the following graphics technologies are specified for printing the invitation:

- Pantone reference
- calendaring
- duplexing
- paper weight. 4

Pantone reference ensures the colors are accurately transferred across various mediums, such as physical & digital where different colour spaces are used.
Duplexing allows for ~~pri~~ printing on both sides of the invitation which is important to be easily recognisable & seen. Paper weight is important as it determines the amount of ink bleeding onto the other side which could ruin the layout.

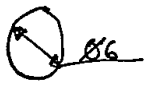
2. A 3D CAD model of a reusable cup is shown below. It consists of a cup, a lid and a detachable straw.



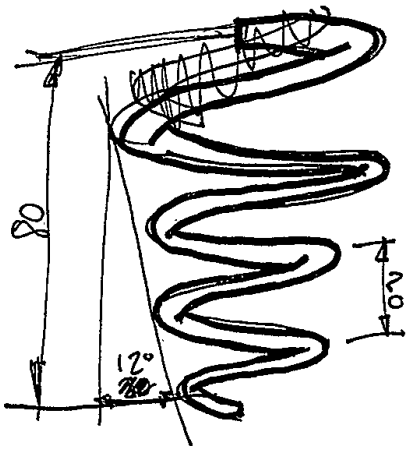
Refer to **supplementary sheet 1 for use with question 2 (a).**

(a) Describe the 3D CAD modelling techniques used to create the straw.
Refer to the dimensions in your answer.
You may use sketches to support your answer. 8

1. Draw a circle Ø6mm

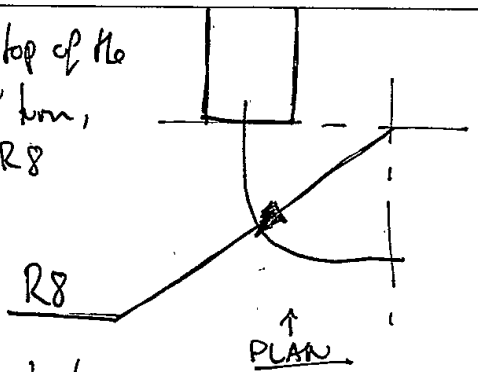


2. Use the helix tool & set the repetitions to 4 with an offset of 20mm & an upward taper of 12°

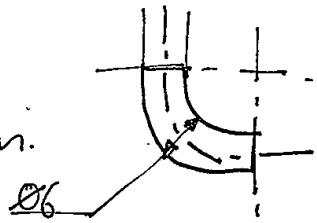


2. (a) (continued)

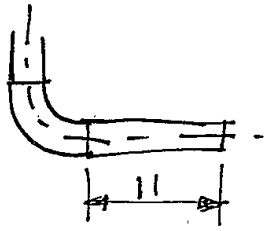
3. At the end of the top of the helix, draw a 90° bend, with a dimension: R8



4. Use the sweep tool to continue the profile (Ø6) along the 2D line drawn.

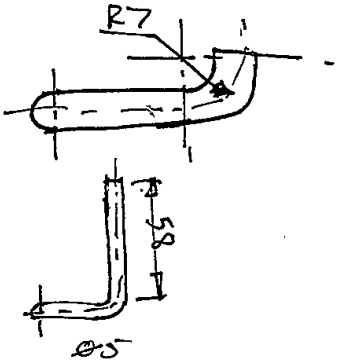


5. Extend that profile by 11mm by extrusion

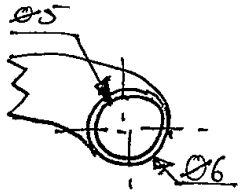


6. From elevation view, draw a line that goes 90° up with R7. And use the sweep tool to continue the profile

7. Extrude the vertical profile by 58mm



8. Use the shell tool & give a wall thickness of 1mm



2. **(continued)**

Morphing (freeform modelling) was used to create a series of **grip indentations** on the cup.

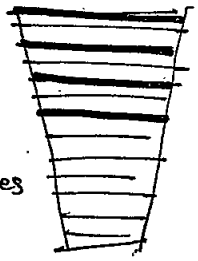
Refer to stages 1 to 4 shown on **supplementary sheet 2 for use with question 2 (b).**

(b) Describe, using morphing (freeform modelling) techniques, how the **grip indentations** on the cup were created.

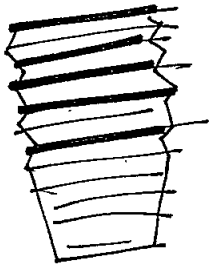
You may use sketches to support your answer. 4

1. Every second line for a few layers were selected using during the freeform process

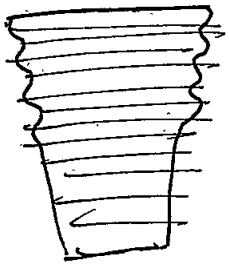
= selected lines



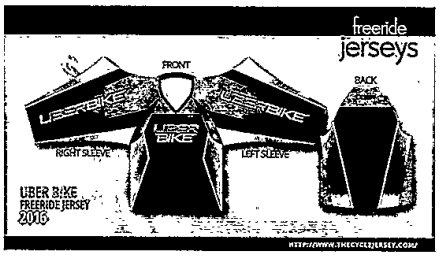
2. Using freeform, the diameter was decreased.



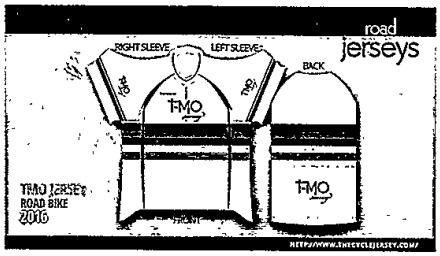
3. Using freeform, an organic smooth finish was applied to and create the egenomic indentations



3. A sportswear company manufactures cycle jerseys which can be customised.
Two examples of cycle jerseys on their website are shown below.



example of long sleeve jersey



example of short sleeve jersey

(a) Describe, giving one reason, why cycle jerseys are shown on the website as surface developments. 1

So as to show to the user all surface designs instantly & in one view to clearly communicate all sides of the designs.

(b) Explain two differences between ppi and dpi when working with digital and printed media. 2

DPI refers to "dots per inch" & essentially encapsulates how many dots will be ~~printed~~ applied by the printer, with more dots resulting in a clearer print.
PPI refers to "pixels" per inch & often tells us how many pixels the exported file will contain with more pixels resulting in a clearer & crisper design as it has a higher resolution

3. (continued)

Refer to **supplementary sheet for use with question 3 (c) and 3 (d).**

(c) Explain the importance of the artwork guidelines to the company.

You should consider image resolution, file types, colour space, and using CAD/CAM to cut the jersey.

Do not refer to the print process in your response. 8

Image resolution ~~ensures~~ guidelines ensures the customer's image will be produced with a high enough resolution for good quality. It also is important so as not to overload the company's servers with too many high resolution images, this ensures it runs smoothly.

The use of CAD/CAM ensures the cuts are accurate since it may be performed by a robot. Also, CAD CAM allows for digital files to be shared & exported digitally to allow for use by customers from home over the internet.

File types are important since it outlines file types that are compatable with vector use & printing technologies. PDF's are vector files which means the design can be upscaled at no loss of resolution. Also, PDF's have small data sizes meaning it won't can be quickly shared over the internet & won't take up too much of the company's bandwidth. The use of colour space guidelines ensures accurate colour outputs & conversions from different colour spaces like RGB & CMYK, for print uniformity.

3. (continued)

Refer to **supplementary sheet 3 for use with question 3 (c) and 3 (d).**

The company considered various printing options for the cycle jersey but there were a number of disadvantages of using screen printing.

(d) Explain, considering the information in the artwork guidelines, why screen printing is not suitable for this purpose. 3

Screen printing is for large scale banner parts. These will only be printed on smaller mediums. Also, it uses ink that won't be compatable with the materials it will be printed on. Screen printing can be an expensive process which may damage parts made from the product.

The company is going to produce a promotional video of the manufacturing process. Various graphic media file formats are being considered.

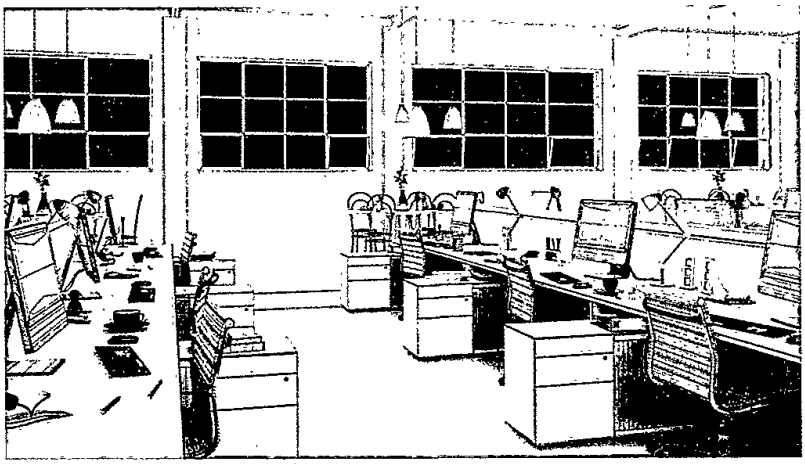
(e) Describe one advantage of each of the following graphic media file formats.
You must give a different advantage for each graphic media file format. 2

mpeg Have low data/file sizes meaning it can be easily & quickly ~~upload~~ uploaded & downloaded by the user.

3gp These have a high quality resolution, ensuring the video quality is crisp and clear for the user.

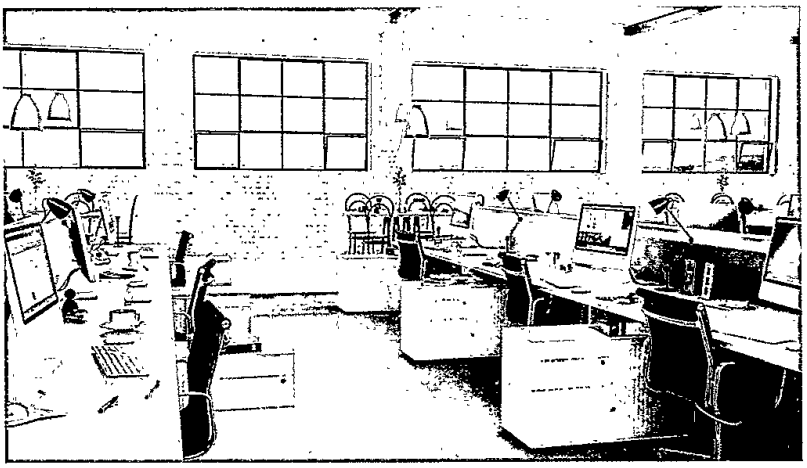
4. A commercial interior design company has designed the office shown below.
One of the company's designers produced the 3D model shown in **Image 1.**

Image 1



The designer then applied illustration techniques to the 3D model shown in **Image 2.**

Image 2



(a) Identify three different illustration techniques, other than applied lighting and HDRI, and describe how they have been used to enhance **Image 2.** **6**

Technique 1 BUMP MAPPING.

Description This creates surface imperfections such as bumps which enhances the way the light interacts with the made model for added realism.

4. (a) (continued)

Technique 2 Specularity

Description Adds point of highlights to show how the lighting interacts with the model & also indicates style & position / direction of lighting for added realism.

Technique 3 ~~Reflections~~ Texture mapping

Description The process of adding 2D textures to communicate colour, patterns & type of material to create a scene with realistic objects, using wood & metal etc.

(b) Describe two advantages of using HDRI techniques to enhance **Image 2**. 2

HDRI's apply realistic lighting levels from a real life ~~scene~~ scene, for added realism & understandable lighting directions. HDRI's also have an image surrounding to simulate views outside windows to create a real life scene.

(c) Identify three types of lighting applied in **Image 2** and explain why each has been used. 6

Lighting type 1 Point lighting

Explanation Lighting used by desk lamps to illuminate desk spaces.

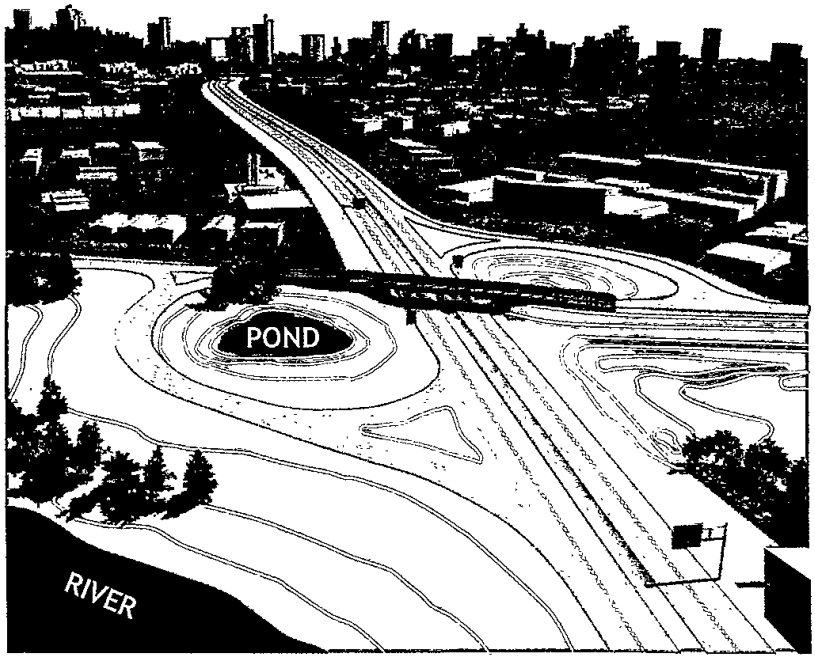
Lighting type 2 Area lighting

Explanation Created by the hanging lights, these light up large areas of the scene.

Lighting type 3 Image based lighting

Explanation Applying the lighting from a real life scene to emulate the ~~scene~~ scene in a realistic environment.

5. A construction company is designing and building the road junction shown in the graphic below.



5. (continued)

A structural engineer carried out an FEA test on a computer model on the bridge within the junction.

(a) Describe two ways a structural engineer would use the FEA test results. **2**

To see weak points of the bridge that will be under the most stress from its own weight.
To ~~simulate~~ see how it'd cope under different applied forces from vehicles, snow & wind & pedestrians etc.

(b) A model maker used information from a topographical survey carried out on the area around the junction.

Explain why the topographical survey would provide useful information to a model maker. **2**

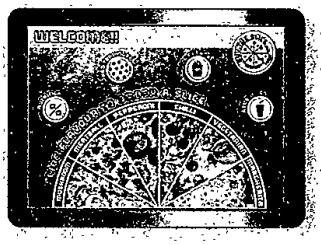
It highlights ~~areas that~~ points of similar altitudes that could be used for two ends of the bridge, this helps the model maker create a level model. It also shows the topography of the land underneath which influences the length of supporting beams & the overall model height.

(c) An animator created two simulations of traffic flow. The first simulation shows the current traffic flow. The second simulation shows the anticipated traffic flow after the junction is complete.

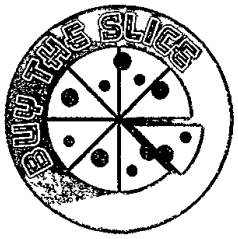
Explain, giving three reasons, why motion tweening was used to animate the vehicles used in the traffic flow simulation. **3**

It allows for clear & smooth animation to be made, as it has a simple process.
It allows for the use of transitions ~~to create~~ to communicate realistic movement of vehicles, such as slowly accelerating & decelerating.

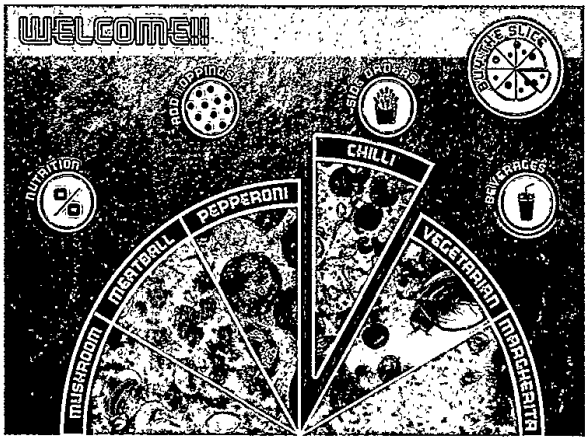
6. A pizza company are introducing interactive screens for ordering instore as shown below.



interactive screen before use



company logo



interactive screen during use

(a) Explain why the interactive screen has been designed to be easy to navigate. 3

The use of radial balance directs the users eye across the layout. The use of white space surrounding the circular icons allows them to stand out & be clear to the user. The option slides out to make it clear the user's selection, to reduce risk of ~~them~~ ~~making~~ selecting wrong choice.

6. (continued)

(b) Describe how the designer has used focal point, silhouette and negative space in the design of the company logo. 3

The ~~lines~~ lines of the pizza converge in the centre to create a focal point that leads the reader's eye there. The toppings are cast created through negative space since they are almost a hole ~~they~~ through the pizza graphic, they've been removed from the top layer. Silhouette has been used in text on the logo. The black fill contrasts the lighter colour scheme & allows it to stand out.

6. (continued)

Two images from the interactive screen are shown below.

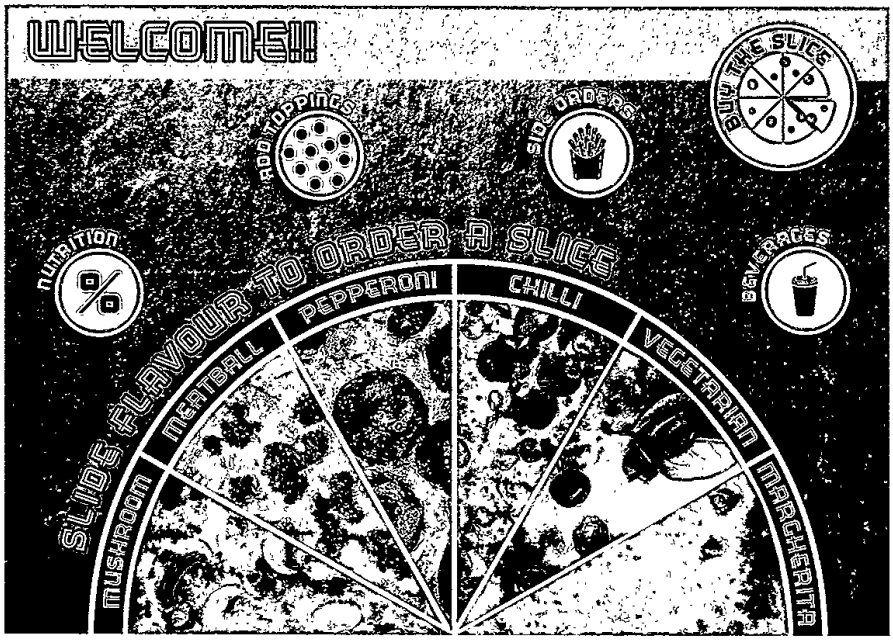


Image A Interactive screen before use

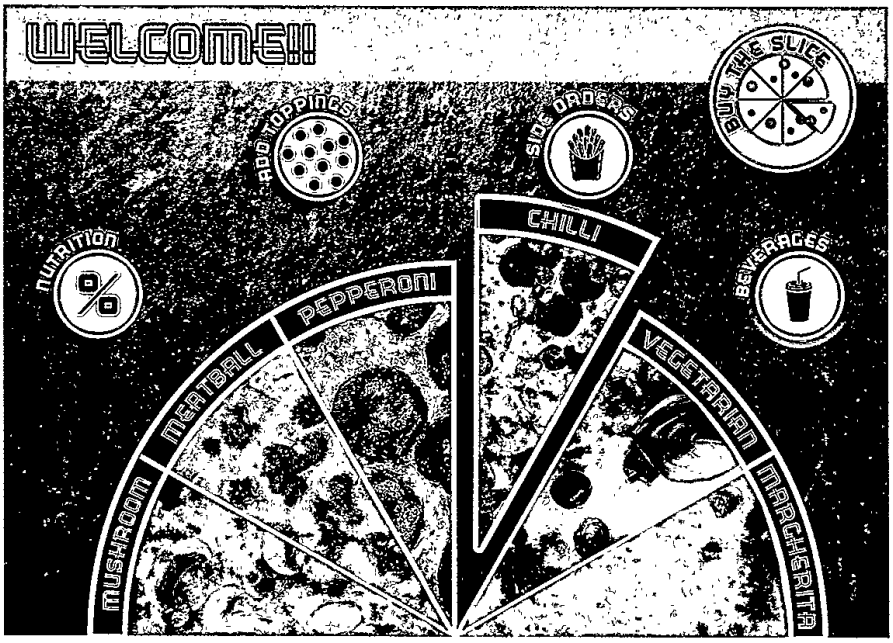


Image B Interactive screen during use

6. (continued)

(c) Describe two ways each of the following design elements and principles enhances the interactive screen.

(i) Radial balance — 2

Radial Balance creates a simple line for the user to follow w/ their eyes. It clearly separates the layout, creates a simple user psychology. The simple layout also creates a first place in the layout since the user can quickly decide & scan through the options.

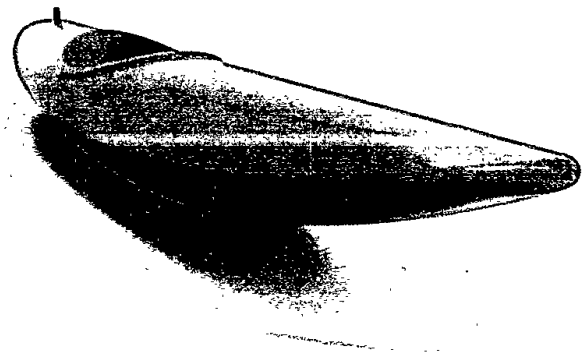
(ii) Texture — 2

Texture is created used in the background image to add visual interest & realism as it emulates a pizza making worktop. It creates a visual link to the act of making a pizza. The texture on the pizza images gives a clear representation of the product to help the user make their decision

(d) Describe, using the correct graphic terms, the animation techniques and video edits that will change **Image A** to **Image B**. — 2

Using Motion Tweening, the elements will move from point A to B which is removed from the menu elements to stand out. There may also be a smooth transition for a more pleasing animation.

7. A 3D CAD model of a prototype kayak is shown below.



Refer to **supplementary sheet 4 for use with question 7.**

A CAD technician has created technical graphics for a kayak manufacturing company but has made errors applying British Standards.

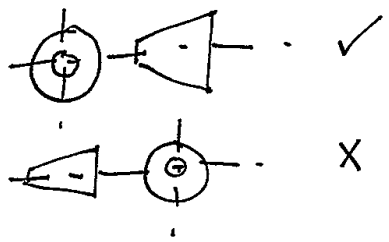
(a) Describe three British Standards errors in the kayak technical graphics on **supplementary sheet 4.** **3**

In Enlarged view C, there's no centre marks on the dimension of "R2".

In the title block, the third angle projection symbol is incorrect with back to front symbols.

In the title block, it should state "scale as shown" since different views have their own scale.

There is a missing dimension of the minor axis in plan view of the kayak.



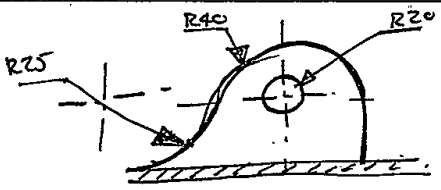
7. (continued)

(b) (i) Describe how a 2D CAD sketch constraint was used to create the rope attachment point.

Refer to the dimensions in your answer.

You may use sketches to support your answer. **2**

1. Sketch the profile shown



2. ~~Extrude with thickness~~

3. Align it to the horizontal axis of the layout.

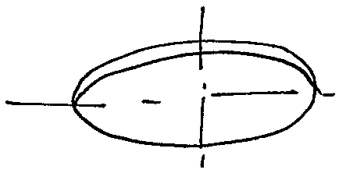
The cockpit coaming feature has a fillet that changes from 2 to 6 mm and back again.

(ii) Describe the 3D CAD modelling technique used to create this feature and how it was applied.

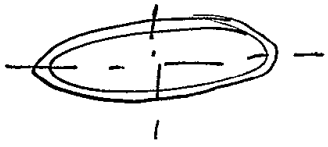
Refer to the dimensions in your answer.

You may use sketches to support your answer. **2**

1. You apply an irregular fillet that transitions from 2mm to 6mm. Only do this to one side



2. Mirror this to the other side for equal fillet transition



7. (continued)

The manufacturing company has written about the prototype kayak in its literature.

> The prototype kayak was put through a rigorous series of tests. Using our state-of-the-art technology, we were able to show the kayak's improved performance and the kayaker's full range of movement when they descended our specially designed course.

The company used a range of graphic technologies in the design and testing of the prototype kayak.

(c) (i) Describe how CFD digital testing could be used in the design of the prototype kayak. 2

CFD can simulate the aerodynamics of the model. It shows how easily the prototype will cut through the water, thus how easy it is to manoeuvre. It also shows how the air moves around it again how easy for the user to cover distances.

(ii) Describe how motion capture technology was used by the manufacturing company. 2

Motion capture tech can be used to see the ergonomics of how the user moves with the product. This helps identify areas internally which may cause discomfort that the manufacturers couldn't see from the outside.

[END OF QUESTION PAPER]