Candidate 1 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

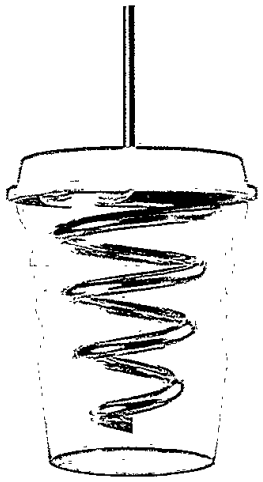
The colour scheme (black and gold) has connotations of wealth and luxury. The film reel pays homage to golden age. The contrast is clearly shown through the use of reverse text on the front page, aided by the emboss. The texture is used on the front page add strip to draw attention and make it look like real gold flakes. The stars create the impression of a gloss finish and add a more modern feel to the invite. On the back the camera has a emboss and texture giving the illusion of matt.

(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 to ensure each invite uses the exact colour specified and are all the same.
To ensure the correct amount of pressure is applied to each sheet, the paper weight must be specified, otherwise this could cause problems with the printers rollers. A flexi roller may have to be used.
Calendaring must be specified to ensure the invite is printed the correct way up otherwise one side could be upside down.
Duplexing must be specified so the material is correct. Substrate

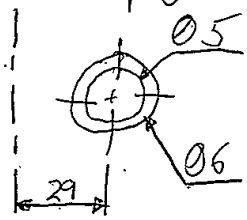
2. A 3D CAD model of a reusable cup is shown below. It consists of a cup, a lid and a detachable straw.



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

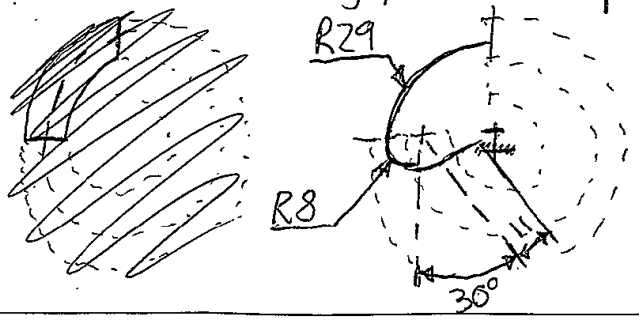
(a) Describe the 3D CAD modelling techniques used to create the **straw.**
Refer to the dimensions in your answer.
You may use sketches to support your answer. **8**

① Sketch profile



② Create a helix on the centre axis shown, Pitch: 20 With a taper of 12°. Height: 80 (or 4 rotations)

③ Perpendicular to the finishing point, sketch path;

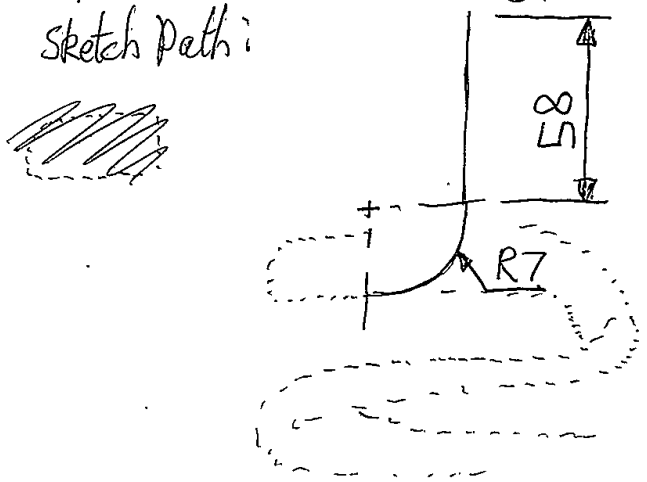


2. (a) (continued)

④ Extend the geometry of the helix finishing point (to give another identical circle sketch)

⑤ Extrude the circle ④ along the path ③.

⑥ Perpendicular to the finishing point of ⑤, sketch path:



⑦ Extend the geometry as previous extrude along path to give identical circle sketch.

⑧ Extrude circle ⑦ along the path ⑥

--- Previous Model —— New sketch

2. **(continued)**

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

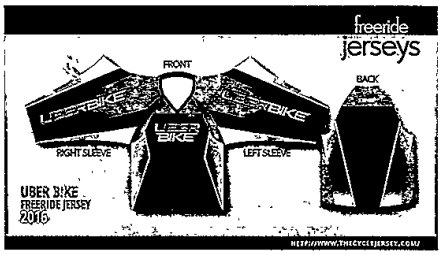
Refer to stages 1 to 4 shown on **supplementary sheet 2 for use with question 2 (b).**

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

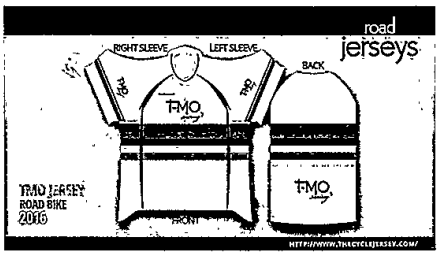
You may use sketches to support your answer. 4

* Lines of Symmetry were applied to the cup. Points were then selected around the rim of the cup which can be dragged (manipulated) outwards to create the bulge looks.
This can then be repeated a number of times.
Finally the freeform model could be solidified.

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

This allows the entire jersey to be shown at once.
This may be how the jerseys are manufactured

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

Ppi = pixels per inch i.e quality on a screen
dpi = dots per inch i.e- better quality on printed media
pixels and dots have different sizes so it is better to use pixels when on digital media and dots when using a printer as these are the standard sizes.

[Turn over

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**

The logos are asked for in vector file formats or with high enough resolution to ensure there is no pixelation or blurred images.
All fonts must be converted to vectors so they are scalable.
Any designs containing a bleed would not work.
Using CAD/CAM to cut the jersey may be difficult because of the stretchable material
The template is .dxf. which means it is compatible with most softwares customers may have at home.
RGB colours may not convert perfectly so this is why CMYK is preferred.
The guidelines ensure the company can be as efficient as possible and the client can have as close a match as possible to their intended design.
The colour chart test ensures clients will not fault the company for bad CMYK convesions.
The guidelines show how the jersey will be assembled/stitched.

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**

The fabric is stretchable therefore it may not apply correctly.
Screen printing may limit the colours available.
Screen printing is time consuming.
Screen printing would require new templates for each design which is inefficient and uneconomical.
The breathable fabric may cause unwanted ink in unwanted places
The waterproof coating may cause ink to run.

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

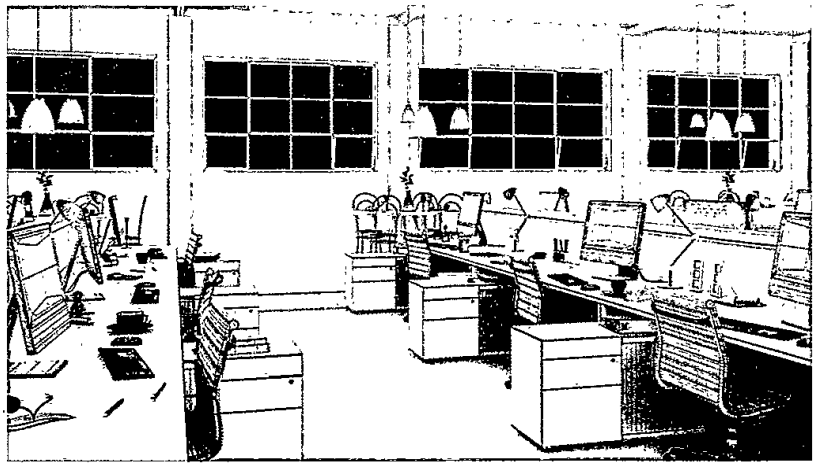
(e) Describe one advantage of each of the following graphic media file formats.
You must give a different advantage for each graphic media file format. **2**

mpeg is compatible with mobile devices

3gp has a low file size for sharing online

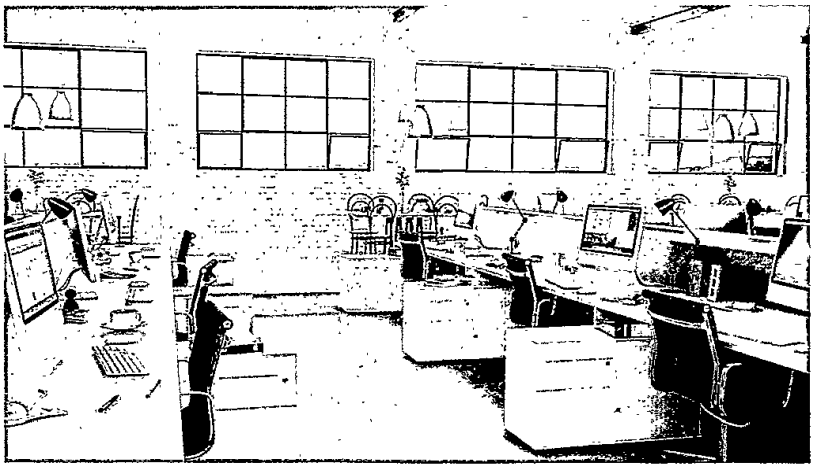
4. A commercial interior design company has designed the office shown below.
One of the company's designers produced the 3D model shown in **Image 1.**

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 ~~Texture Mapping~~ Bump Mapping

Description The brick texture on the back wall adds the illusion of depth and adds character to the building for a more realistic wall.

4. (a) (continued)

Technique 2 Texture Mapping

Description A dirty texture has been applied to the ~~[illegible]~~ back wall to make the building appear lived in/used.

Technique 3 Shadow

Description Shadows have been applied to the trolleys and computer monitors to add depth.

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

Makes colours look more vibrant and natural. Appears to make the image better quality (illusion) Looks more professional

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

Lighting type 1 Spot light

Explanation To draw attention to the hanging lamps and the screens.

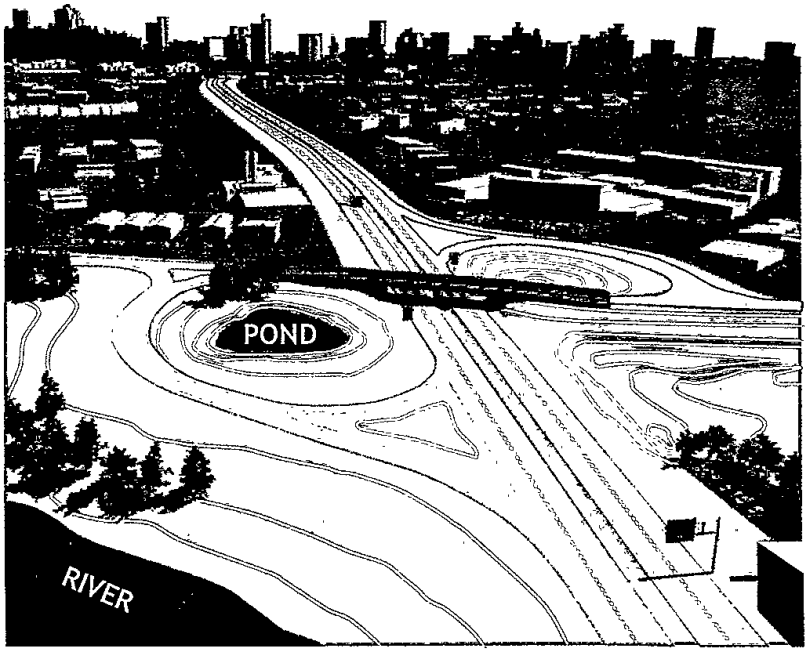
Lighting type 2 Volumetrics

Explanation To add a more realistic feel to the windows as though that is really outside.

Lighting type 3 ~~[illegible]~~ Specularity

Explanation The cabinet surfaces have rings to show they have a gloss finish.

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 determine whether to add/remove support to improve structural integrity/cut costs.
To identify any flaws or weak sections.
To determine if bridge will work or fail to save time/costs downstream.

(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**

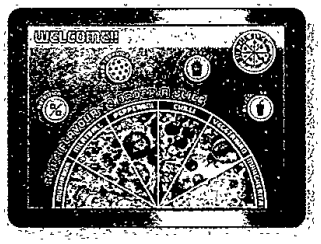
Shows natural features such as trees, rocks (location/height of) etc which are needed for an accurate model.
Shows contours to give a better idea of direction and gradient of slopes for shape of land.
Shows man made features needed for model.

(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**

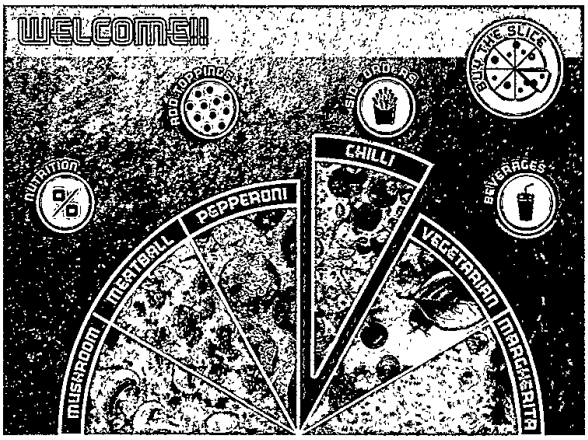
Only start and end positions needed so is more efficient/saves time.
The path can be easily edited.
Multiple objects can be animated at once.
Provides more consistent motion than stop motion for example.

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 screen has clear, discernable buttons, in bright colours.
The buttons are large and can be pressed by any size fingers.
The buttons are spaced apart well.
The buttons are all clearly labelled.

6. (continued)

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

Focal point has been used to draw the users eye to the pizza toppings, making them dominant. Silhouettes have been used as logos, which makes them clear and easy to understand for the eyes. Negative space has been used to simulate a pizza and its individual slices, adding fun and visual interest to the screens.

6. (continued)

Two images from the interactive screen are shown below.

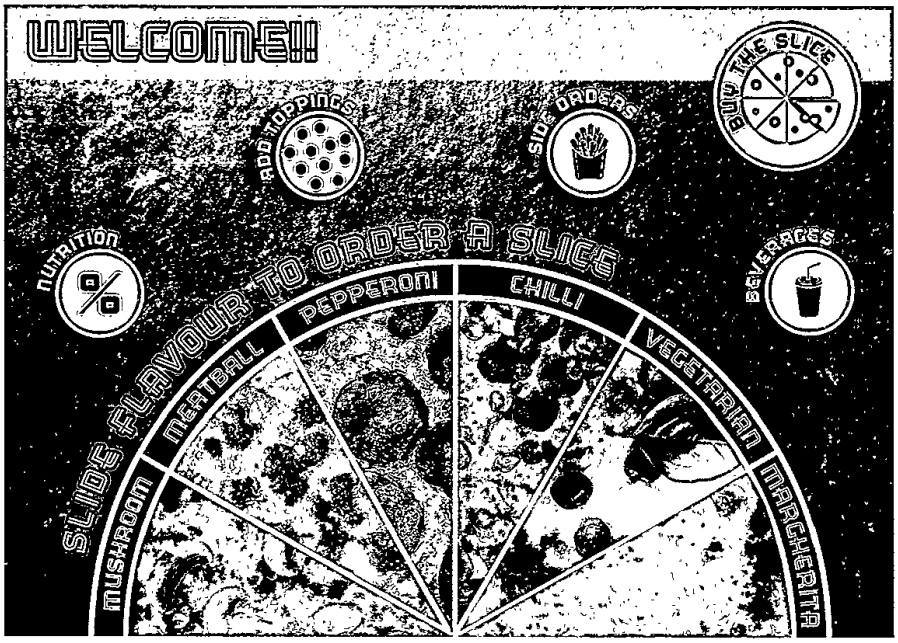


Image A Interactive screen before use

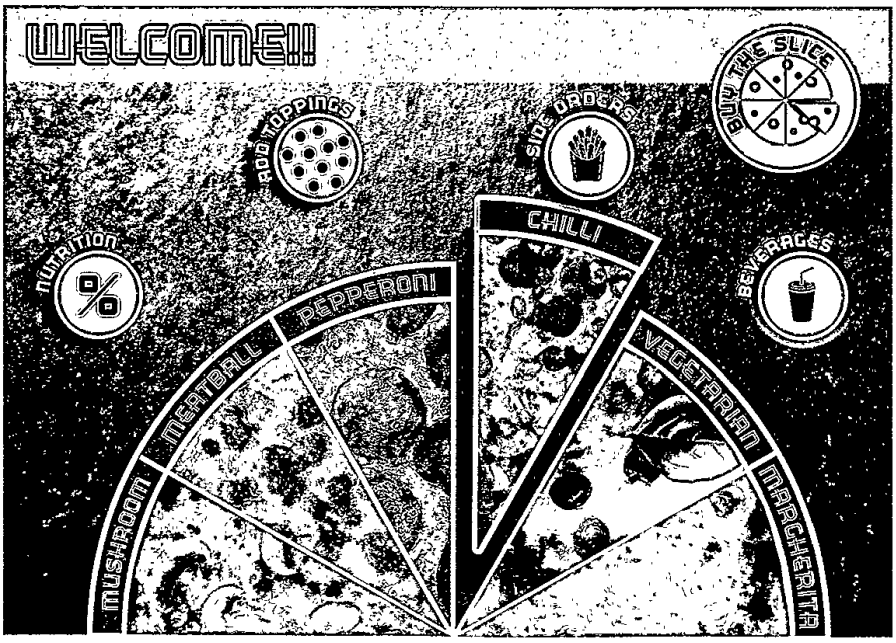


Image B Interactive screen during use

6. (continued)

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

(i) Radial balance Creates a focal point in the centre of the pizza, drawing attention to it. Creates symmetry which is appealing to older audiences. Makes everything easy to find (follow the circle) 2

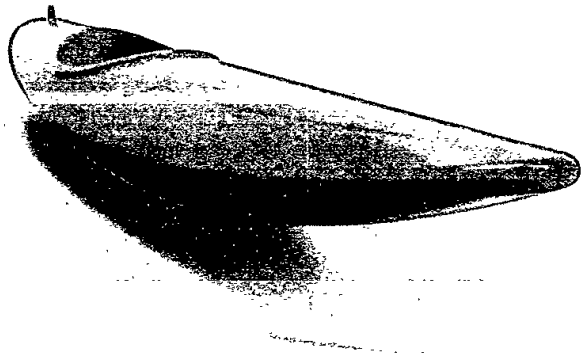
(ii) Texture The background is textured, this makes the screen more realistic as well as mimicing the look of a stone pizza oven. This could improve a customers perception of the store as more prosfesional. 2

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

Motion Tweening has been used to select the slice and move it upwards (radially)
A drop shadow has been applied to add depth as though the slice has been picked up.
An emboss has been applied to the beverages button to mimic a physical button being pressed.

[Turn over

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**

The stepped section should only show half of the kayak as only both section lines (1 quarter)
The ⌀ symbol was used incorrectly.
Third-Angle Projection Symbol incorrect?
Arrow Label lines did not fully extend for all of their text (6. Stern/1. Cockpit)
Random unaligned arrow on detail H (centre circle)
Detail H and G labels different sizes.

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**

A tangency constraint was used to constrain the R40 'circle' to the R25 on the side.

Both arcs were drawn and the constraint was applied when symbol appears.

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**

An irregular fillet was used here.
The edge was selected and intervals at 6. and 2 were inputted at the minor/major axises.
These were then correctly spaced/adjusted and the fillet was persormed.

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

To ensure there are no accidental holes in the kayak
To test the aerodynamics and ensure the kayak is not taking in extra air (drag force) inside.
To ensure no external components are trapping airflow

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

To capture the Kayakers movements and ensure these were still possible inside the new prototype.
To ensure the Kayaker would not hit the kayak when moving.

[END OF QUESTION PAPER]