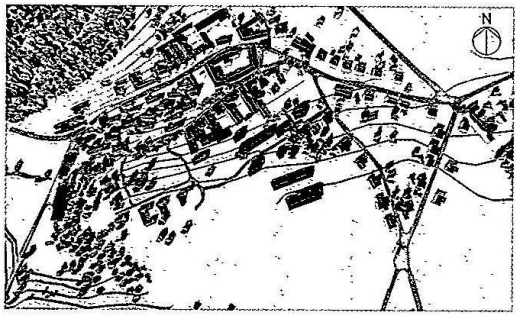
Candidate 4 evidence

SECTION 1 — 50 marks

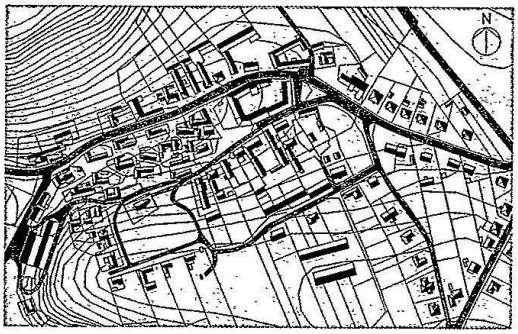
Attempt ALL questions

1. A planning proposal for a large housing development has been submitted by an architect to the local council.

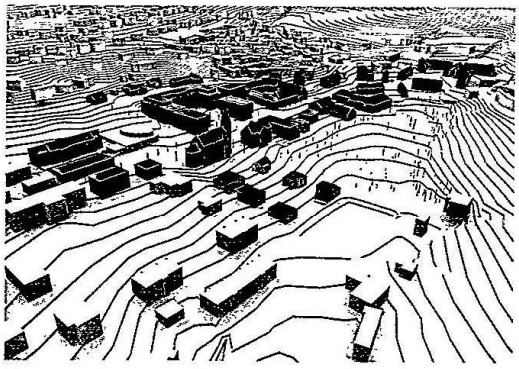
   A variety of graphics of the development are shown below.



Graphic 1



Graphic 2



Graphic 3

1. (continued)

(a) Describe, with reference to graphics 1–3, how these would be used by:

(i) the housing developer;

Graphic 2- To determine road access and safety. Graphic 1- To understand the forestry and natural abstacles in the area. Graphic 3- To see the movement/relief of the land.

(ii) the house buyer. 2

Graphic 1- To see how the trees effect the view and sunlight. Graphic 2- To make sure they have the appropriate amount of road access. Graphic 3- To make sure the relief of the land isn't an issue for garden use.

Before planning can be granted a public consultation must take place for local residents. The company produced a range of graphic communications to showcase the housing development, these included:

- 2D pictorial drawings
- 3D printed scale model of the development
- Animations.

(b) Describe **two** ways in which these graphic communications could help the housing company achieve a positive public image.

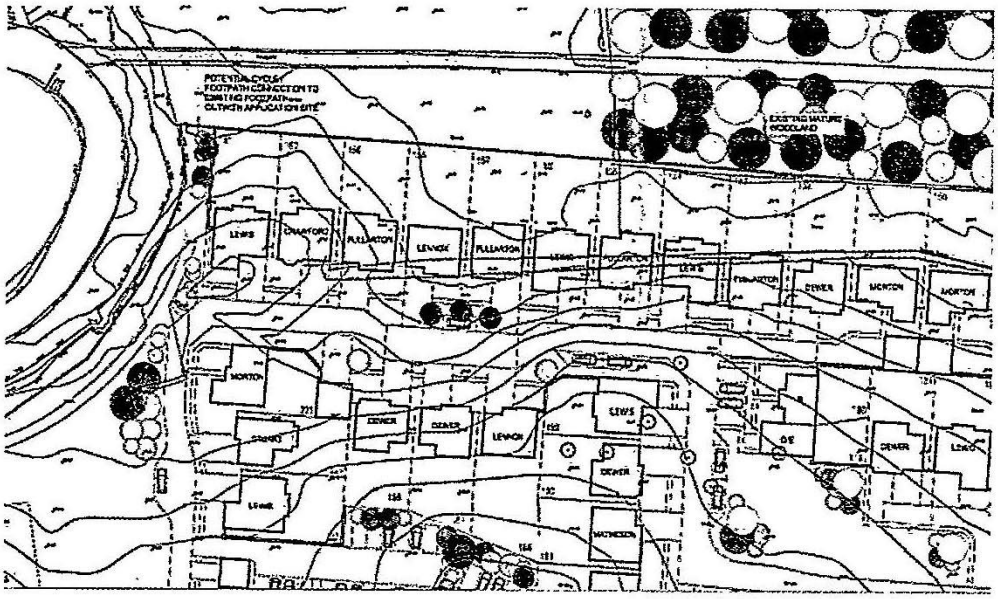
3D scale model allows the public to understand the aesthetic value of the development as not everyone will understand pictorial drawings.

Animations also portray the image/aesthetics of the development in a more engaging way.

[Turn over

1. **(continued)**

A topographical survey was produced for the area. An example of this type of graphic is shown below.

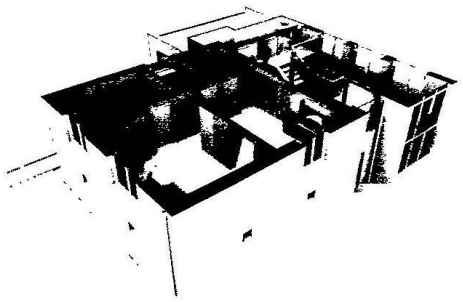


(c) Describe **two** reasons why this type of graphic is of value to the architect.

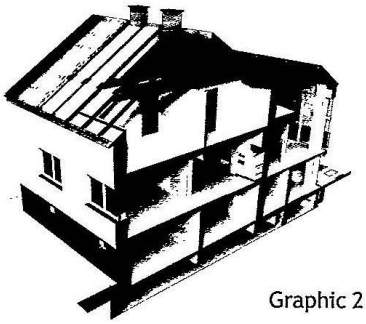
The contour of the land can be seen in these graphics allowing the architect to ~~to~~ designs a stable house. The drainage information will be used to designs an appropriate drainage system for the house.

1. **(continued)**

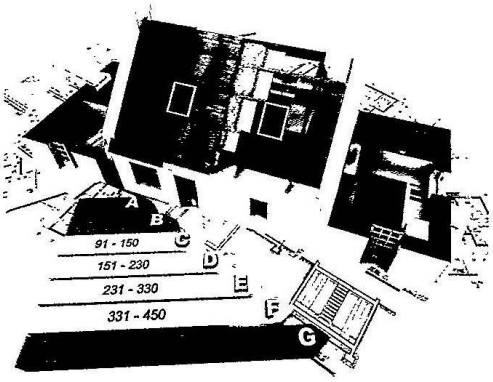
Various graphics of houses in the development are shown.



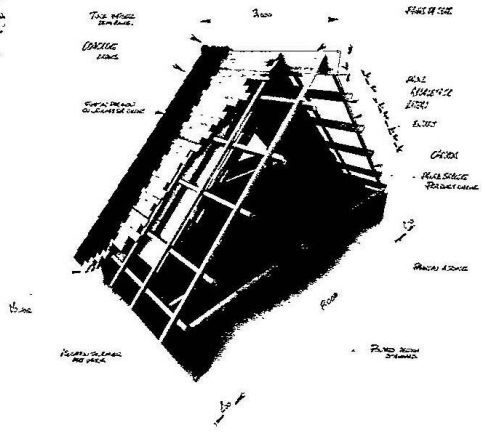
Graphic 1



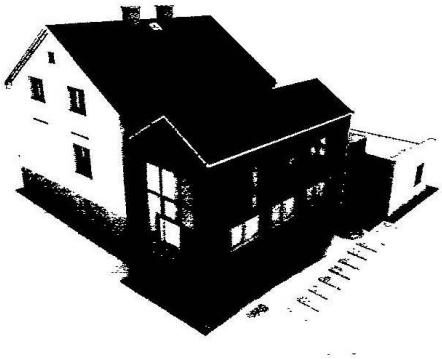
Graphic 2



Graphic 3



Graphic 4



Graphic 5

1. **(continued)**

(d) Describe, with reference to the graphics 1 to 5, what information can be gained that would be relevant to:

(i) the construction trades;

Graphic 4 - Details the type of materials and the length required.
Graphic 2 - Understand the layout & materials for the range. This may effect material choice

(ii) the company sales team.

Graphic 1 - To show the customer what the interior aesthetics look like.
Graphic 5 - To show the customer what the exterior aesthetics of the product.

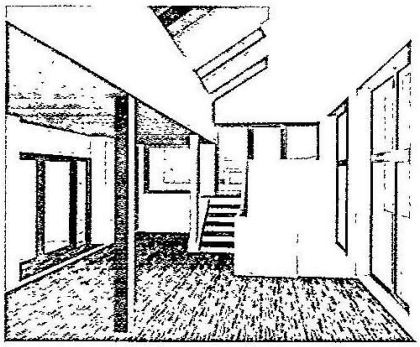
The housing market is very competitive. Promotion of new developments is a high priority for the company.

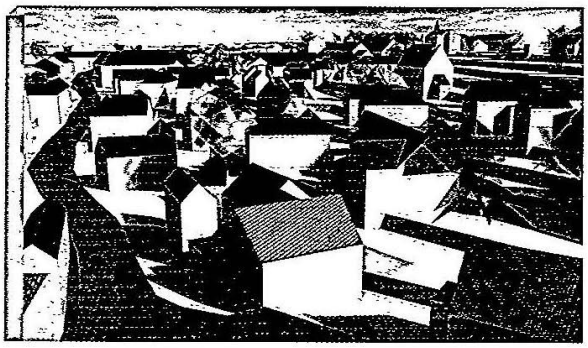
(e) Explain **two** ways in which internet based **graphic communications** could be beneficial to the housing company.

It is widely accessed by many people around the world. The information can easily be shared through social media.

1. **(continued)**

A fly-through of the available house styles and a virtual tour of the housing development are available for the target market to view.





(f) State **two** advantages of using motion tweening in this style of graphic communication.

Motion tweening is simple to program and is cheap compared to other alternatives.

When the architect runs the fly-through a problem is encountered. When entering the building the animation plunges into darkness.

(g) Describe how the lighting in the animation could be changed to rectify this problem.

A HDRI (High Dynamic Range Image) could be used to improve the lighting dynamics.

1. (continued)

The company's Graphic Designer creates graphic representations of how the houses may look prior to construction.

(h) Explain the use of the different illustration techniques used on the promotional work for the graphics shown.

(i) Graphic 1

Technique 1

Ambient lighting - To show realistic lighting styles

Technique 2

Texture mapping - Applied texture to the material to simulate a real material.

(ii) Graphic 2

Technique 1

Rendered environment - A full environment has been placed around the house to show a realistic representation.

Technique 2

Point source light - A point source light, in this case to represent the sun. This shows how shadows will appear due to the sun rays.

2. A caravan manufacturer is releasing their new range of caravans in time for the spring season. A computer model is produced of the caravan shell prior to manufacture.

(a) Describe the process of converting a 3D computer model into a 3D printed model.

The file is converted into an STL file and exported to a 3D printer. The printer aligns the model to a ground plane and builds the model using a series of heated plastic extrusions on a build plate.

(b) Explain, other than digital testing methods, a benefit of producing the 3D printed model for:

(i) the caravan designer;

To ensure structural integrity is secure.
To understand how the aesthetics will play a role in the material choice.

(ii) the caravan manufacturer.

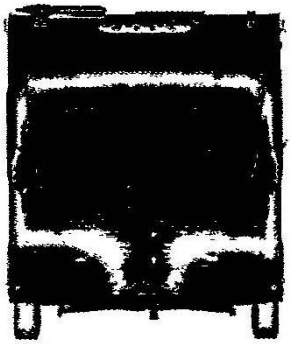
To see how parts will need to be fitted (the assembly technique).
To ensure the materials used will be suitable for the design.

2. (continued)

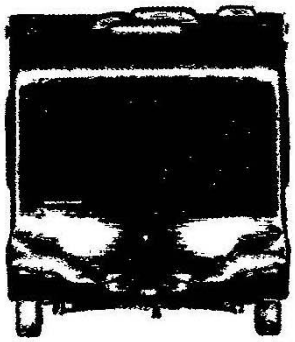
(c) State two digital testing methods that could have been applied to the 3D computer models.

Computational Fluid Dynamics (CFD)
Finite Element Analysis (FEA)

The results of the digital testing are shown below. The images show the forces that act upon the caravan while in transit. The red areas show the greatest drag forces.



New Caravan Model



Competitor Model

(d) Explain two advantages of this type of information to the target market.

The force upon the caravan will effect the maximum speed of the vehicle.
The force upon the caravan will effect the overall fuel consumption of the vehicle.

2. (continued)

Rendered 3D computer models of the caravan interior and exterior were included in the promotional material.

(e) Describe what information could be gathered from the rendered images which may be of interest to the target market.

- The quality of materials used
- The quality of design and design complexity
- The aesthetics of the exterior and interior.
- The overall space in the interior.

2. **(continued)**

Digital advertising is becoming an increasing part of promoting and selling products. The website designers intend to use VRML within the website to promote the new caravans internal **and** external details.

(f) Explain **two** advantages of using this format over other graphic media files.

- It makes it much easier to visualise space within the model.

- Everyone can understand virtual reality models compared to using pictorial drawings.

(g) Describe how using a VRML format may increase interest for the product and create sales for the company.

Its a much quicker way of interacting with a model and allows customers to view every part of the product they are considering buying from their homes.

3. A major publicity drive is being conducted by the Blood Transfusion Service to raise awareness of the importance of Giving Blood in Scotland. They plan to organise a range of 5K and 10K races across the country.

Graphic Designers have been tasked to design and produce a range of graphic communications to promote the event.

The event "Blood Run" logo has been produced as a vector graphic, to be used in the online and printed advertising.

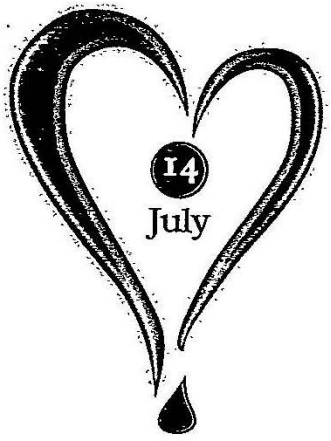
(a) Describe **three** advantages of vector images compared to raster images.

- The scale of the image can be increased without losing image quality.
- Smaller file sizes.
- Use less computer processing to open/edit.

The colours used within the promotional work must incorporate the colours used in the existing Give Blood logo.

(b) Explain how the Graphic Designers can ensure an exact colour match is achieved.

By using a colour match system such as Pantone.



3. **(continued)**

When the client viewed the pre-production print of the flyer, they were disappointed with the paper and quality of product.

(c) Describe **two** changes that could be made to the paper to improve the quality before going to final print.

The paper could be calleundered to create a smoother feel to it. The papers density could be increased to improve the durability and printing systems.

3. **(continued)**

The process Offset Lithography was used to produce promotional work for the event.

3. **(continued)**

(d) Describe how the process would be used to produce the flyer shown opposite.

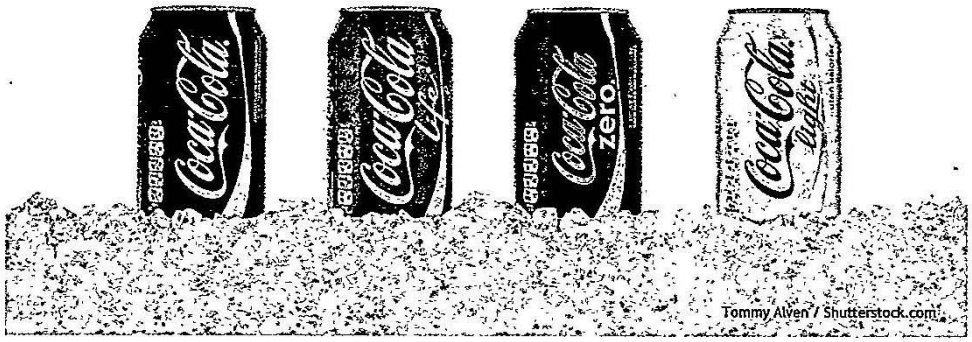
Colour plates would be created, one for each of the 4 CMYK colours. The plates would then be placed on large rollers and the paper fed into them. Each wheel colour would imprint its colour value over the paper and the next would imprint over that colour. At the end of the process. The crop marks on the paper (' — ') show where the edge will be removed.

The round symbols (⊕) indicate where the paper needs to be aligned in each drum because if the paper isn't aligned then the colours will not overlay properly.

SECTION 2 — 30 marks M

Attempt ALL questions

4. A selection of current soft drinks products are shown below.



The Coca Cola typeface and white wavy line are common features used in this product range.

(a) Describe the effect these common features have in maintaining a brand identity.

• Easily recognisable
• Cannot be copied due to property rights.

4. **(continued)**

Companies such as Coca Cola invest significant sums of money to ensure that their brands are protected.

(b) Explain, giving **three** reasons, why companies protect their intellectual property rights.

- Other companies cannot use their logo as their own.
- To protect their reputation as a business.
- False advertising cannot take place.

4. **(continued)**

The company uses a variety of advertising to showcase their products.

(c) Explain, with reference to the graphics shown on the **Supplementary Sheet for use with Question 4 (c)**, how the company have considered target market, colour and social responsibilities.

Target market The iconic drink is in every image, enticing people to buy the product. The 3 adverts are all diggerent in terms of target audience. This will allow many people to be egget rather than a selected few.

Colour Graphic 1 contains suple colour scheme however sticks with the iconic 'Coke' red. The colours contrast allowing for clarity in the poster.
The 2nd graphic also uses the 'Coke' red colour as it is the brand identity

Social responsibilities Each poster is positive on life. Graphic 1 emphasis social behaviour and entertainment.
Graphic 3 emphasises environmental factors. ~~[illegible]~~
Graphic 2 emphasis the adventurine feeling in life.

5. A range of pictorial and orthographic views of a new design for a trailer jockey wheel assembly are shown on the **Supplementary Sheets for use with Question 5.**

(a) Describe the 3D CAD modelling techniques used to create component "A" **in the most efficient and economical way.** Make reference to the dimensions from the drawings in your answer.

You may use sketches within your answer.

1. Create sketch and draw circle of diameter 34mm.
2. Extrude/add circle by 350mm.
3. Create sketch on top surface and using offset tool, create a smaller circle of 10mm diameter.
4. Using Extrude/subtract, cut the circle into the rod by 150mm.
5. Create a sketch on the bottom of the rod. Using the offset tool create an interior circle of 30mm diameter.
6. Using Extrude/subtract remove material by 200mm.
7. Create a sketch 2mm up from the bottom of the rod on a work plane.
8. Using project edge, project the edge of the rod. Draw a rectangle 2.5mm from the center of the cylinder tangent to the cylinder edge 25mm on either side of the centreline. Dimensions shown:

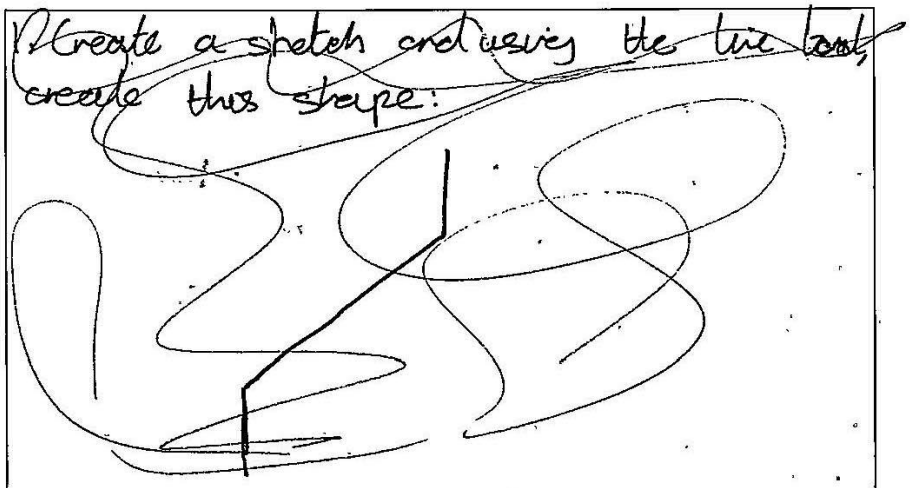
9. Continue the shape (rectangle) at an angle of 135° from the horizontal. Continue the rectangle for 14mm.
10. Continue the rectangle at 180° for 14.9mm.
11. Extrude/add material up by 40mm.

see back of book

5. (continued)

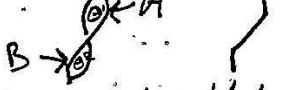
(b) Describe the 3D CAD modelling techniques used to create component "B" **in the most efficient and economical way.** Make reference to the dimensions from the drawings in your answer.

You may use sketches within your answer.



~~1. Create sketch, Draw circle diameter 15mm.~~
~~2.~~

1. Create Sketch; Usk line tool to create shape:



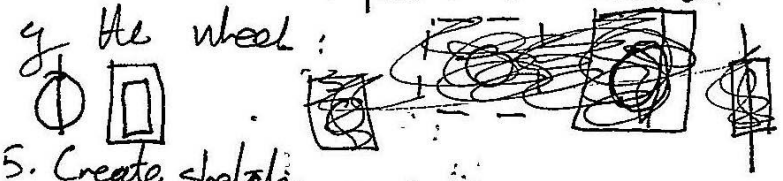
2. Use fillet (2D) to create fillets at point A and B eg radius 25mm.
3. Dimension the top point and bottom points to asite eg 125 mm.
4. ~~Using~~ Dimension θ_1 at 120° and θ_2 also 120°.
5. Create a circle sketch on the end point on a perpendicular plane. Circle diameter 15mm. *See Back of Booklet

5. (continued)

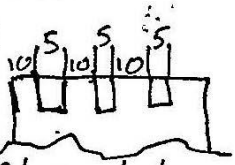
(c) Describe **the most efficient and economical way** of creating component "C". Make reference to 3D CAD modelling techniques and to the dimensions from the drawings in your answer.

You may use sketches within your answer.

1. Create sketch – draw circle – radius 110 mm. – Extrude/add sketch by 60 mm.
2. Create sketch – draw circle – diameter 190 mm – ~~[illegible]~~ use offset-create circle @ Ø 220 mm – Extrude/subtract outer circle by 3.5 mm.
3. Create sketch – draw circle – ~~[illegible]~~ diameter 20 mm – extrude/subtract – through all selected.
4. Create work plane in centre of the wheel:



5. Create sketch.



Draw using rectangle tool.

6. use revolve/revolute extrude to subtract 3 rectangle all around circular wheel.
7. Create sketch, draw circle ~~[illegible]~~ radius 23 mm, use revolve/extrude subtract in circular to remove material.
8. Mirror feature over origin plane.

5. (continued)

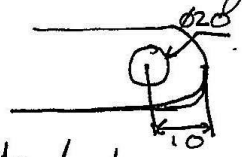
(d) Describe the 3D CAD modelling constraints that would be used to assemble the hex-bolt to the handle. ~~Handle~~

1. Radial constraint from the bolt cylinder axis to hole cylinder axis.
2. Mate constraint from bolt head 'underserface' to the surface within the hole of the handle.

ADDITIONAL SPACE FOR ANSWERS AND ROUGH WORKING

5. a) 12. Using the fillet tool, create a fillet at the end of the extrusion by 20mm radius.

13. Use the hole / slot tool to create a hole of 20mm diameter, 10mm from the apex of the fillet:



14. Use a mirror geometry tool to mirror the material over the center origin plane of the cylinder.

5.15) 16. Use extrude allowing a path to extrude/add the circle along the linear path.

7. Create a sketch on the top circular surface and use offset tool to create a circle of diameter 10mm.

8. Extrude subtract by 10mm.

9. Create sketch on bottom circle surface. Draw circle of diameter 22.6mm.

10. Create a sketch on a new plane, 10mm down. Draw circle of 23mm.

11. Use loft tool to join the two circles together.

12. Create another sketch on the larger circle surface.

13. Extrude/add circle by 17mm.

14. Create another sketch on the surface and draw a circle of 10mm. Extrude/add 2mm.

15. Another sketch