



FOR OFFICIAL USE

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National
Qualifications
SPECIMEN ONLY

Mark

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SQ22/H/01

**Graphic
Communication**

Date — Not applicable

Duration — 2 hours



Fill in these boxes and read what is printed below.

Full name of centre

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Town

--

Forename(s)

--

Surname

--

Number of seat

--

Date of birth

Day

Month

Year

D	D
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M	M
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Y	Y
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Scottish candidate number

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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.



Attempt ALL questions

Total marks — 70

MARKS

1. A public building that was constructed in the 1950s is to be modernised. The original drawings were produced manually in paper format. The architect has requested that the manual drawings be converted to a digital format and sent electronically.

The conversion methods being considered are: scanning the original drawings or reproducing the drawings using CAD software.

- (a) (i) Compare the two methods in terms of their suitability for this task.

4

The comparison must refer to both methods

- Scanning produces a raster image which cannot be subsequently edited
- CAD produces a vector image which can be edited
- Redrawing the image using CAD means that the image can be edited/detail changed in the future (by the original designer or by other people)
- In a scanned image the detail cannot be edited/changed
- Redrawing for a building would be very time consuming in comparison scanning would take a significantly shorter time

Re-drawing

Advantages can cover:

- option to add in layers / easy to edit/modify / can use in simulations
- produces vector graphic / small file size
- updated drawings to include modern drawing standards

Disadvantages can cover:

- very time consuming / mistakes could be made

Scanning

Advantages can cover:

- Speed / file can be archived / file can be emailed
- files are easily viewed on many electronic devices

Disadvantages can cover:

- drawings cannot be edited after scanning
- Large file sizes
- produces raster graphic
- physical drawing sizes may prove too large to scan in one attempt (may require piecing together)

1. (a) (continued)

- (ii) Explain two possible disadvantages that may be encountered when two different people or companies work together on the same project using CAD.

2

- the incompatibility of file types
- Inconsistent drawing standards
- files cannot be worked on simultaneously by different parties
- possible complications in language barriers

CAD simulation could be used to test aspects of the design of the building.

- (b) Identify an aspect of the design that could be tested through a CAD simulation.

1

Any appropriate and specific aspect for testing such as:

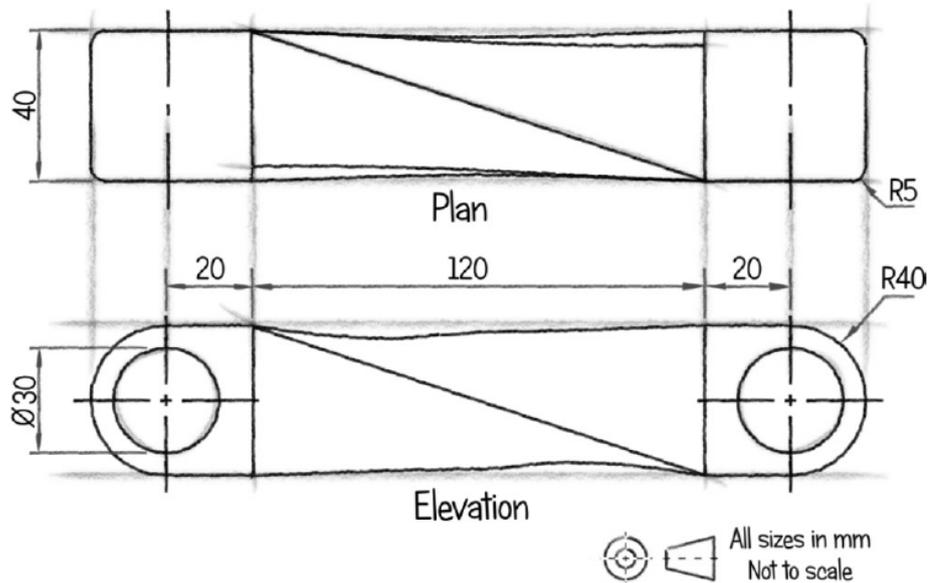
- heat flow / flow of people (dynamic)
- static loading / strength of material
- ventilation flow/rate / lighting
- evacuation time

- (c) Identify an advantage of a “paperless office” to an architectural business.

1

- ease of storage
- ease of sharing
- ease of collaborative working
- positive environmental aspects
- reduction in copying

2. The sketches below were used by a CAD technician to create a 3D model of a portable speaker casing. The 3D model will be used to make production drawings and a promotional illustration.



Orthographic sketch

The CAD technician sketched a modelling plan before creating the 3D model. The first two stages of the modelling plan are shown below.

- (a) Describe the 3D modelling techniques proposed for each stage, making reference to all relevant dimensions from the orthographic sketch. You can sketch, annotate the sketches provided and/or use text in your answer.

(i) 2

Description which makes reference to:

loft command to join profiles
and
the size of the profiles
(40 mm x 40 mm)
and a distance of 120 mm

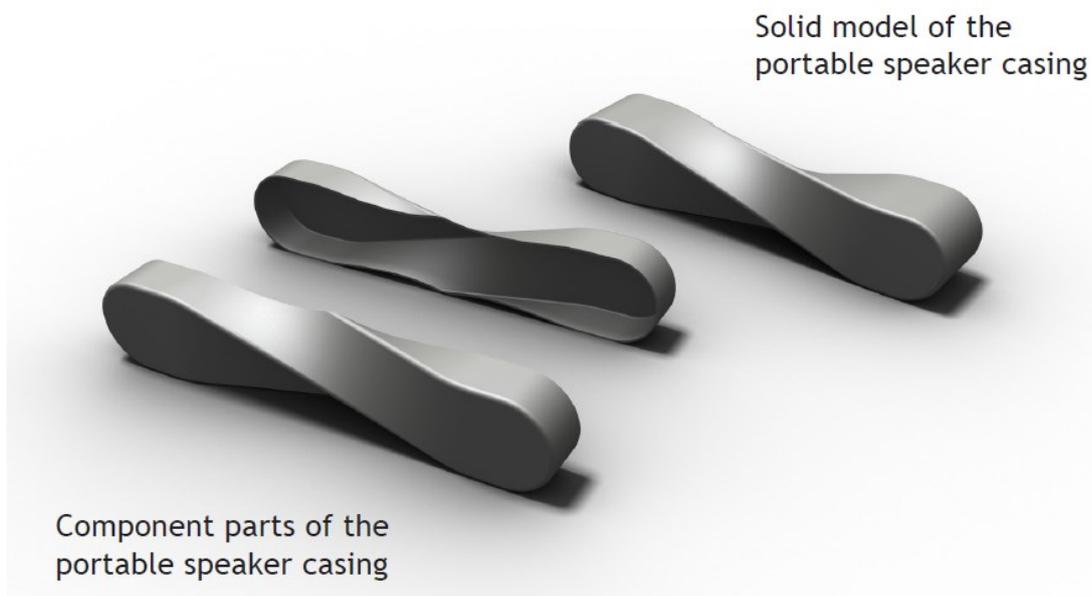
(ii) 2

Description which makes reference to:

extruding a cuboid 40 mm and
applying a radius to the end edges

drawing a profile the shape
indicated on the sketch
Extrude profile by 40 mm

2. (continued)



A solid model of the portable speaker casing and the two components generated from it are shown above.

- (b) Describe, using a “top-down” approach, the techniques used to create the two component parts from the solid model. You can sketch, annotate and/or use text in your answer.

4

A description which makes reference to:

using the shell solid command to remove interior material from the solid model

and

creating a sketch through the solid model (lengthways).

The sketch must be bigger than the solid model

and

extruding the sketch with a cut/subtraction in one direction and saving the file

and

redefining the modelling tree/extrusion and cut/subtract in

the opposite direction and saving the file under a different name

OR

A description which makes reference to:

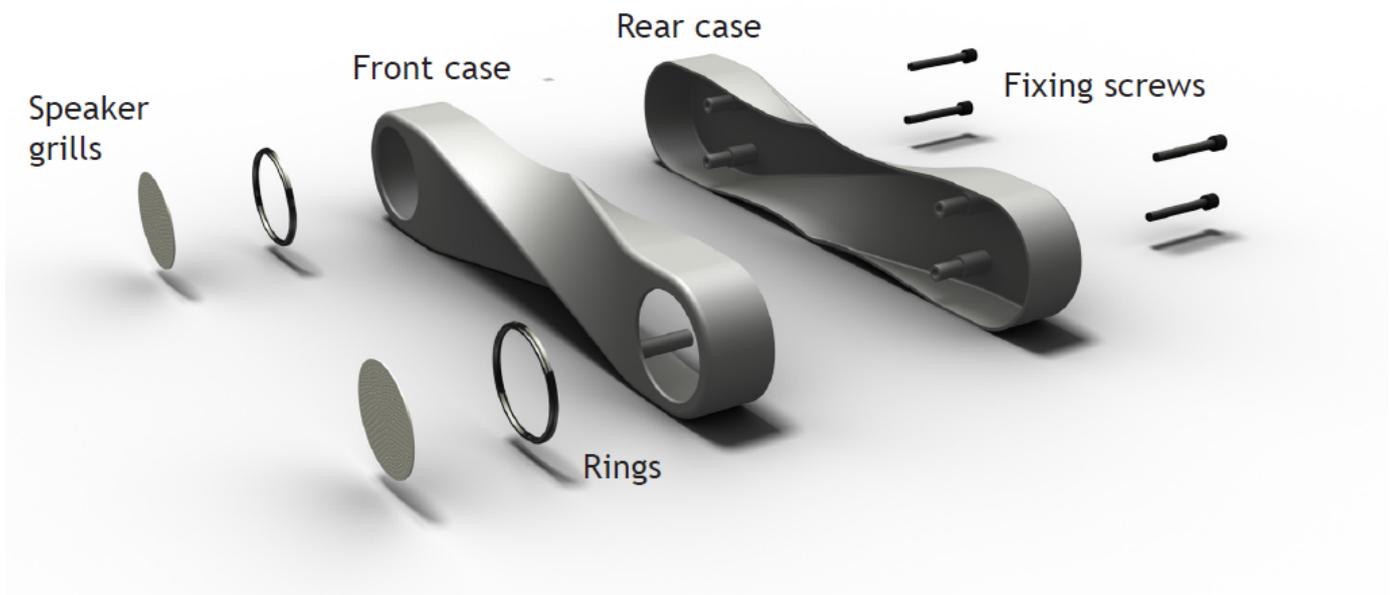
Using the shell solid command to remove interior material from the solid model

Creation of Work Plane on Centre Line of Speaker (Defined on length)

Use of Split Tool

Deleting Split Sections & Saving as required to create two discrete components

2. (continued)



The components of the speaker casing are shown above.

The fixing screws were imported from a CAD library.

(c) Explain why this type of component would be included in a CAD library.

2

- removes repetition
- saves time on drawing common or complex components
- common components in a CAD library are likely to conform to standards
- accurately represent common or frequently used parts
- library components can be used or shared between a wide range of models
- library components can be used or shared between a wide range of technicians, operators or people

2. (continued)



The two component parts of the portable speaker casing need to be assembled within the CAD software.

- (d) Outline the 3D modelling techniques used to fully constrain the two component parts. You may use annotated sketches to support your answer if you wish.

2

An outline description which makes reference to constraining methods, eg:

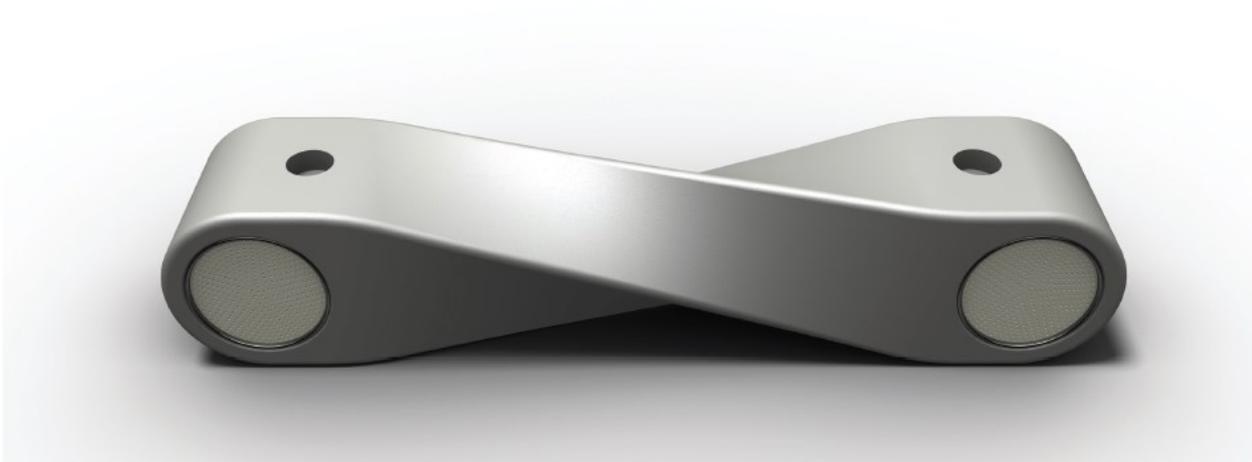
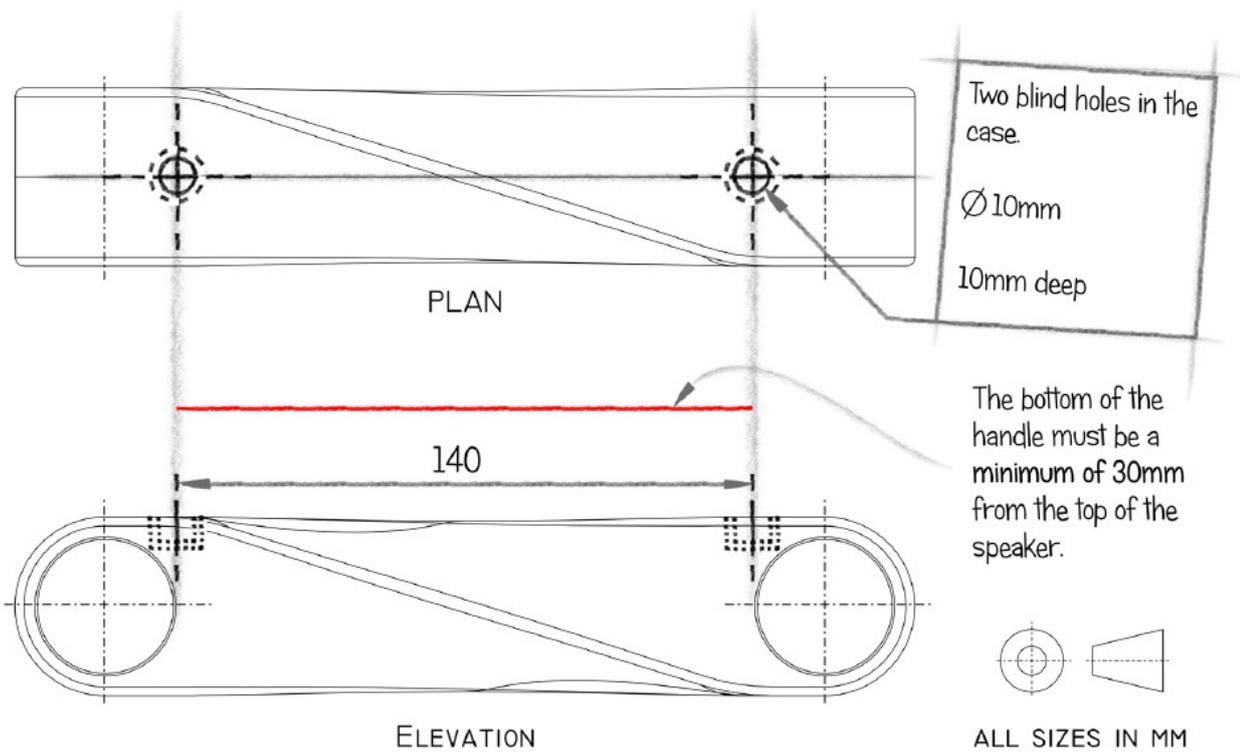
centre the axis of two corresponding screw-bosses or

centre the axis of the two corresponding radiused case components

and

mate the two flat faces on the components, either on the outer case or the bosses

2. (continued)



2. (continued)

The portable speaker casing design has been modified to allow a simple handle to be attached. These modifications have been sketched on the production drawings and shown on the 3D model on the left.

- (e) Produce a modelling plan which could be used to create a 3D CAD model of a simple handle to fit the blind holes in the casing. The handle will be glued into the holes. You can sketch, annotate, and/or use text in your answer.

4

Production of a modelling plan which communicates how key features of the 3D model are generated

Responses should include references to:

140 mm between centres (1 mark)

minimum 30 mm clearance for handle (1 mark)

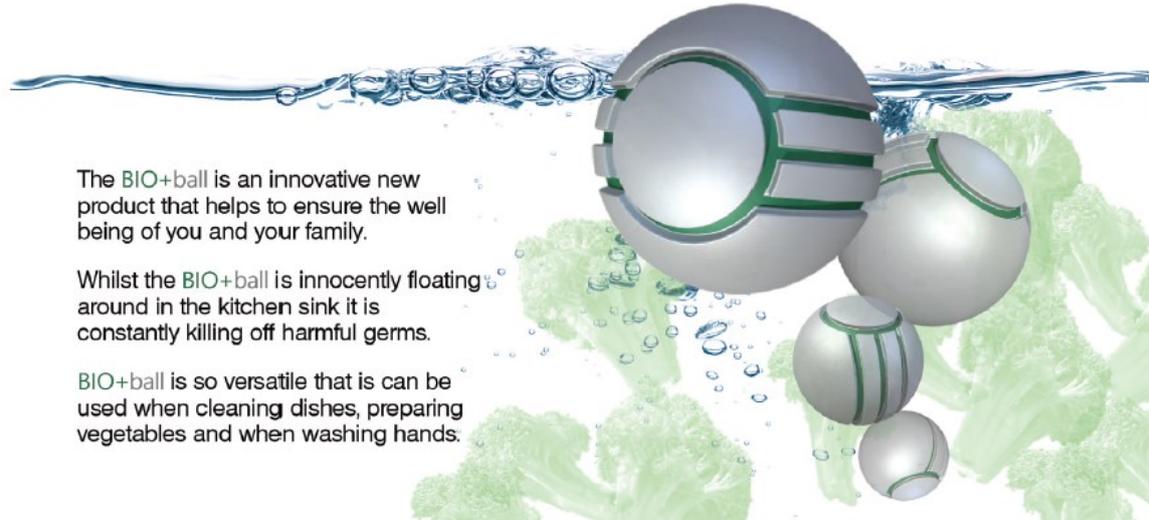
10 mm diameter for the handle (1 mark)

any suitable modelling technique to complete the handle (1 mark)

3. The promotional layout below is used to attract consumers to a new product.

BIO+ball

keeping your family safe + clean



The BIO+ball is an innovative new product that helps to ensure the well being of you and your family.

Whilst the BIO+ball is innocently floating around in the kitchen sink it is constantly killing off harmful germs.

BIO+ball is so versatile that it can be used when cleaning dishes, preparing vegetables and when washing hands.

Explain how the graphic designer has used typeface, colour and choice of images to attract consumers.

4

Explanations should make appropriate reference to (and relate the choices made to Target market (consumer)

- families, hygiene aware, families with young children

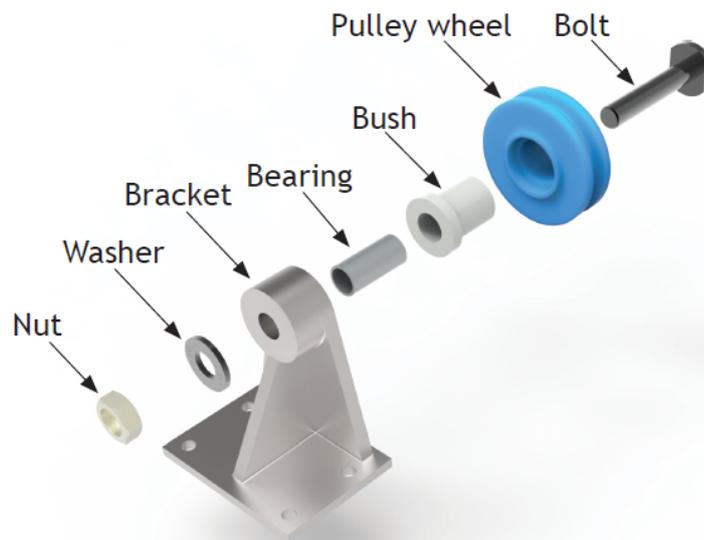
Colour scheme/choice of images

- Fresh, hygienic, calm, natural, health, safety
- link to broccoli (fresh, organic, natural)

Typeface

- sans serif font, modern, use of product logo to promote brand
- use of uppercase to emphasise the bio/eco, aspect of the product

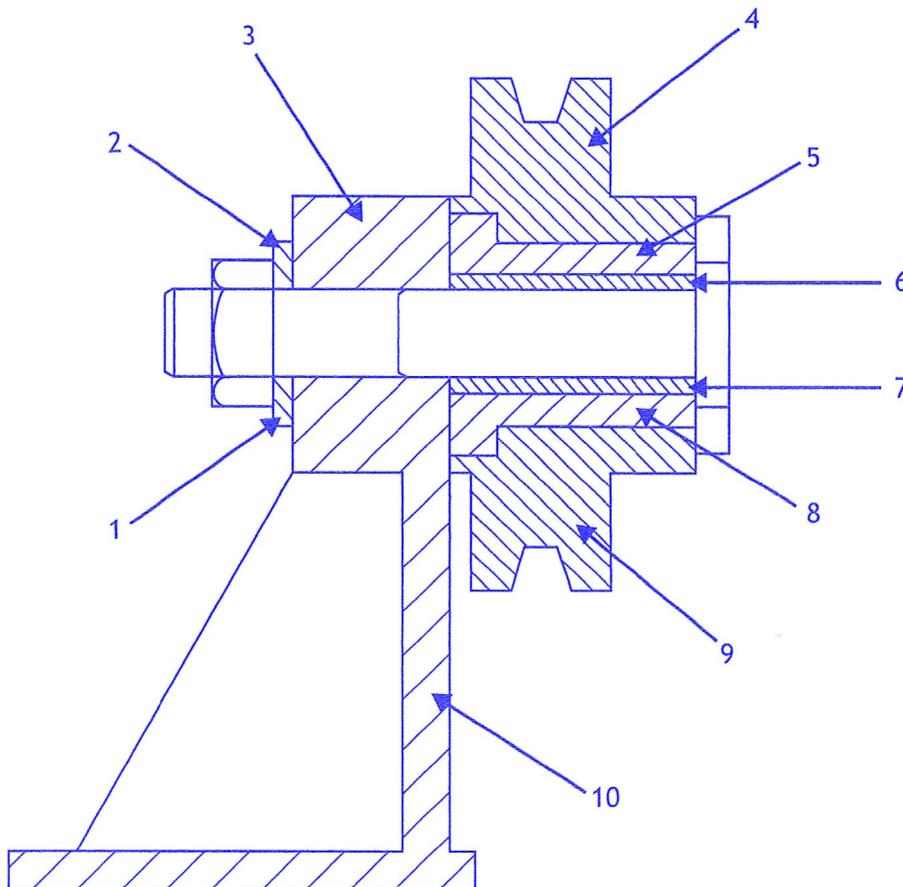
4. Components that make up a pulley wheel assembly are shown below as an exploded view.



An incomplete sectional elevation, cut along a central vertical plane, is shown below.

- (a) (i) Apply hatching to the assembled elevation to show the different components taking account of British Standards. You may sketch the section lines on the view and you can use a straight edge if you wish.

3



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

Part X is a Web

1

4. (a) (continued)

The bolt used in the assembly has flat sections on the end for a spanner to fit.

- (iii) Apply the British Standards convention for this flat on the bolt shown below (Figure 1).

1

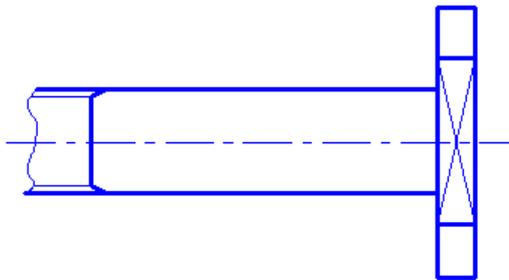


Figure 1

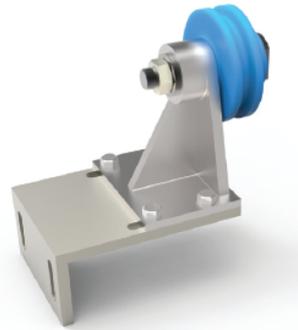


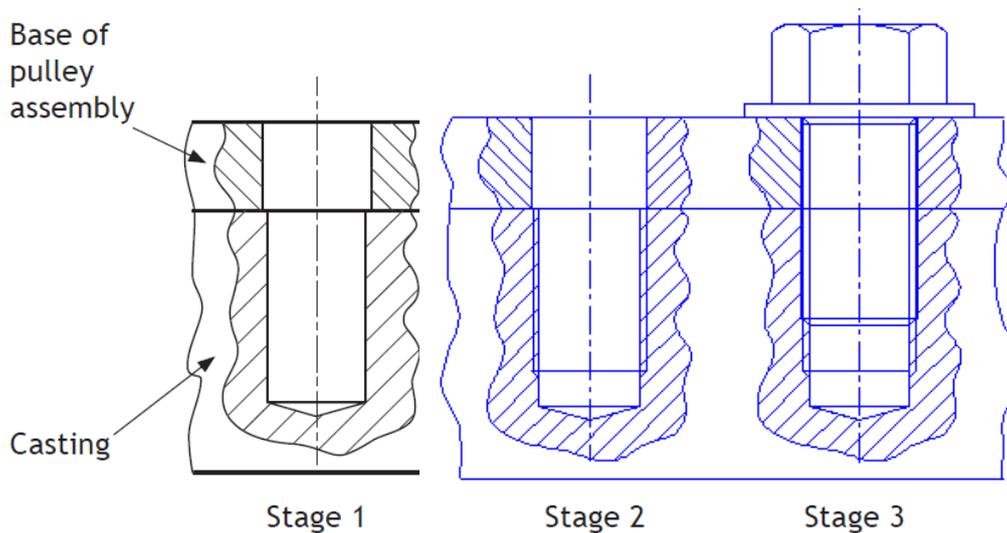
Figure 2

The 3D view in Figure 2 shows the pulley assembly bolted by the base to another component. The drawing below shows the three stages.

Stage 1 — a blind hole is machined in the component

Stage 2 — a thread is cut into the blind hole

Stage 3 — an M10 bolt and washer is fitted to secure the pulley assembly



- (b) (i) Apply hatching to **Stage 2** and **Stage 3** above taking account of British Standards and conventions. You may sketch the section lines on the view and you can use a straight edge if you wish.

2

4. (b) (continued)

(ii) Explain the term “blind hole” at Stage 1.

1

A blind hole is a hole that is drilled or milled to a specified depth without breaking through to the other side of the material

(iii) What does the “M” stand for on the M10 bolt?

1

Metric

(iv) Determine the depth of the hole for the thread cut at Stage 2.

1

30mm

(v) State the type of section shown at Stages 1 to 3.

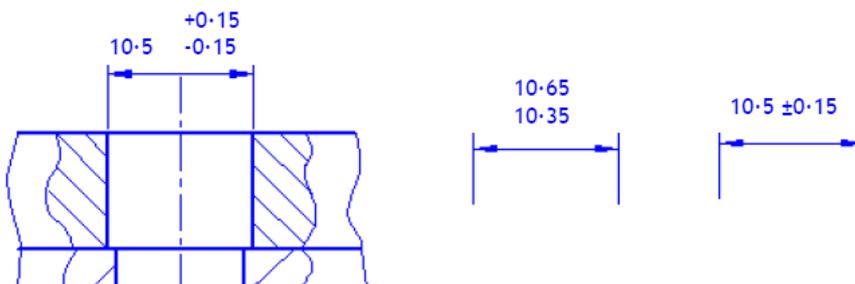
1

Local or Part Section

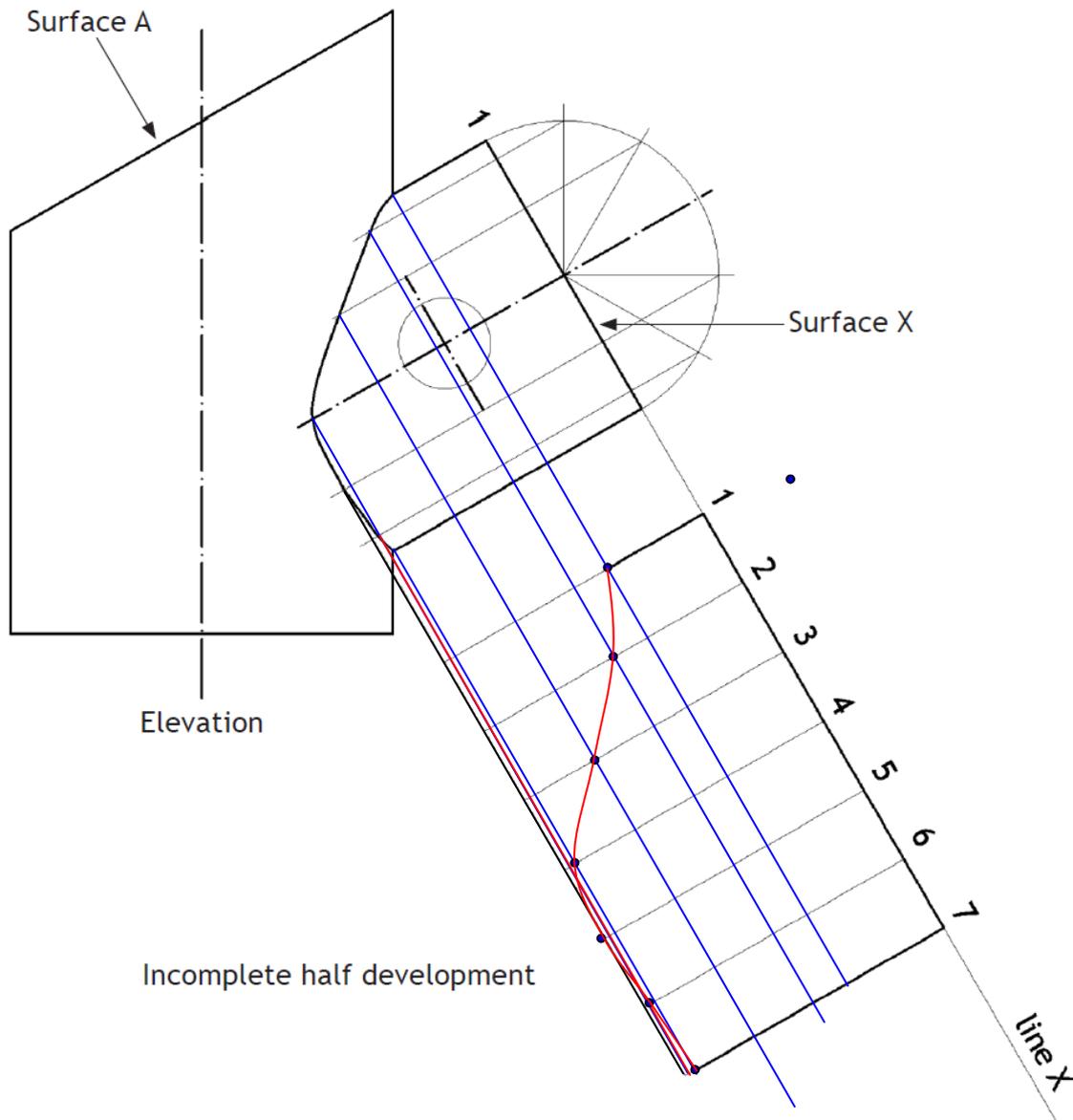
The holes on the base of the pulley assembly are 10.5 mm with a tolerance of -0.15 and $+0.15$ applied.

(vi) Apply the dimensional tolerance to the hole in Stage 1 taking account of British Standards.

1



5. The elevation of two interpenetrating cylindrical pipes is shown below. A surface development of interpenetrating cylindrical pipes is being generated using 2D CAD. The elevation and part construction work is shown below.



Line X has been drawn and will be offset to the left to create a series of parallel lines to locate the intersection for plotting the points.

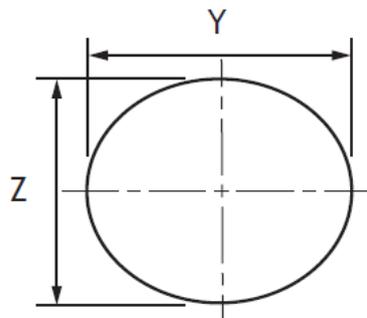
5. (continued)

- (a) Complete the table provided indicating the offset required to locate the position of the points on each generator given (1–7) and the centre point for the circle.

2

Generator line	Offset from line X (mm) (within the ranges)
1	13-15
2	18.5-20.5
3	27.5-29.5
4	37.5-39.5
5	37-39
6	37.5-39.5
7	36.5-38.5
Circle centre point	17-19

The true shape of surface A is shown below.



Not to scale

- (b) What are the full dimensions for Y and Z on surface A?

1

Y = 57–58 mm Z = 49–51 mm

6. Use the three layouts in the **Question 6 supplement** provided to answer this question.

Three promotional layouts for “One Stop Kit Shop”, a cycling accessories chain, are shown.

The layouts are aimed at three different target markets and will be displayed in three different magazines.

Target market layout 1: (45–65 years) male and female, leisure cycling, working and retired singles and couples, grown-up families, TV influences: gardening and travel shows

Target market layout 2: (25–45 years) male and female, working, keen cyclists, adventure cycling, young families or no family commitments, TV influences: sport and Top Gear

Target market layout 3: (15–25 years) predominantly male, serious adventure and mountain biking, single, independent, TV influences: reality shows, indie and grunge music

The graphic designer has used a range of design elements and principles in each of the three layouts to appeal to the different target markets.

- (a) Explain why the styles of typeface used in layout 1 will appeal to its target market.

2

The serif fonts are formal, traditional or old fashioned

They represent a more sophisticated or mature look to appeal to the older target market

The flicks and flowing curves in the font styles look friendly and safe to an older target market

Each letter flowing into the next makes it easier for an older target market to read

- (b) Explain how the use of shape enhances layout 2.

2

The page is rectilinear and so are the boxes, lines and the square.

The cropped images create curved or natural shapes that bring eye-catching contrast with/ visual interest against the rectilinear shapes.

The cropped cyclist and helmet (the product) stand out against a simple geometric backdrop.

The punctuation circles add contrast against the rectilinear shapes in the layout.

The curved text above the cyclist creates contrast with the rectilinear shapes in the layout.

The purpose of the advert is to attract attention quickly;

the contrasting shapes (mentioned earlier) help ensure this.

The curved text mimics (harmonises with) the shape of the helmet and appears to protect the cyclist's head.

6. (continued)

In layout 2, three lines, two blue and one orange, are used.

- (c) Explain how each of these lines improves layout 2. Each of your explanations should be different.

3

Orange line:

- creates a unifying accent colour with the other orange items
- creates depth by passing behind the cyclist / emphasises part of the slogan

Blue vertical line:

- creates depth by passing behind the helmet
- creates eye-catching contrast with the horizontal lines
- separates the space for the web address

Blue horizontal line:

- connects the layout items horizontally
- aids alignment with the slogan and company name
- creates eye-catching contrast with the orange colours
- creates a vertical/horizontal contrast
- separates the space for the company name

Advancing and receding colours have been used in each of the layouts.

- (d) Select one of the layouts. Identify an advancing colour used in it, and describe the impact this colour has on the layout.

2

In layout _____ the advancing colour is Red / Orange.

The effect this colour has on the layout is:

- it lifts the red or orange items forward
- makes the red or orange items more prominent
- makes the red or orange items stand out more
- creates contrast with the receding colours in the layout

Different forms of balance have been used in the layouts. In layout 1 the cyclists are placed off-centre, whilst in layout 2 the cyclist is placed in the centre of the layout.

- (e) (i) Explain one challenge that placing a main item in the centre of a layout gives the graphic designer.

1

Symmetrical Balance

- It leaves two awkward spaces to fill rather than one usable space
- It misses the most natural focal points

6. (e) (continued)

- (ii) Explain the benefit of placing a main item off-centre in a layout (other than your answer to 6(e)(i)).

1

Symmetrical Balance

- It will create visual interest through asymmetry, white space, and a natural focal point
- It leaves a single space that is easier to fill/populate

- (f) Explain three different ways in which the graphic designer has used design elements and principles in layout 3 to appeal to its target market.

3

- The font is a graffiti/grungy/sans serif style and is fun and youthful
- Images of mountain bike stunts connect with target market
- Tilted images and items make the layout less formal and create visual interest
- Bold, contrasting colours (blue and red) create a youthful look
- Distressed images will appeal to young target market

Question 6 supplement

Layout 1



Layout 2



Layout 3



7. Use “The Colour and the Shape” articles (layout A and layout B) from the **Question 7 supplement** provided to answer this question.

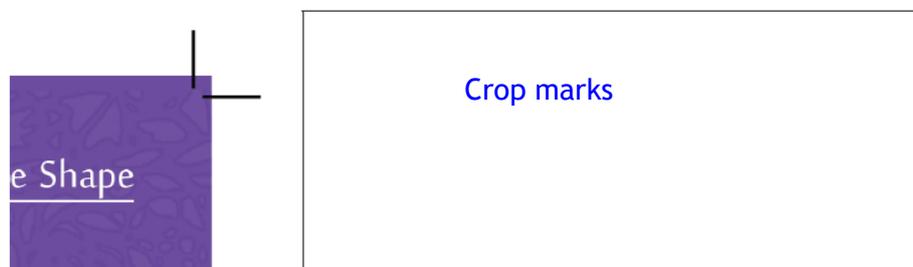
A graphic designer has created a magazine double-page spread for a home furnishing publication as shown in layout A. After development, the graphic designer enhanced the layout and produced a pre-press copy, layout B.

- (a) Explain **two** reasons for using **headers** and **footers** in a multi-page document. 2

- They can assist in navigating within a document
- They display useful information including: title/chapter, page number, date, author
- They identify the document’s content
- They create a sense of unity throughout a document or section

- (b) Examine the feature shown below.

- (i) State the name of this feature which is in each corner of layout B. 1



- (ii) Explain the purpose of this feature. 1

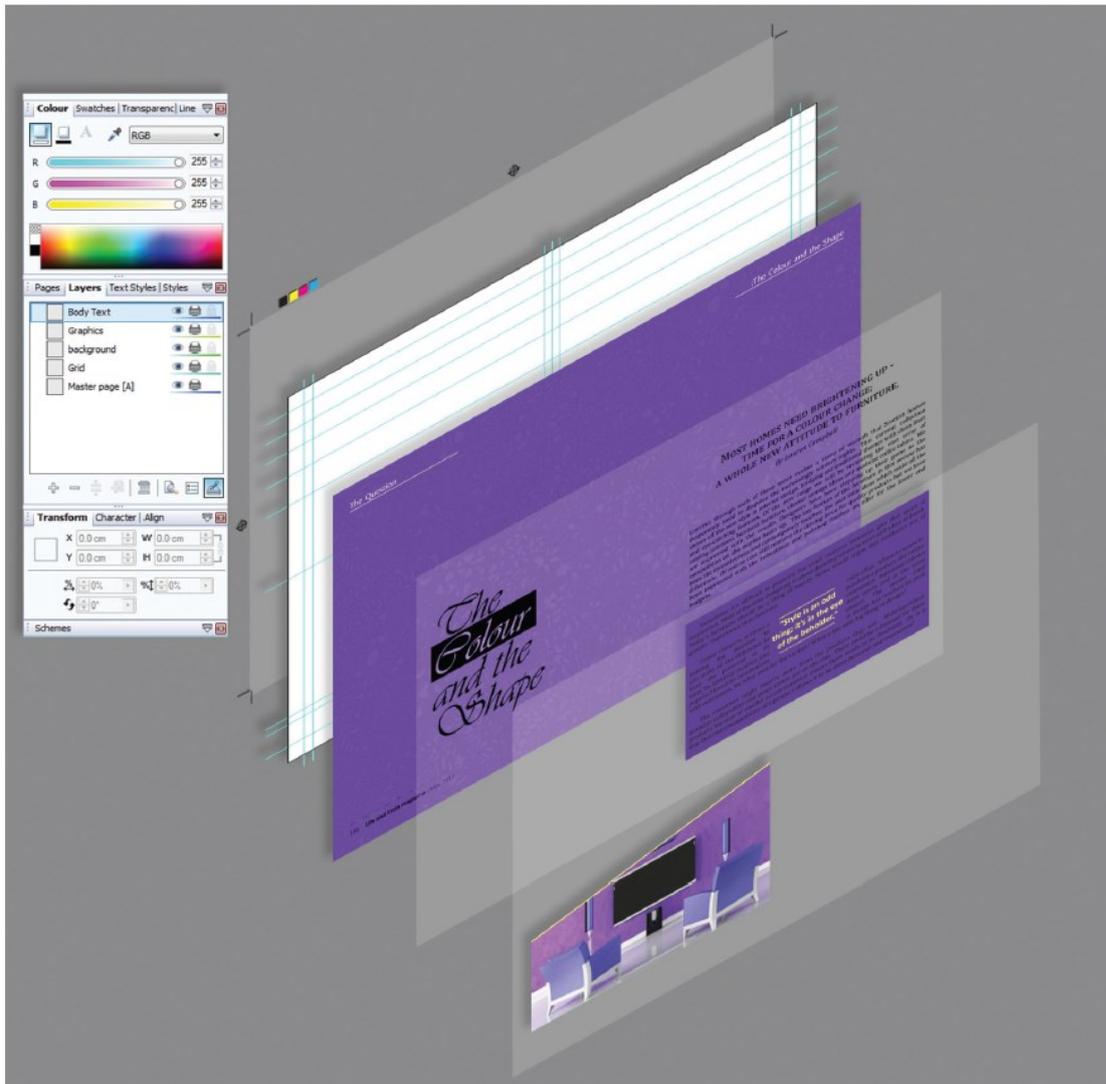
Crop marks illustrate the boundary where the document is to be cut after printing

- (iii) Explain why the graphic designer used bleed in layout B. 1

To bleed is to extend a graphic or image frame beyond a trimmed edge of the page
 To ensure the graphic or image extends to the very edge of the page of a document
 Edge to edge printing.

7. (continued)

Examine the layering tree shown below.



(c) Describe layering as it is used in layout B in terms of the function and the benefits of layering for the graphic designer.

2

- Layering can support in creating a master page for future documents
- Layering allows graphics and text to be edited separately
- Layering supports image manipulation and can occur on separate layers
- Layers can be duplicated and linked to other layers
- Layers can be turned off or on to aid clarity
- Layers can be brought forward or backward as necessary

7. (continued)

Examine **both** layout A and layout B.

Three DTP improvements have been made from layout A to layout B.

(d) Identify what these improvements are and explain their impact.

- | | | |
|-------|---|---|
| (i) | <p>Layout improvement 1 is: Use of reverse</p> <p>and the impact is:</p> <ul style="list-style-type: none">• offsets the main text from the headline/sub-headline• lightens the layout (decreases the value) | 2 |
| (ii) | <p>Layout improvement 2 is: Use dropped capital</p> <p>and the impact is:</p> <ul style="list-style-type: none">• emphasises the start of a paragraph• signifies the main text column | 2 |
| (iii) | <p>Layout improvement 3 is:</p> <p>main text column is converted from one to two columns</p> <p>and the impact is:</p> <ul style="list-style-type: none">• follows a standard method of presenting a main body of text• assists with the readability of the document | 2 |

Question 7 supplement

Layout A

CMYK color bar

The Question :The Colour and the Shape

The Colour and the Shape

MOST HOMES NEED BRIGHTENING UP - TIME FOR A COLOUR CHANGE; A WHOLE NEW ATTITUDE TO FURNITURE.
By Lauren Campbell

LOFTING through each of these tones evokes a sense of warmth that Scottish homes desperately need to disguise the increasingly wintry nights. This current collection shows off the new style in interior design, bridging old traditional themes with clean lines and eye-catching features. Of the new range we will be reviewing the vast array of seating solutions, business furniture, clever storage ideas and modular coffee tables. We are impressed with the results. Designers have been stepping up their game as the competition on the market heats up. The key feature of the furniture in this review has been the inventiveness and contemporary touches; the neat little ideas which make all the difference. Of course cost still remains the driving force for quality products but we have been impressed with the robustness and polished finishes on offer for the lower end budgets.



Sometimes it's difficult to pinpoint the exact moment someone gets that spark of inspiration. Most of the time designing is about deciding where to start and when to finish. Today's furniture should be a thing of beauty. Some would argue that aesthetics are of greater importance than function.

Colour choice is, at times a risky affair. When it comes to making the decision to purchase a product, the colour can make all the difference to consumers. Autumnal colours have the potential to fit most tastes and at the same time, be instantly modern and popular. The recent (and in design has reached its peak with consumers. So, what next for the stylists? What is the next big thing in design?

"Style is an odd thing; it's in the eye of the beholder."

The consumer might require more from the products they use. Multifunctional, modular, collapsibles and space savers are on the rise. There could be a demand for these products because of smaller accommodation means there needs to be flexibility. Or, is it that that interchangeability of a product allows it to be more personal and interactive?

106 Life and Style magazine | May 2013 Life and Style magazine | May 2013 107

Layout B pre-press copy

CMYK color bar

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106 Life and Style magazine | May 2013 Life and Style magazine | May 2013 107