

FOR OFFICIAL USE



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National
Qualifications
EXEMPLAR PAPER ONLY

Mark

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EP22/H/01

**Graphic
Communication**

Date — Not applicable

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

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Year

--	--

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.

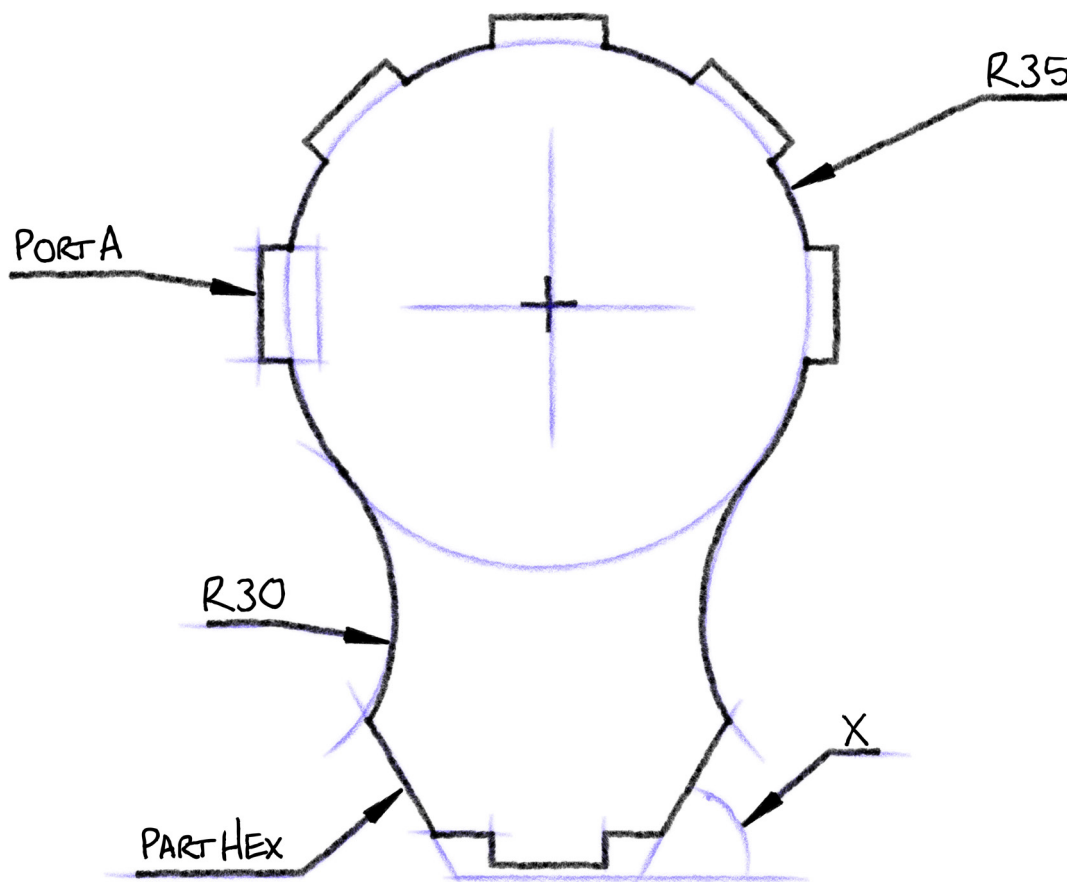
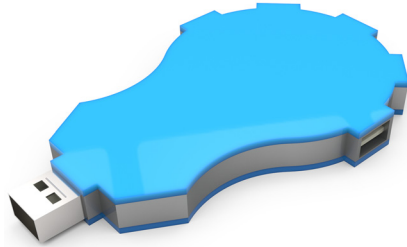
Use **blue** or **black** ink.

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

1. A USB hub has been modelled by a CAD technician.



A 3D CAD model of the USB hub and its preliminary sketch are shown above.



1. (continued)

- (a) Describe, with reference to 2D drawing techniques, how you would create a tangent between the R30 and the R35 arcs. You may write your answer and/or sketch in the preliminary sketch on the previous page to support your answer if you prefer.

5

The USB adaptor has five ports around the upper arc. The CAD technician created a 2D drawing using the information on the preliminary sketch. When drawing the ports, port A was used as the starting point.

- (b) Describe, with reference to 2D CAD drawing techniques, how the CAD technician would draw the other ports. You may write your answer and/or sketch in the preliminary sketch above to support your answer if you prefer.

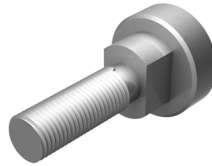
4

- (c) The USB hub is symmetrical about the vertical centre axis. State angle X.

1



2.

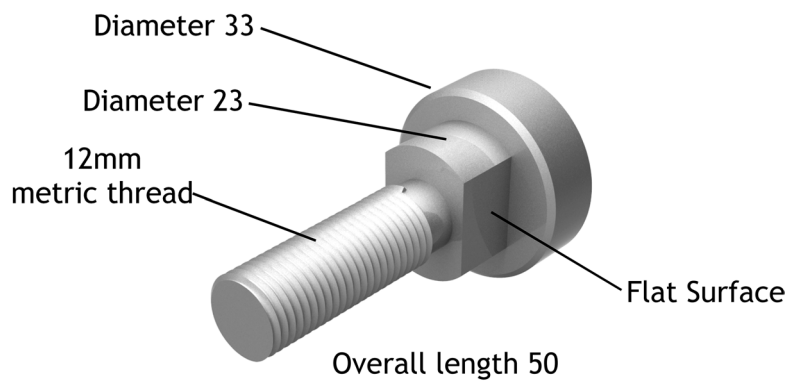


Threaded bolt

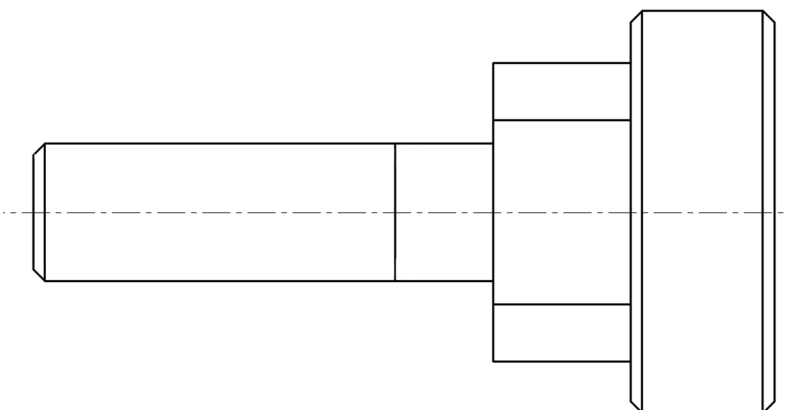
A threaded bolt is shown above.

Apply the following to the elevation below, taking account of British Standards conventions:

- (a) The lines to indicate a thread, at the correct location. 1
- (b) The four dimensions shown on the pictorial view, at their correct locations. 4
- (c) The symbol to indicate the flat surface, at the correct location. 1



Pictorial view



Elevation

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* E P 2 2 H 0 1 0 4 *

3. Infographics are a popular way of presenting statistical information.



(a) Explain how the design of the above infographic has been influenced by choice of images, colour and typeface, in attempting to communicate the information.

3

3. (continued)

The silhouette of the child at the top of the infographic was electronically captured and inserted into the DTP document.

(b) Describe how a hard copy image could be captured and inserted into a DTP document, making reference to file type.

2

The graphic designer decided to make digital copies rather than hard copies of the infographic.

(c) Describe the advantages of this decision.

2



4. For this question, you must refer to the magazine layout shown in the supplement at the end of this Exemplar Question Paper.

(a) State **two** instances where the graphic designer has created depth to add interest in the magazine layout.

2

(b) State an example of emphasis in the layout **and** explain the effect created.

2

The graphic designer has made use of value in the magazine layout.

(c) State where value has been used in the layout **and** explain the effect it has.

2

(d) Describe how the graphic designer has created an informal and interesting look to the magazine layout.

2



MARKS

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4. (continued)

(e) State where rhythm has been used in the magazine layout.

1

Throughout the magazine layout, the graphic designer has made use of varied proportion.

(f) Explain what effect the use of varied proportion has on the magazine layout.

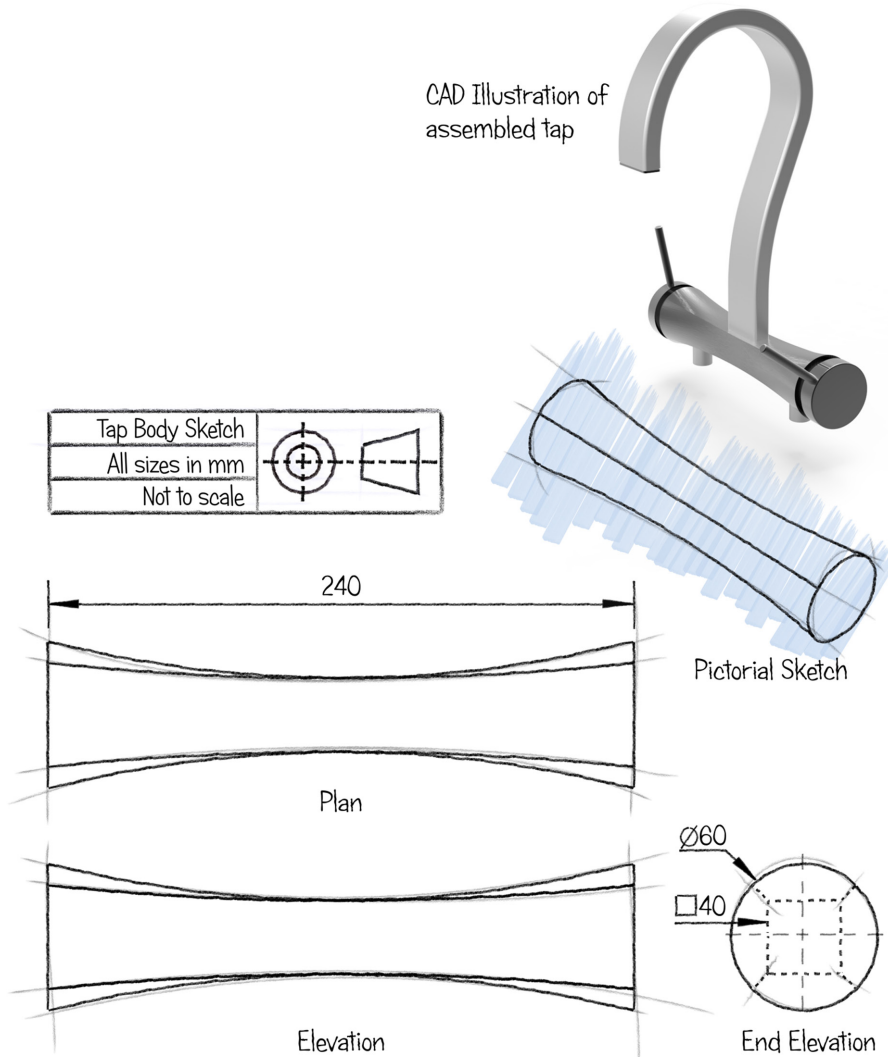
2



* E P 2 2 H 0 1 0 8 *

5.

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Preliminary sketches of a tap body and an assembled 3D CAD model of the tap are shown above.

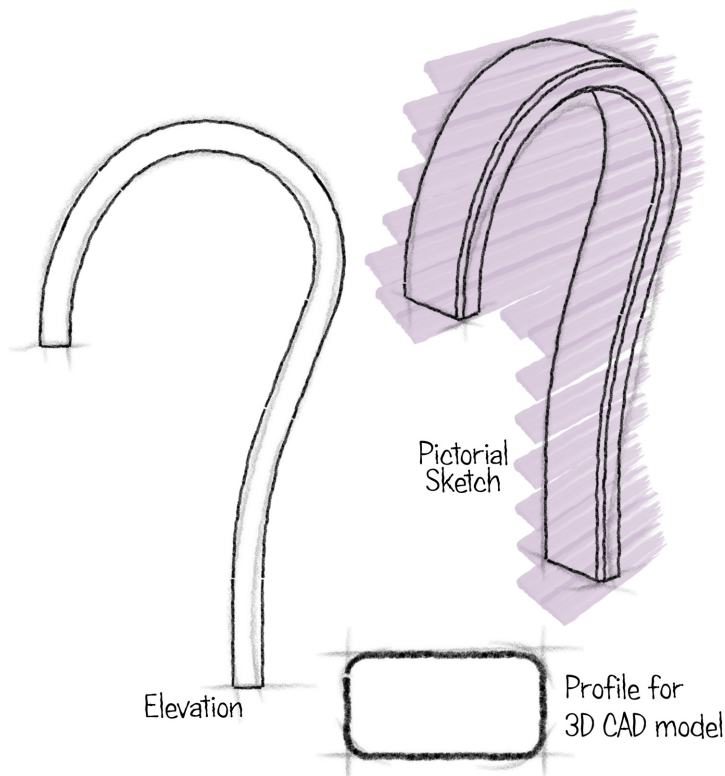
- (a) Describe, with reference to 3D CAD modelling techniques, how the tap body can be modelled. You should make references to the dimensions shown above.

3



5. (continued)

MARKS
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Preliminary sketches of the neck of the tap are shown above.

- (b) Describe, with reference to 3D CAD modelling techniques, how the neck of the tap can be created and hollowed to allow water to flow through it.

2



5. (continued)

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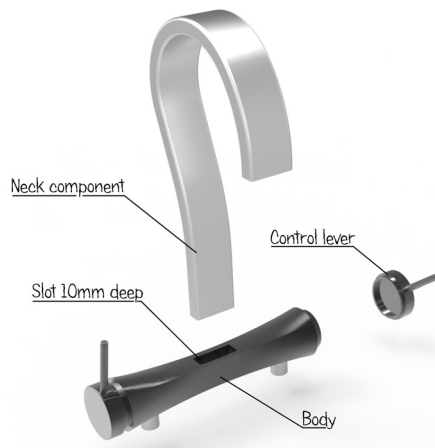


Fig 1

A partially assembled 3D model of the tap is shown in Fig 1 above.



Fig 2

The tap components shown in Fig 2 above were created using a “bottom up” approach.

(c) Describe “bottom-up” CAD modelling.

2



MARKS

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5. (continued)

(d) (i) Describe, with reference to constraints, how the neck and body components of the tap will be assembled.

2

(ii) Describe, with reference to constraints, how the control lever and body components of the tap will be assembled.

2



* E P 2 2 H 0 1 1 2 *

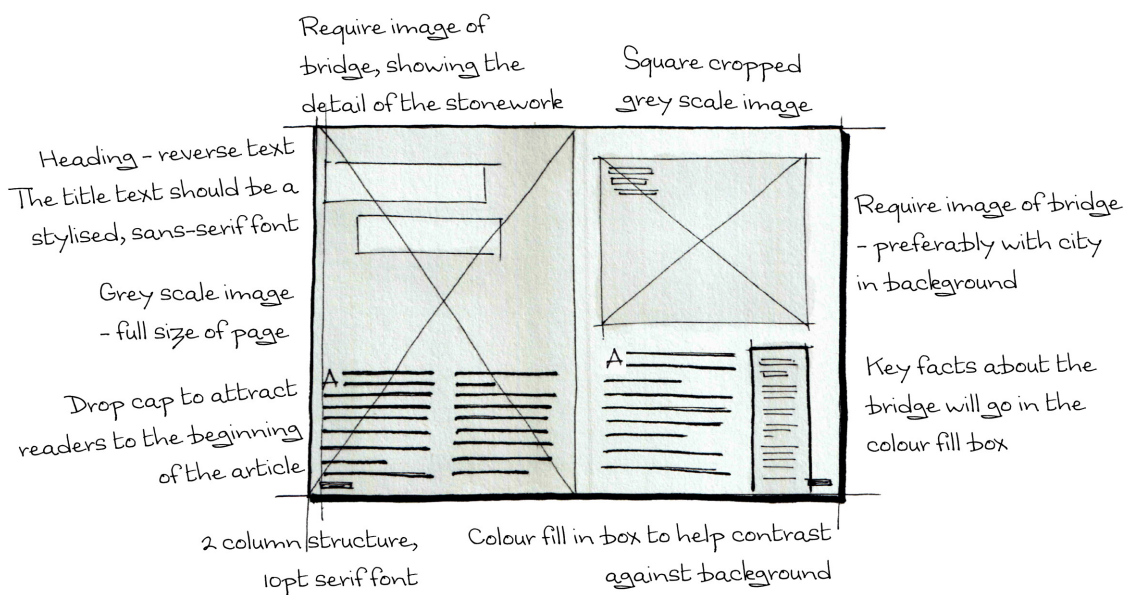
6. Graphic design is often used to provoke an emotional response. “Save the Children” ran a campaign in 2006 using the graphic below.



Explain how the various elements of the graphic have been used to achieve maximum impact.

4

7.



A thumbnail graphic is shown above.

Thumbnails are used extensively by graphic designers to explore and develop ideas.

- (a) State two reasons why thumbnails are not appropriate to communicate ideas with a client.

2

7. (continued)



The graphic designer decided to make use of stock photographs, such as that shown above, for the publication. These were purchased online.

- (b) Describe one advantage and one disadvantage of using stock photographs.

2



* E P 2 2 H 0 1 1 5 *

7. (continued)



“Drop caps” have been applied at the beginning of the body text on each page of the draft layout shown above.

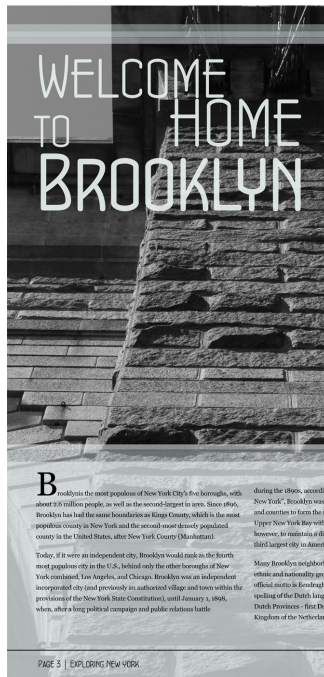
(c) Describe a problem that the reader may experience with this approach. 1

(d) Explain the issue the graphic designer could face when adding reverse text upon a greyscale image. 1



7. (continued)

MARKS DO NOT WRITE IN THIS MARGIN



Part of the layout is shown above.

(e) Describe, with reference to the part layout, how the graphic designer has made use of the following terms.

(i) Justification 1

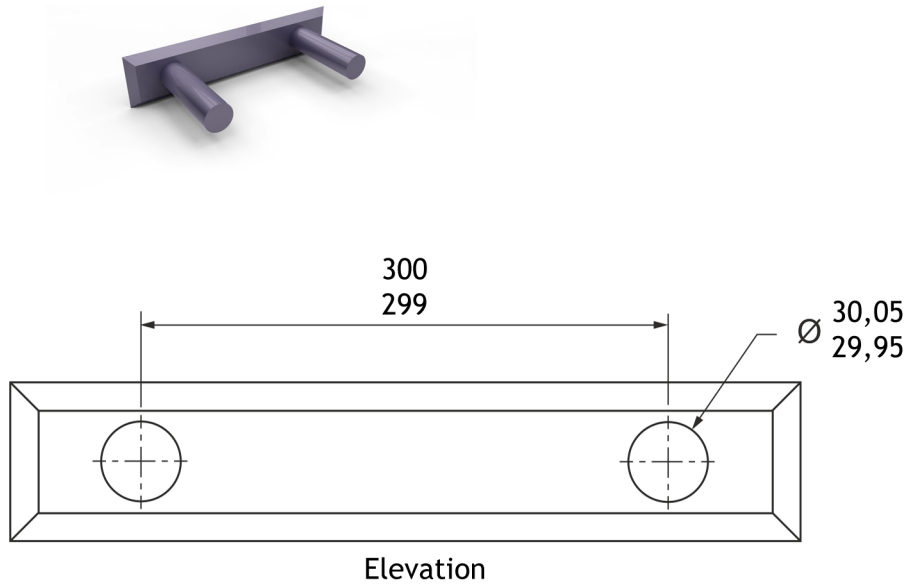
(ii) Alignment 1

(iii) Gutter 1

(iv) Transparency 1



8.



A 3D CAD model and elevation of a bracket are shown above.

The location pins, each $\text{Ø}30\text{ mm}$, are set apart at 300 mm nominal centres. There are tolerances on both the **sizes and location** of the pins.

- (a) Calculate the maximum and minimum gap between the pins. 2

Maximum _____

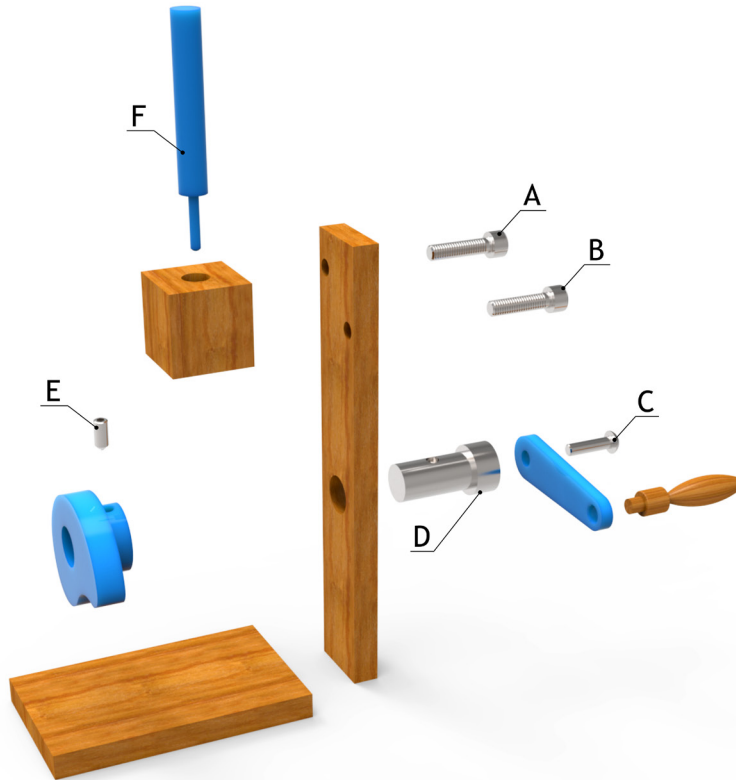
Minimum _____

- (b) Explain why tolerances are an important feature in production drawings for manufacturing. 2



9.

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Exploded model

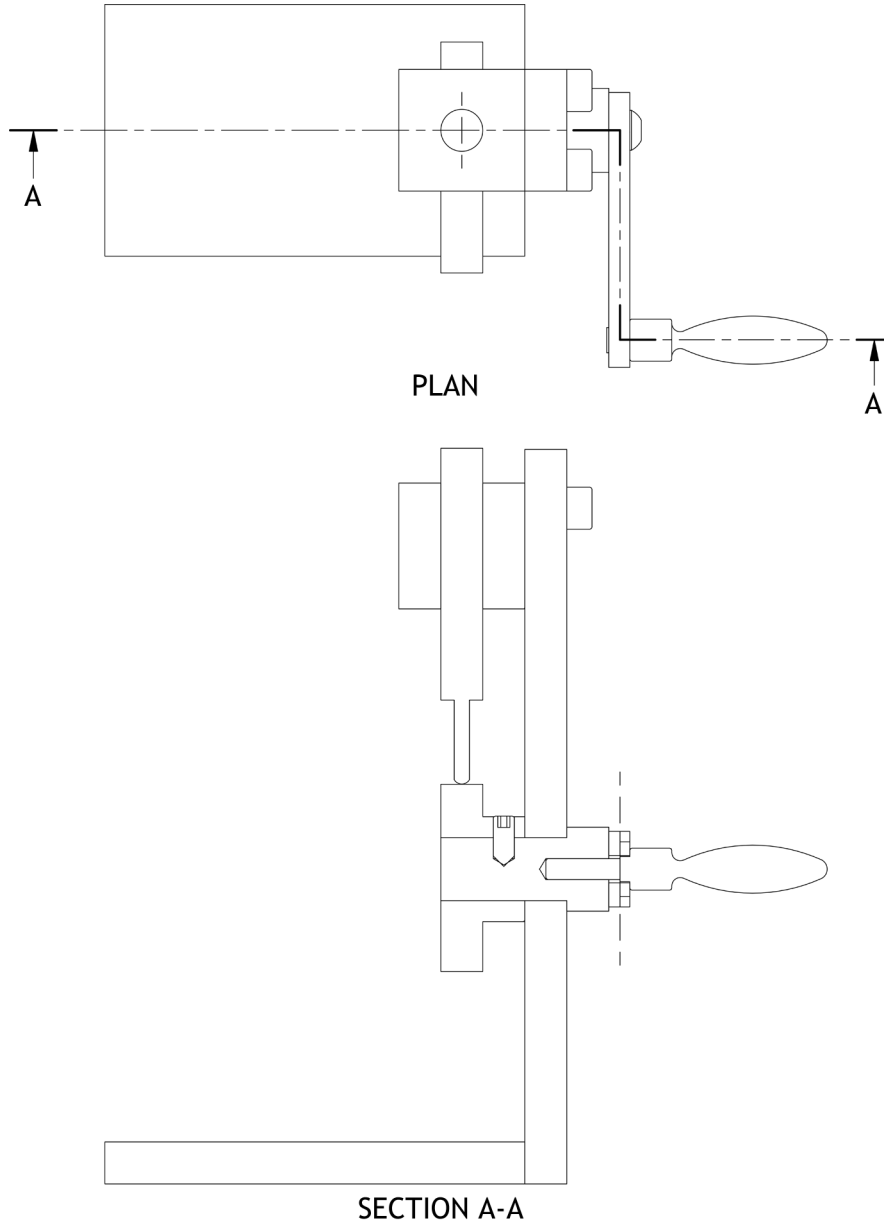
An exploded model of a mechanical device is shown above.



9. (continued)

Apply hatching to section A-A on the drawing of the device, taking account of British Standards conventions. You should not section any component parts labelled A-F on the exploded 3D model shown opposite.

7



[END OF EXEMPLAR PAPER]



* E P 2 2 H 0 1 2 0 *



44 Is the average climb rate in ft/min achievable by any of the planes and pilots

44 The number of litres of fuel a plane gets through in one lap of the course.

8

6 The length, in metres of the EDGE 540 plane, the wingspan totals 7.44m and the top speed of 416.5km/h. Only 230 knots.

7

The Las Vegas Super Air Race marks the seventh and penultimate race of the season, and as the World Championship heats up in the Nevada Desert, the stakes have never been higher.

7



982 The number of competitive hours of racing so far this season. The 2014 Super Air Race World Championships is heading for the season showdown in Las Vegas, but the race for the title is not over by any means.

43 The number of points available in every race. The top 8 finishing pilots are awarded points. 1st place pilot receives 12 world championship points. Pilots finishing 9th to 12th receive no points.

25 The maximum G-Force experienced by pilots whilst navigating the chicane section of the course. 5 times as many G's as an F1 driver will ever experience.

BY THE NUMBERS

3 The number of sectors in the race. Detailed timing sheets are produced after each flying session, which have all the different sectors, know are split times, with speeds included.

79 In seconds, is the average lap time recorded by the pilots in the previous 7 races, the fastest lap was achieved by Austrian pilot Hannes Arch in Abu Dhabi with a time of 74.34 seconds.



12 The number of pilots competing in the Master Class category in eight races across the globe for the title of 2014 Super Air Race World Champion. Pilots can win World Championship points at each race and the pilot with the most points after the last race of the season becomes the Super Air Race World Champion.

Paul Bonhomme leads the standings by 1 point. He is the most successful pilot in the history of the Super Air Race. The celebrated British Ace has won a record 13 races and been on the podium 36 times in the 50 races since the sport was created in 2005.

109 The FAI was founded in France 109 years ago in 1905 and is a non-governmental and non-profit-making organisation. They recognize the Super Air Race World Championships as an official World Championship.



53 The age of the oldest pilot to compete in the Super Air Race World Championship. The next oldest contender is 36...

25 The number of world nations represented at the 2014 Super Air Race World Championships. So far, 12 different nation's pilots have taken home one of the top 3 places in the championships - which undoubtedly gathers together the world's greatest stunt pilots.



62 The number of replacement engines planes can get through in a year of competition.

63

The time it takes, in seconds, for a pilot to reach 2,000ft above sea-level from a standing-still take-off.

Copyright acknowledgement

Question 3 - Infographic on Cyberbullying is taken from uKnowKids.com.

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Question 6 - Graphic is taken from the 'Save the Children' Campaign, 2006.

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**Graphic
Communication**

Marking Instructions

These Marking Instructions have been provided to show how SQA would mark this Exemplar Question Paper.

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General Marking Principles for Higher Graphic Communication

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the detailed Marking Instructions, which identify the key features required in candidate responses.

- (a) Marks for each candidate response must always be assigned in line with these general marking principles and the detailed Marking Instructions for this assessment.
- (b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding: they are not deducted from a maximum on the basis of errors or omissions.
- (c) For each candidate response, the following provides an overview of the marking principles. Refer to the Marking Instructions for further guidance on how these principles should be applied.

(i) Questions that ask candidates to **describe**

Candidates must provide a statement or structure of characteristics and/or features. This should be more than an outline or a list. Candidates may refer to, for instance, a concept, experiment, situation, or facts in the context of and appropriate to the question. Candidates will normally be required to make the same number of factual/appropriate points as are awarded in the question.

(ii) Questions that ask candidates to **explain**

Candidates must generally relate cause and effect and/or make relationships between things clear. These will be related to the context of the question or a specific area within a question.

(iii) Questions that ask candidates to **compare**

Candidates must generally demonstrate knowledge and understanding of the similarities and/or differences between, for instance, things, methods, or choices. These will be related to the context of the question or a specific area within a question.

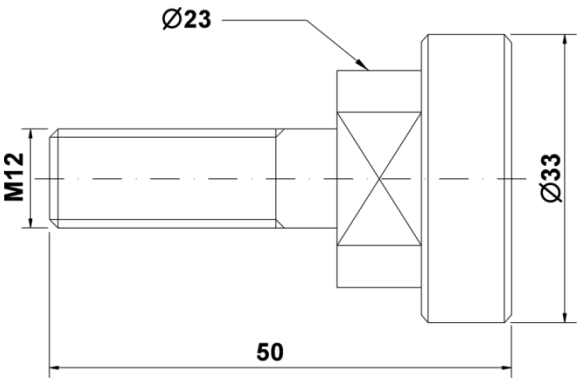
(iv) Questions that ask candidates to **state**

Candidates must present an answer in brief form.

- (d) Candidates can respond to any question using text, sketching, annotations or combinations where they prefer. No marks shall be awarded for the quality of sketching. Marking will relate only to the information being conveyed.

Marking Instructions for each question

Question		Expected response	Max mark	Additional guidance
1	(a)	<p>Descriptions for either a manual or electronic approach. This can be in written or annotated forms or a mixture of both.</p> <p>Manual method:</p> <ul style="list-style-type: none"> mark centre and draw R35 circle add radius 30+35 strike arc R65 from centre of R35 circle strike R30 arc from the corner of intersection between part X and arc draw the R30 arc from established centre <p>CAD method:</p> <ul style="list-style-type: none"> draw R35 circle and constrain draw part hex and constrain draw R30 circle apply tangent constraints to circles R30 and R35 apply tangent command to vertex (corner) of hex 	5	<p>Accept any appropriate information provided within annotations and/or text on the sketch to support the answer.</p> <p>Accept a mixture of annotations and written responses.</p>
1	(b)	<p>Descriptions will make reference to 2D CAD techniques including:</p> <ul style="list-style-type: none"> draw rectangle and overlapping circle trim rectangle and circle correct description of polar (circular) array tool correct description of trimming 	4	<p>Accept any appropriate information provided within annotations and/or text on the sketch to support the answer.</p> <p>Accept a mixture of annotations and written responses.</p>
1	(c)	The angle is 60°	1	

Question		Expected response	Max mark	Additional guidance
2	(a) (b) (c)	 <p>Four dimensions:</p> <ul style="list-style-type: none"> • Length 50 • Diameter 33 • Diameter 23 • Metric thread 12 <p>Accept only British Standards (BS) arrowheads.</p>	1	Correct application of BS convention for the thread at 1 mark.
			4	<p>Correct dimensions applied to BS, four at 1 mark each.</p> <p>For the diameter, 1 mark for all of the following being correct:</p> <p>The leader lines included, correct arrowhead type, position and orientation of the text, and diameter symbol (not radius).</p> <p>For the thread, 1 mark for all of the following being correct:</p> <p>The leader lines included, correct arrowhead type, position and orientation of the text, and thread convention.</p>
			1	1 mark for correct flat surface convention applied.
3		<p>Explanations must include references to:</p> <p>Image choice</p> <ul style="list-style-type: none"> • child – indicating that the subject matter relates to young people • computer – indicating that that the subject relates to computer/online activities • male/female silhouette – indicating volume or statistic 	3	1 mark for each correct explanation per choice.

Question		Expected response	Max mark	Additional guidance
		<p>Colour choice</p> <ul style="list-style-type: none"> • aggressive – stands out • danger/warning <p>Typeface choice</p> <ul style="list-style-type: none"> • capitalisation • mixture of font size • formal font • modern sans serif font – impact, reflecting contemporary issue 		
3	(b)	<p>Any description is likely to include references to:</p> <ul style="list-style-type: none"> • scanning • hand scanner • flatbed scanner • digital photograph • digital capture • some photocopiers <p>File type descriptions are likely to include references to:</p> <ul style="list-style-type: none"> • .jpg, .png, .bmp, .pdf, .gif, .tiff 	2	Any two correct input methods, at 1 mark each.
3	(c)	<p>Any description is likely to include references to:</p> <ul style="list-style-type: none"> • savings of raw materials – ink, toner, paper, transportation costs • savings of storage space (physical) • savings of postal costs of transportation • possible inaccuracy of printing processes <p>Any other appropriate answer</p>	2	Any two at 1 mark each.

Question		Expected response	Max mark	Additional guidance
4	(a)	<p>Instances which use depth to add interest include:</p> <ul style="list-style-type: none"> • dropped shadows around the photographs • layering of images over text • layering of text over text • variation in font size (red numbers) 	2	Any two correct instances identified at 1 mark each.
4	(b)	<p>Emphasis has been created by:</p> <ul style="list-style-type: none"> • the use of red throughout the numbers within the document and • the use of a variety of point sizes in the text <p>Emphasis has the effect of:</p> <ul style="list-style-type: none"> • creating impact • providing focus • attracting the reader's attention 	2	Any one use of emphasis at 1 mark and its resulting effect at 1 mark.
4	(c)	<p>Value has been used in the layout in the “2010” graphic.</p> <ul style="list-style-type: none"> • The effect it has on the application of value is that it adds/contributes to depth in the layout. 	2	
4	(d)	<p>Description will make references to features such as:</p> <ul style="list-style-type: none"> • large variety of font sizes used • lack of grid formal structure • rotation of images • layering of images • use of bleed in image and title font 	2	Descriptions making reference to any two at 1 mark each.

Question		Expected response	Max mark	Additional guidance
4	(e)	<p>Instances where rhythm has been used are in the:</p> <ul style="list-style-type: none"> • continued use of red in titles • rhythm of shape (rectangular images) • subtle rotations of images • subtle left alignment of text 	1	Any one instance at 1 mark.
4	(f)	<p>Explanations of the effect of the use of varied proportion, will make references to varied proportion:</p> <ul style="list-style-type: none"> • being less formal • being engaging and interesting • giving the impression of movement (reflecting sporting activity) • creating multiple focal points 	2	Any two at 1 mark each.
5	(a)	<p>Descriptions will make references to appropriate modelling techniques and will be correctly (and sequentially) ordered.</p> <p>Either:</p> <ol style="list-style-type: none"> 1. Three profiles – 40 mm square, diameter 60mm, diameter 60 mm (1 mark) 2. Loft (1 mark) 3. Offset work planes – 240 mm with middle plane at 120 mm (1 mark) <p>or:</p> <ol style="list-style-type: none"> 1. Two profiles – 40 mm square, diameter 60 mm (1 mark) 2. Loft (1 mark) 3. Offset work plane – 120 mm and mirror feature (1 mark) 	3	<p>Three correct techniques and all in correct order, 3 marks.</p> <p>Two correct techniques and both in correct order, 2 marks.</p> <p>One correct technique and in correct order, 1 mark.</p> <p>Three correct techniques, with any out of order, 2 marks.</p> <p>Two correct techniques, with either out of order, 1 mark.</p>
5	(b)	<p>Descriptions will make references to:</p> <p>“Sweep along a path” and “shell.”</p>	2	Two references at 1 mark each.
5	(c)	<p>The description will be similar to:</p> <p>“Bottom-up CAD modelling involves the creation of individual components and subsequent assembly, using appropriate constraints.”</p>	2	<p>1 mark for the reference to creating individual components.</p> <p>1 mark for the reference to assembling these components and the use of constraints.</p>

Question			Expected response	Max mark	Additional guidance
5	(d)	(i)	The description will include references to: align, align, mate or mate, mate, mate or centre axis, centre axis, mate	2	In each case, 1 mark for referencing the correct surfaces of components and 1 mark for referencing the constraints.
5	(d)	(ii)	Centre axis (1 mark) and mate (1 mark).	2	
6			Explanations will include references drawn from the: <ul style="list-style-type: none"> • use of bold colours • use of black, emphasising morbidity or mortality • child-like quality of production (images) • child-like quality of production (text) • colour scheme draws focus to the charity logo • contrast between connotations of rifle and pencil (war and education) • cross-over in trend (indicating more education less conflict) 	4	Four references within explanations at 1 mark each.
7	(a)		Reasons can include: <ul style="list-style-type: none"> • insufficient detail/information • no images included • no text • no typeface • colours may not be representative of the final graphic • annotations on the thumbnails may not make sense/be appropriate to the client • it may change significantly in the subsequent stages of the development 	2	Any two at 1 mark each.

Question			Expected response	Max mark	Additional guidance
7	(b)		<p>Advantages:</p> <ul style="list-style-type: none"> • access to high quality images • an extensive range of images • broad range of subjects/topics • constantly refreshing the stock/content • image size can be selected • easy to browse <p>Any other appropriate answer</p> <p>Disadvantages:</p> <ul style="list-style-type: none"> • financial/monetary/cost implications • image may not be exactly what is needed/preferred/desired • potentially large file sizes – therefore potential to slow productivity where larger numbers of images are required <p>Any other appropriate answer.</p>	2	Any two at 1 mark each.
7	(c)		The reader may consider this to be two separate articles.	1	
7	(d)		If there is too much white in the greyscale image, the title may be too hard to read/or be illegible/or reduce emphasis.	1	
7	(e)	(i)	<p>Justification – description similar to:</p> <p>“The justification on the layout is left justified.”</p>	1	<p>Accept any appropriate supporting information within annotations.</p> <p>Accept a mixture of annotations and written responses.</p>
7	(e)	(ii)	<p>Alignment – description similar to:</p> <p>“The title and the left hand column of text are aligned.”</p>	1	Accept any appropriate supporting information within annotations.

Question			Expected response	Max mark	Additional guidance
					Accept a mixture of annotations and written responses.
7	(e)	(iii)	Gutter – description similar to: “A gutter has been used between the two body text columns.”	1	Accept any appropriate supporting information within annotations. Accept a mixture of annotations and written responses.
7	(e)	(iv)	Transparency – description similar to: “The body text has been placed in a transparency, as the background can be seen through it to an extent.”	1	Accept any appropriate supporting information within annotations. Accept a mixture of annotations and written responses.
8	(a)		Maximum $300 - 29.95 = 270.05$ mm (1 mark) Minimum $299 - 30.05 = 268.95$ mm (1 mark)	2	
8	(b)		Reasons: <ul style="list-style-type: none"> • Cost – the more accurate an item needs to be, the higher the cost. • Time to produce – the more accurate an item, the longer it will take. • Affects the function of the product. • Affects the inter-changeability of the product. 	2	Any two at 1 mark each.

Question		Expected response	Max mark	Additional guidance
9			7	<p>1 mark for each correct application of section hatching lines, up to a total of 6 marks.</p> <p>(Hatching direction for single components must be applied in the same direction to be awarded the full mark.)</p> <p>1 mark for applying all five centre lines correctly.</p>

[END OF EXEMPLAR MARKING INSTRUCTIONS]