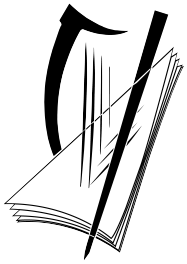


**Coimisiún na Scrúduithe Stáit**
State Examinations Commission

# Leaving Certificate 2018

# Marking Scheme

# Design and Communication Graphics

## Ordinary Level

**Note to teachers and students on the use of published marking schemes**

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

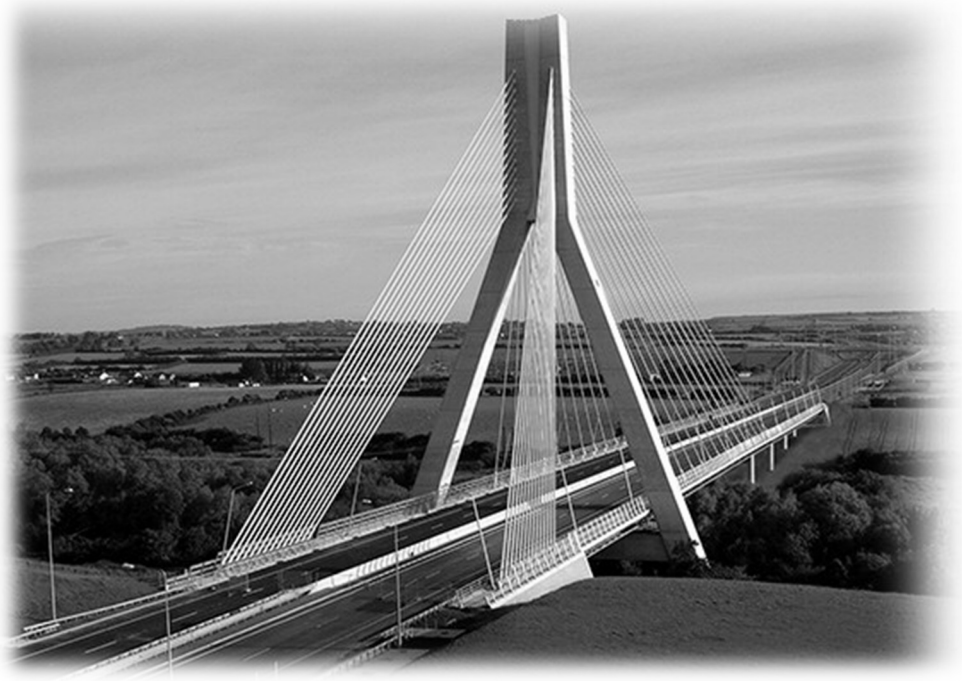
**Future Marking Schemes**

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

**Coimisiún na Scrúduithe Stáit**
*State Examinations Commission*

***Leaving Certificate Examination 2018***

# *Design and Communication Graphics*
## *Ordinary Level*



# *Marking Scheme and Sample Solutions*

**(Other valid solutions are acceptable and are marked accordingly)**

## QUESTION A-1

**MARKS**

**(a) Ellipse *(10)***

(i) Appropriate use of given major and minor axes ..... **1**

(ii) Required constructions for additional points ..... **2**

(iii) Locate required additional points ..... **4**

(iv) Complete curve ..... **3**

**(b) Focal points *(5)***

(v) Locate required focal points ..... **5**

**(c) Second arc *(3)***

(vi) Locate centre point ..... **2**

(vii) Draw remainder of second arc ..... **1**

(viii) ***Presentation*** ..... **2**

***Total = 20***

## QUESTION A-2

**MARKS**

**(a) Cylinder *(11)***

(i) Projection from centre in elevation ..... **3**

(ii) Locate centre in plan ..... **4**

(iii) Draw plan of cylinder … (incl. hidden detail) ..... **4**

**(b) Hemisphere in plan *(7)***

(iv) Constructions in elevation ..... **1**

(v) Projections to plan ..... **2**

(vi) Locate centre in plan ..... **2**

(vii) Draw hemisphere in plan ….(incl. hidden detail) ..... **2**

(viii) ***Presentation*** ..... **2**

***Total = 20***

## QUESTION A-3

**MARKS**

**Perspective of Bridge *(18)***

(i) Radiate lines to correct vanishing points ..... **2**

(ii) Projections from plan ..... **2**

(iii) Complete right leg of tower ..... **8**

(iv) Complete left leg of tower ..... **2**

(v) Complete perspective ..... **4**

(vi) ***Presentation*** ..... **2**

***Total = 20***

## QUESTION A-4

**MARKS**

**(a) End View *(15)***

(i) Projections from plan ..... **8**

(ii) Points defined in end view ..... **3**

(iii) Complete visible end ..... **2**

(iv) Complete end view….(incl. hidden detail) ..... **2**

**(b) True shape *(3)***

(v) Apply correct length of edge ..... **1**

(vi) Use correct angles ..... **1**

(vii) Draw required true shape ..... **1**

(viii) ***Presentation*** ..... **2**

***Total = 20***

# QUESTION B-1

**MARKS**

**(a) Elevation *(18)***

(i) Draw wall of house ..... **8**

(ii) Outline of bay window ..... **5**

(iii) Complete bay window ..... **5**

**(b) Plan *(10)***

(iv) Plan of wall ..... **5**

(v) Outline of bay window ..... **3**

(vi) Complete the plan ..... **2**

**(c) Auxiliary elevation *(13)***

(vii) $X_1Y_1$ parallel to plan of surface A ..... **1**

(viii) Projections from plan ..... **1**

(ix) Transfer of heights from elevation ..... **3**

(x) Draw surface A ..... **2**

(xi) Complete auxiliary elevation ..... **6**

(xii) ***Presentation*** ..... **4**

***Total = 45***

# QUESTION B-2

**MARKS**

**(a) Plan and Elevation *(33)***

(i) Draw plan of pillar as given ..... **6**

(ii) Draw the plan of step as given ..... **5**

(iii) Draw the elevation of the pillar as given ..... **4**

(iv) Draw the elevation of the step as given ..... **4**

***Interpenetration on Left Hand Side (LHS)***

(v) Projections from LHS of plan ..... **2**

(vi) Locate points on LHS in elevation ..... **2**

(vii) Complete LHS of elevation ..... **3**

***Interpenetration on Right Hand Side (RHS)***

(viii) Projections from RHS of plan ..... **2**

(ix) Locate points on RHS in elevation ..... **2**

(x) Complete RHS of elevation ..... **3**

**(b) End View (8)**

(xi) Transfer of widths from plan ..... **2**

(xii) Projection of heights from elevation ..... **2**

(xiii) End view of pillar ..... **2**

(xiv) Complete end view ..... **2**

(xv) ***Presentation*** ..... **4**

***Total = 45***

# QUESTION B-3

**MARKS**

**(a) Initial setup *(5)***

(i) Draw equilateral triangle ..... **3**

(ii) Draw X, Y and Z axes ..... **2**

**(b) Elevation and Plan *(10)***

(iii) Projections to set up elevation ..... **2**

(iv) Semicircle in elevation ..... **1**

(v) Draw elevation in the correct position ..... **2**

(vi) Projections to set up plan ..... **2**

(vii) Semicircle in plan (or 45º lines) ..... **1**

(viii) Draw plan in the correct position ..... **2**

**(c) Axonometric Projection of main body *(10)***

(ix) Projections from elevation ..... **2**

(x) Projections from plan ..... **2**

(xi) Draw axonometric projection of right vertical surface ..... **2**

(xii) Draw axonometric projection of front face ..... **2**

(xiii) Draw axonometric projection of the top surfaces ..... **2**

**(d) Axonometric Projection of circular clock face *(16)***

(xiv) Divisions on circle in elevation ..... **5**

(xv) Corresponding divisions in plan ..... **5**

(xvi) Projections from circle in elevation ..... **2**

(xvii) Projections from circle in plan ..... **2**

(xviii) Draw axonometric projection of the circular face ..... **2**

(xix) ***Presentation*** ..... **4**

***Total = 45***

# QUESTION C-1

**MARKS**

**(a) Profile *(19)***

(i) Measure heights and draw horizontal lines ..... **6**

(ii) Projections from intersections between line AB and contours ..... **5**

(iii) Draw outline of profile ..... **8**

**(b) Vertical Pylon *(4)***

(iv) Draw tangent from B to profile ..... **2**

(v) Draw pylon and indicate minimum height ..... **2**

**(c) Earthworks for roadway *(18)***

(vi) Parallel lines at 5m intervals for cuttings..... **3**

(vii) Identify points on cutting curves ..... **3**

(viii) Draw cutting curves ..... **4**

(ix) Parallel lines at 10m intervals for embankment ..... **3**

(x) Identify points on embankment curve ..... **3**

(xi) Draw embankment curve ..... **2**

(xii) ***Presentation*** ..... **4**

***Total = 45***

# QUESTION C-2

**MARKS**

**(a) Elevation *(16)***

(i) Draw base of structure ..... **3**

(ii) Draw inner stand section ..... **3**

(iii) Division of RHS for parabola ..... **4**

(iv) Draw right hand curve ..... **2**

(v) Locate points on LHS for parabola ..... **2**

(vi) Draw curve on left side ..... **2**

**(b) End View *(11)***

(vii) Draw base of structure ..... **3**

(viii) Draw roof section ..... **3**

(ix) Construction to locate $90^{o}$ angle ..... **2**

(x) Complete the end view ..... **3**

**(c) Plan of the structure *(14)***

(xi) Projections from elevation ..... **2**

(xii) Projections from end view ..... **2**

(xiii) Draw rectangular base section ..... **2**

(xiv) Locate extremities of curved section ..... **2**

(xv) Locate remaining points on curved section ..... **2**

(xvi) Draw curve ..... **2**

(xvii) Complete plan ..... **2**

(xviii) ***Presentation*** ..... **4**

***Total = 45***

# QUESTION C-3

**MARKS**

**(a) Elevation and Plan *(24)***

(i) Draw straight lines in elevation ..... **10**

(ii) Determine centre and draw arc ……(1,2) ..... **3**

(iii) Draw the outline plan ..... **7**

(iv) Complete the plan ..... **4**

**(b) End View *(8)***

(v) Draw the outline ..... **4**

(vi) Complete the end view ..... **4**

**(c) Surface Development *(9)***

(vii) Appropriate layout of surface development ..... **1**

(viii) Development of bottom surface ..... **2**

(ix) Development of front and back surfaces ..... **2**

(x) Development of two short inclined surfaces ..... **1**

(xi) Development of two long inclined surfaces ..... **1**

(xii) Division of arc ..... **1**

(xiii) Development of curved surface ..... **1**

(xiv) ***Presentation*** ..... **4**

***Total = 45***

# QUESTION C-4

**MARKS**

**(a) Helix *(21)***

(i) Draw circle in plan ..... **3**

(ii) Draw outline elevation ..... **2**

(iii) Division of plan ..... **3**

(iv) Draw horizontal divisions in elevation ..... **3**

(v) Complete projections from plan of helix ..... **2**

(vi) Locate points in elevation ..... **5**

(vii) Draw helix in elevation ..... **3**

**(b) Displacement diagram *(20)***

(viii) $360^o$ division (widths on displacement diagram.)..... **2**

(ix) Correct use of 70mm height..... **2**

(x) Establish follower position at $0^o$, $120^o$, $180^o$ and $360^o$ ..... **2**

(xi) $0^o$ to $120^o$, Uniform Velocity ..... **3**

(xii) $120^o$ to $180^o$, Dwell ..... **2**

(xiii) $180^o$, vertical fall 22mm ..... **2**

(xiv) $180^o$ to $360^o$, Uniform Acceleration and Retardation (UAR) ..... **4**

(xv) Complete displacement diagram (freehand curve) ..... **3**

(xvi) ***Presentation***..... **4**

***Total = 45***

# QUESTION C-5

**MARKS**

***Assembly (11)***

(i) Relative positioning of components ..... **8**

(ii) Use of Section View ..... **3**

***Main body (9)***

(iii) Outline ..... **5**

(iv) Holes ..... **2**

(v) Side slots ..... **2**

***Nose Cone (6)***

(vi) Upper section ..... **4**

(vii) Spigot ..... **2**

***Thruster (4)***

(viii) Lower section ..... **2**

(ix) Spigot ..... **2**

***Wings (8)***

(x) Wing outlines ..... **6**

(xi) Connectors ..... **2**

***Drawing Completion (3)***

(xii) Hatching and Centrelines …(2,1) ..... **3**

(xiii) ***Presentation*** ..... **4**

***Total = 45***

## SECTION A - Core - Answer **any three** of the questions on this A3 sheet.

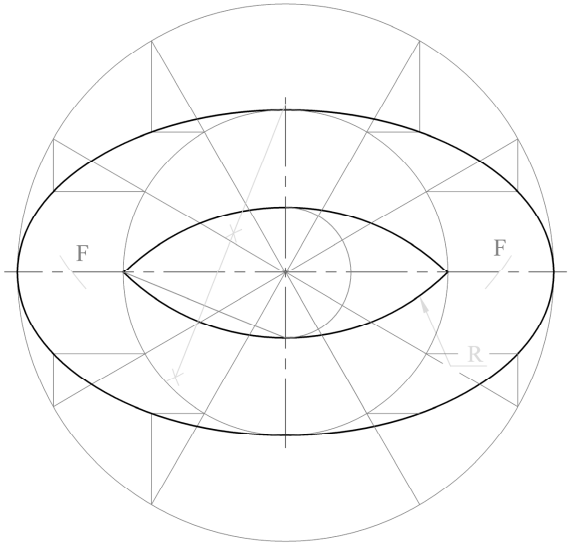
**A-1.** The 3D graphic below shows the proposed design for the new children's hospital in Dublin. It consists of an ellipse and two inner circular arcs.

The drawing on the right shows the major and minor circles for the ellipse. Portions of the ellipse and circular arcs are also shown.

**(a)** Locate the remaining points on the ellipse and draw the curve.

**(b)** Locate the focal points of the ellipse.

**(c)** Locate the centre point for the lower circular arc and complete the drawing.



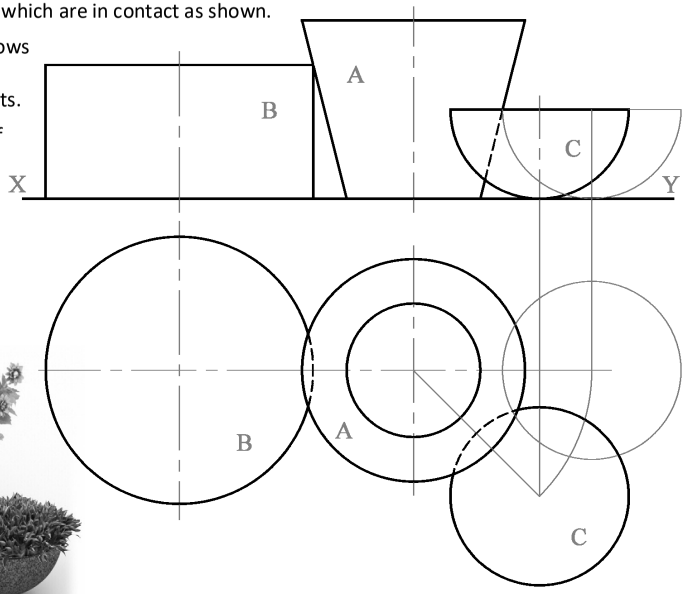

**A-2.** Three stone containers for growing flowers are shown in the 3D graphic below. The containers are in the form of geometrical objects which are in contact as shown.

The drawing on the right shows the elevation and partially completed plan of the objects.

The arrangement consists of a cylinder, a truncated cone and a hemisphere.

**(a)** Draw the plan of the cylinder **B**.

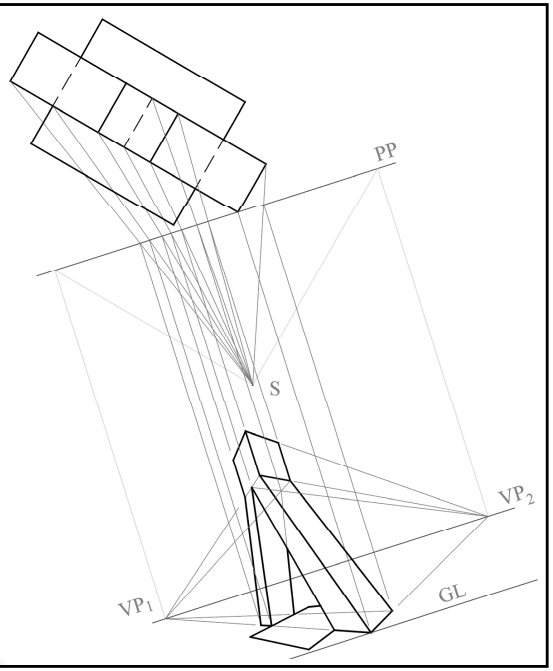
**(b)** Draw the plan of the hemisphere **C**.




**A-3.** The image below shows the *Mary McAleese Boyne Valley Bridge*, a suspension bridge across the river Boyne in County Meath.

The drawing on the right shows the plan and a partially completed perspective view of the concrete tower part of the bridge.

Complete the perspective drawing of the bridge tower.

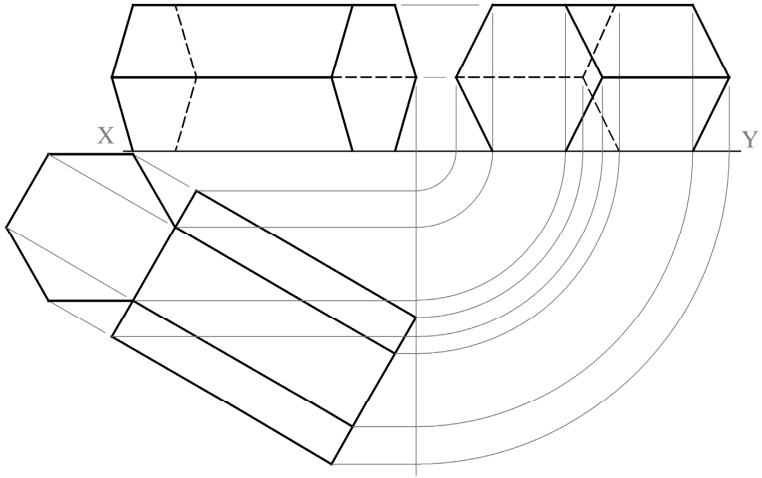



**A-4.** The image below shows a concertina. The instrument is hexagonal in cross-section.

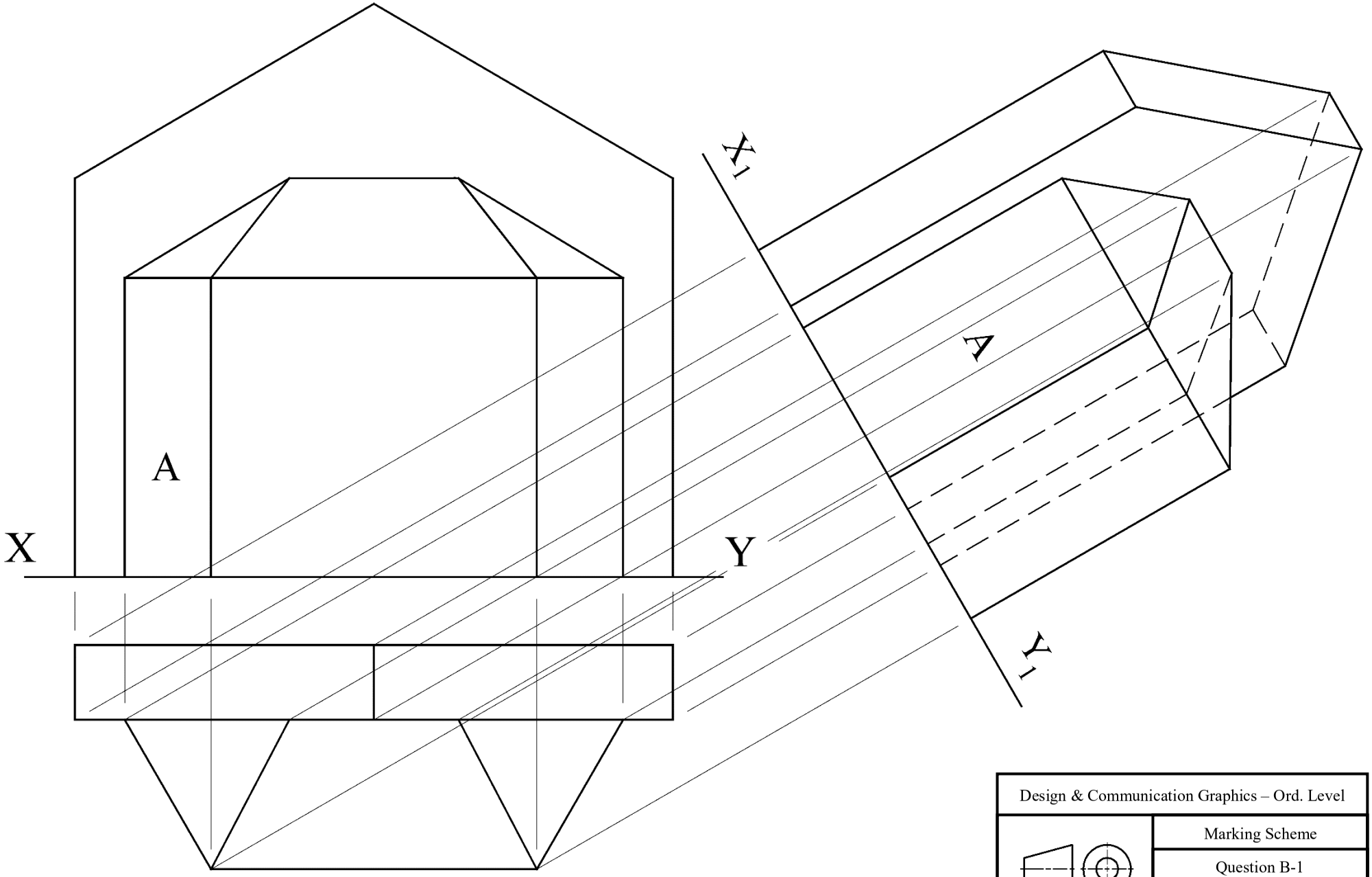
The plan, elevation and the partially completed end view of the instrument are also shown.

**(a)** Complete the end view.

**(b)** Draw the true shape of the end of the instrument.




**This examination paper must be returned at the end of the examination – You must include your Examination Number on the front cover.**




| Design & Communication Graphics – Ord. Level | |
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| | Marking Scheme |
| | Question B-1 |
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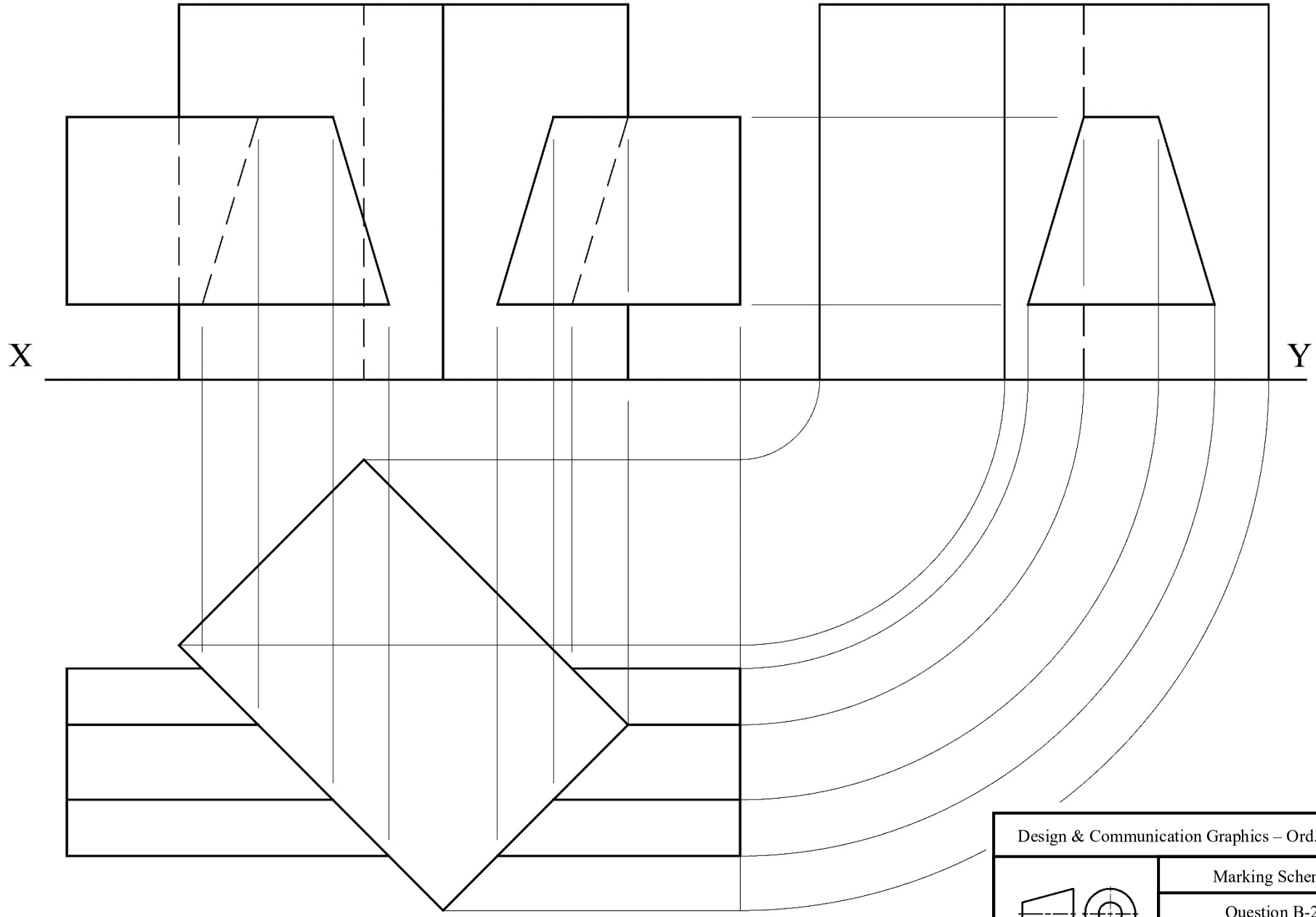


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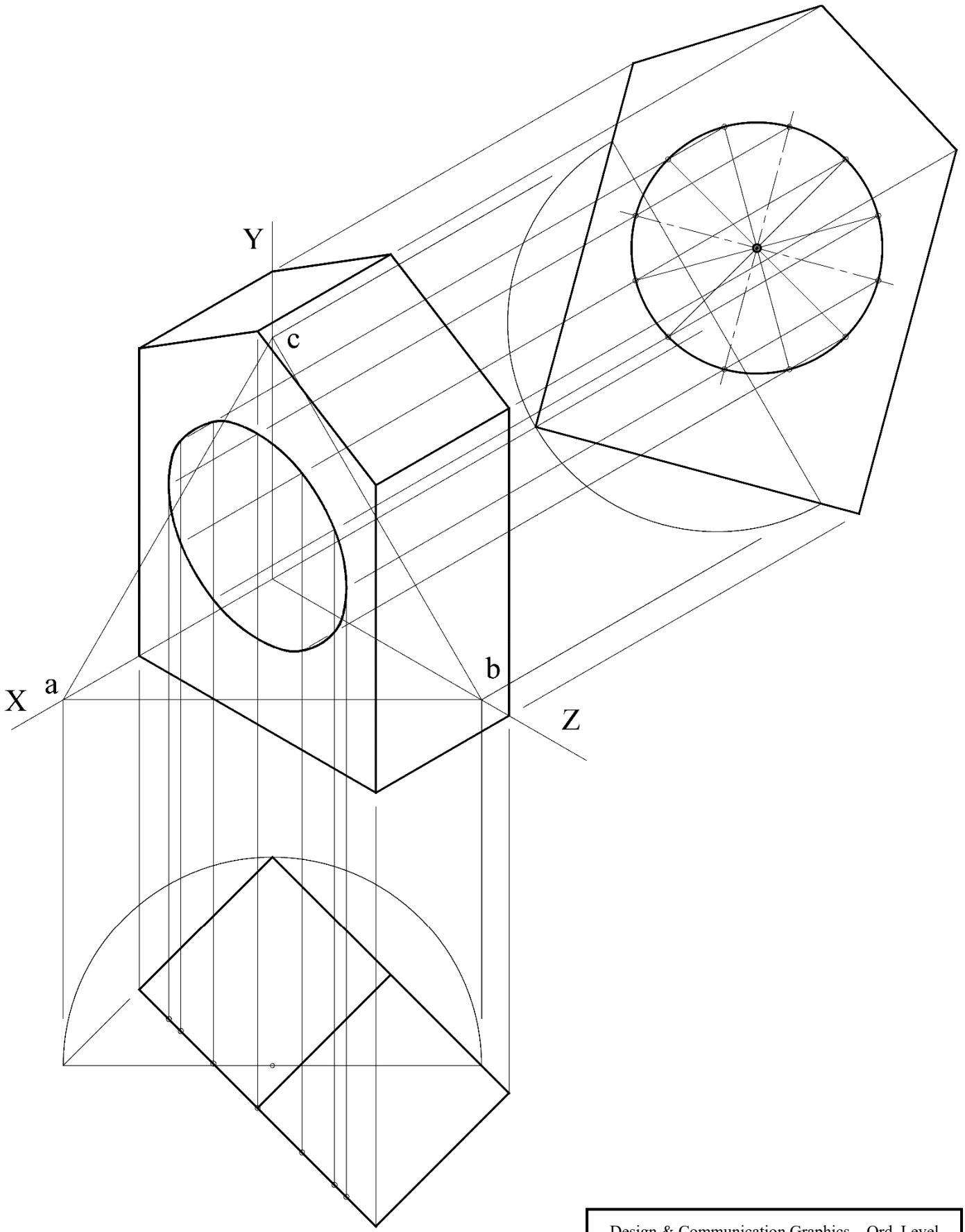


| Design & Communication Graphics – Ord. Level | |
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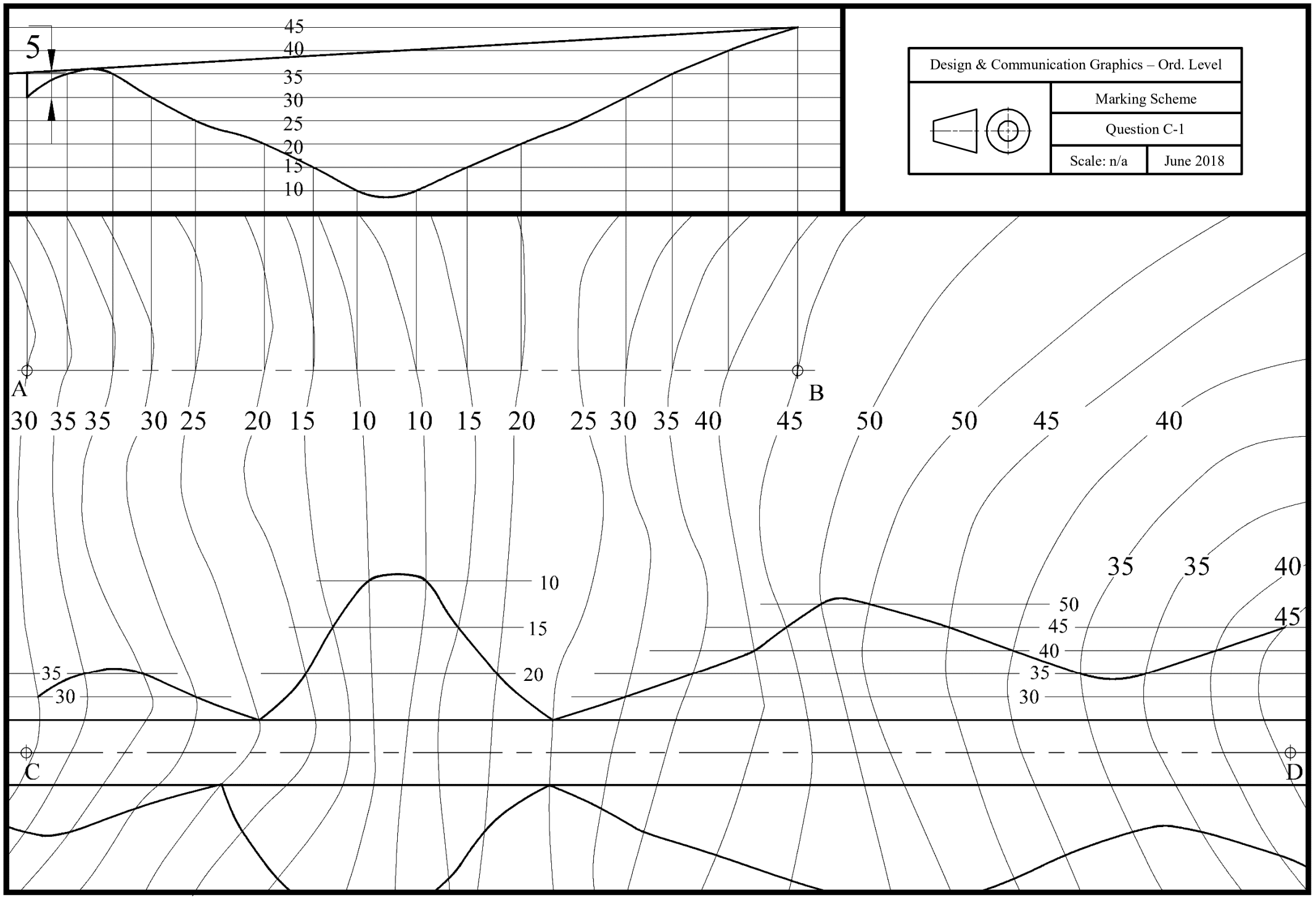
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Design & Communication Graphics – Ord. Level
Marking Scheme
Question C-1
Scale: n/a
June 2018
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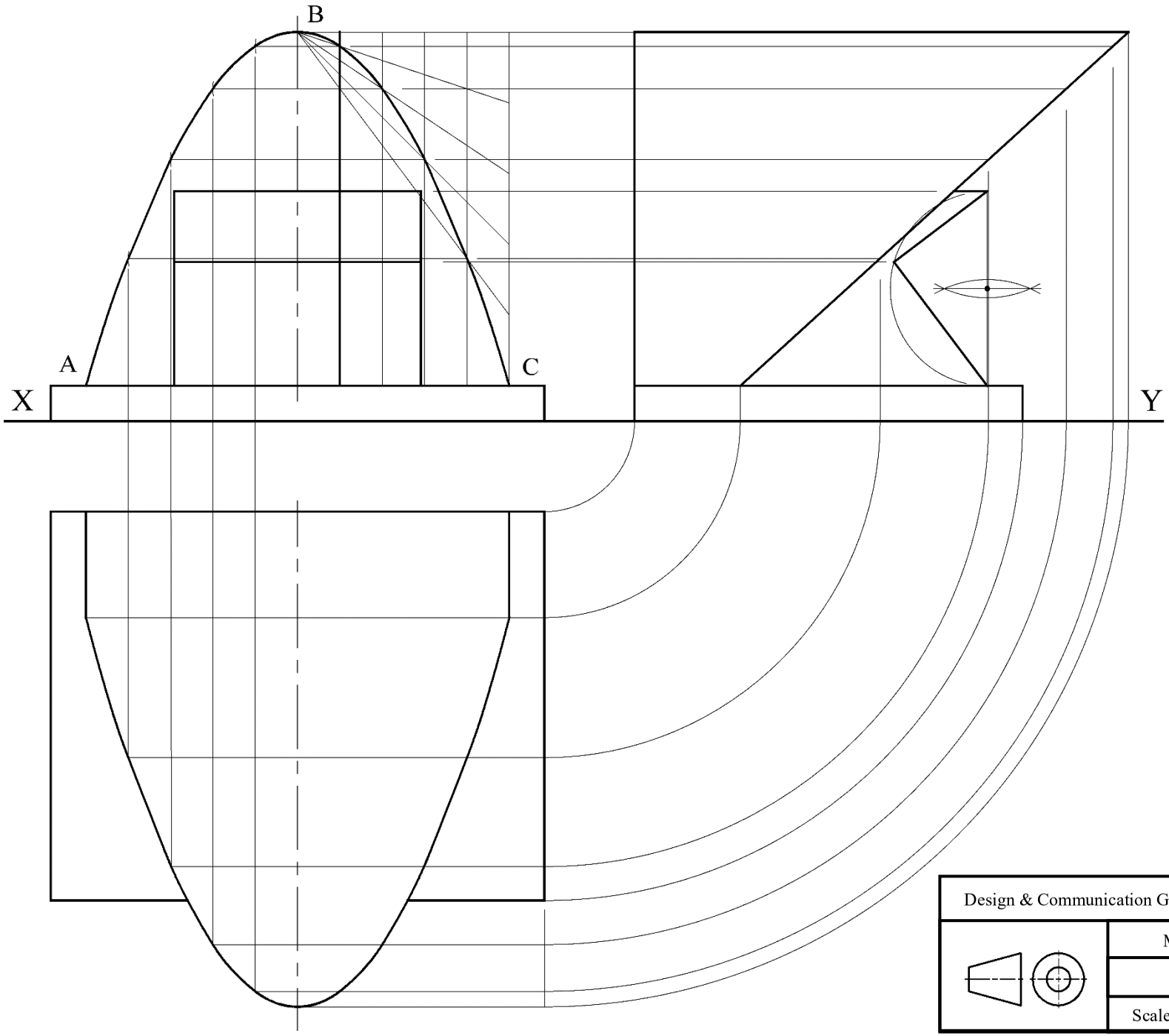


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| | Marking Scheme |
| | Question C-2 |
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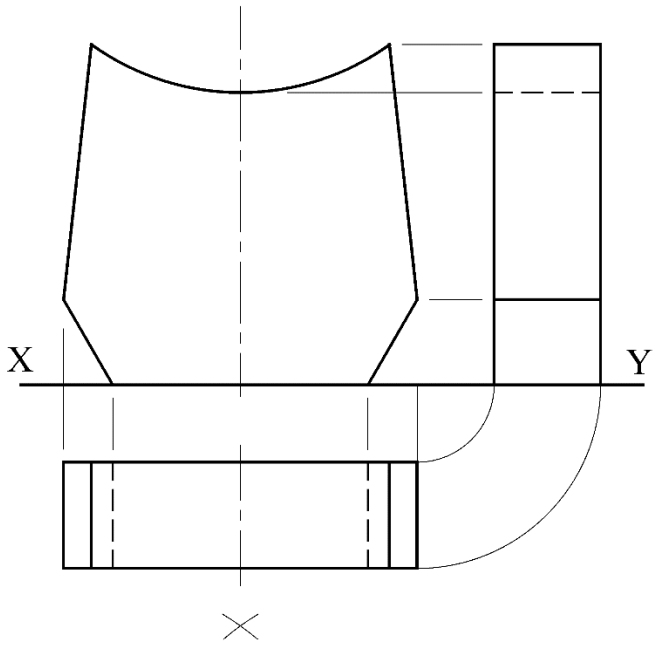


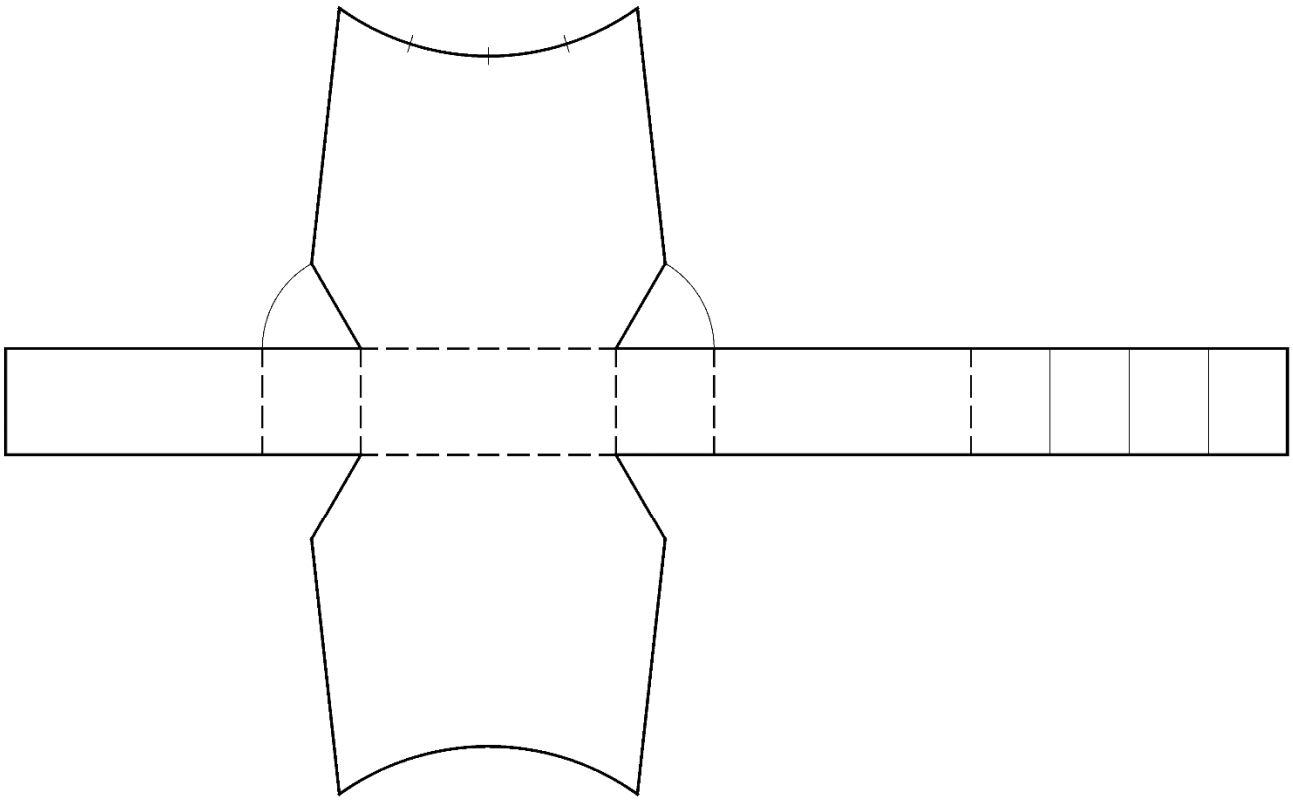

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| | Marking Scheme | |
| | Question C-3 | |
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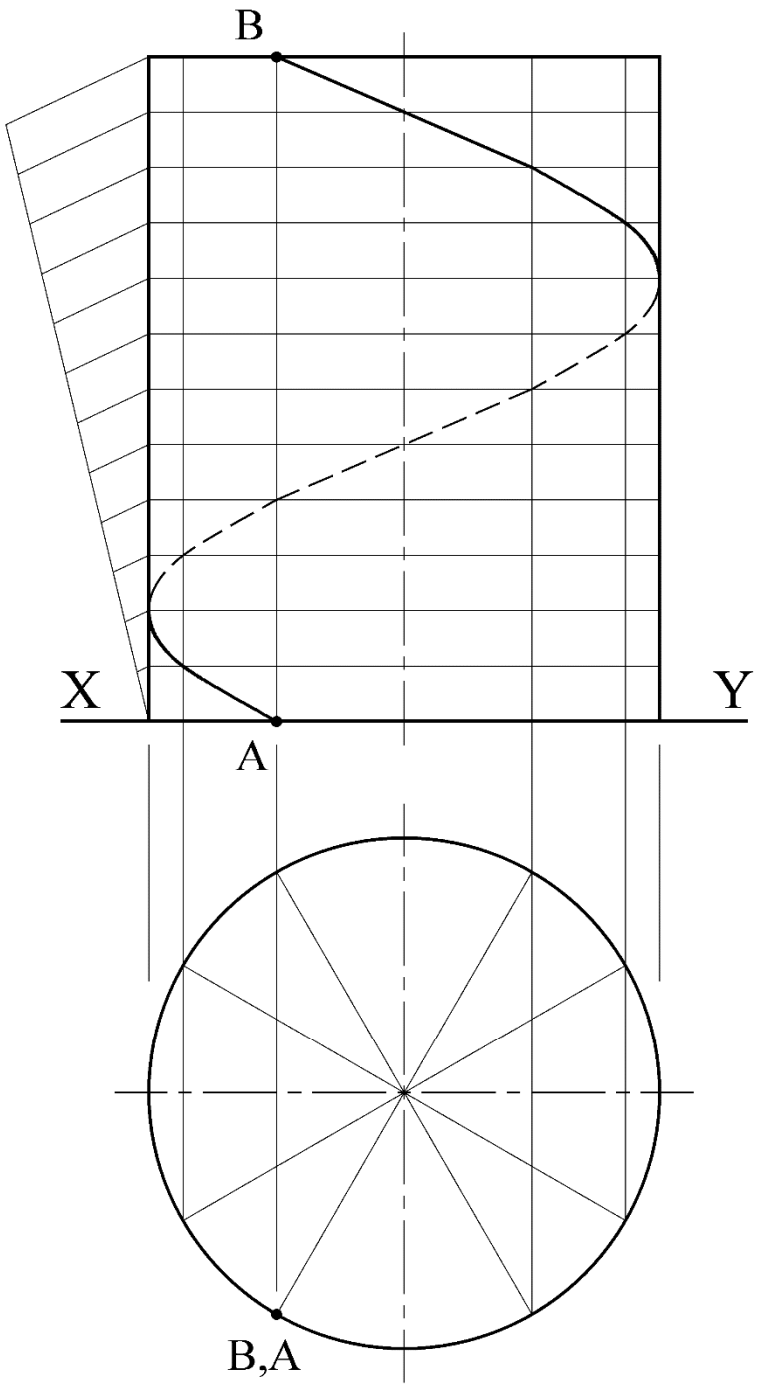


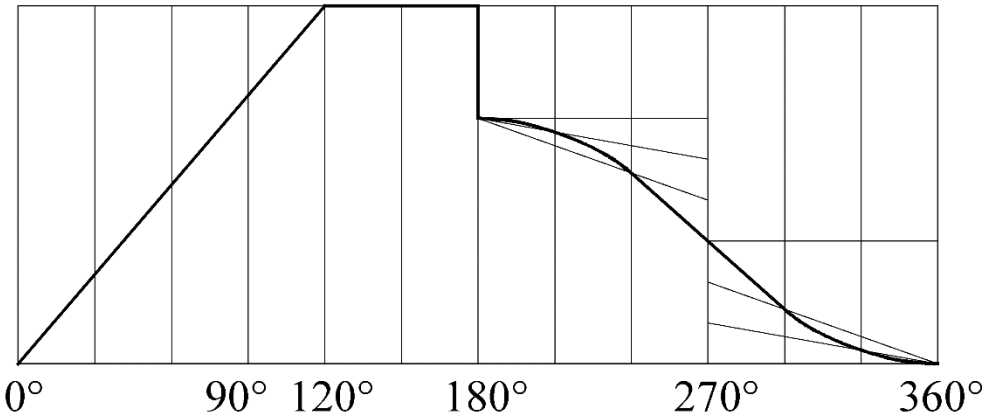


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| | Question C-4 | |
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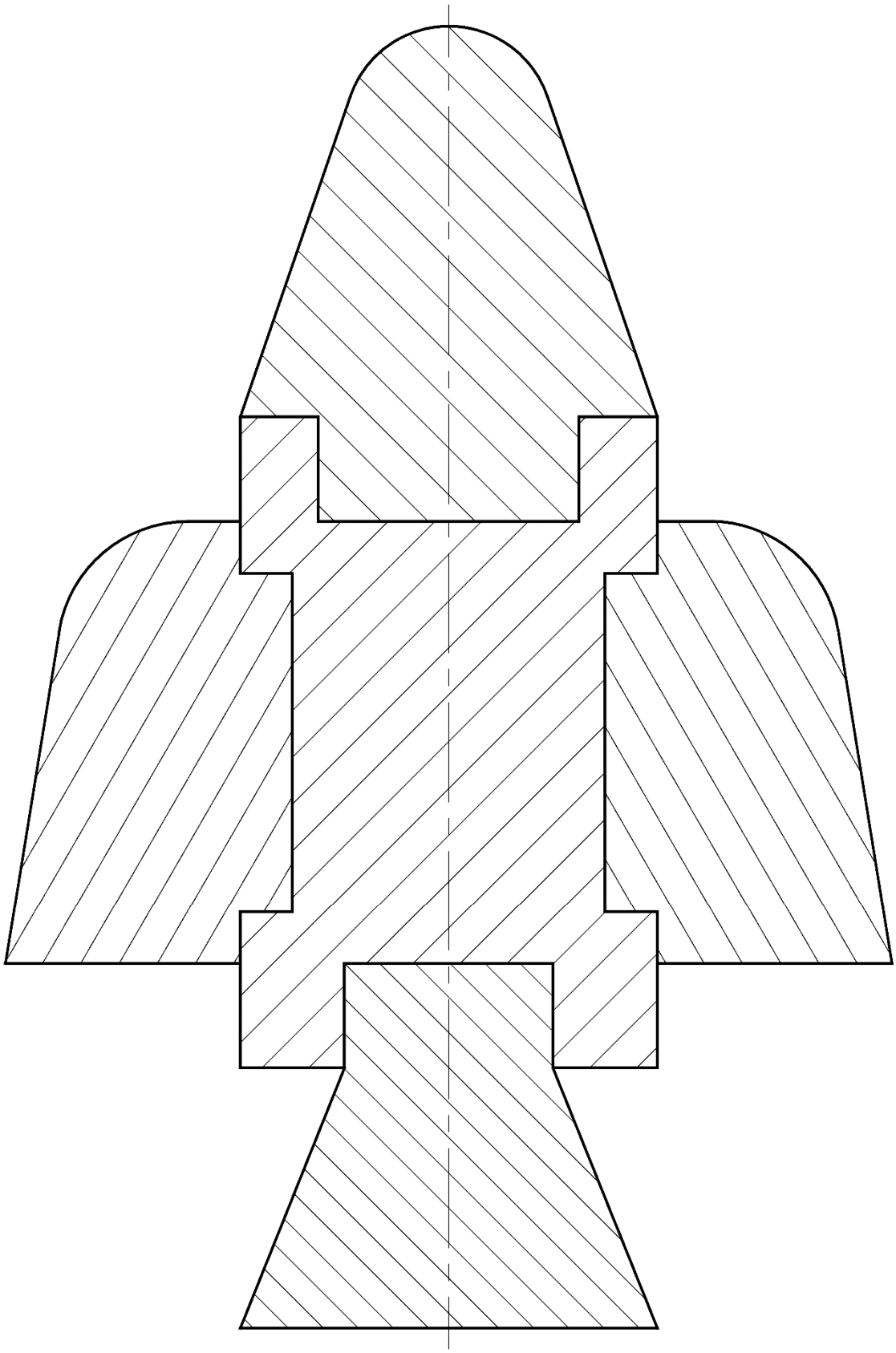

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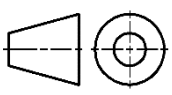
|  | Marking Scheme | |
| | Question C-5 | |
| | Scale: n/a | June 2018 |

Coimisiún na Scrúduithe Stáit
*State Examinations Commission*

# Design and Communication Graphics
# Student Assignment - Ordinary Level
# Assessment Sheet 2018

| Candidate Exam No. |
|---|
| |

| Output | Marking criteria | | Marks |
|---|---|---|---|
| **1** | **Design Research** - Exploration of main design features using primary & secondary research; Selection of appropriate graphics; Effective layout and presentation of information combining images, sketches & annotations | | |
| | a) Extensive range of relevant criteria considered - excellent presentation | **13 - 15** | |
| | b) Most relevant criteria considered - very good presentation | **10 - 12** | |
| | c) Some relevant criteria considered - good presentation | **7 - 9** | |
| | d) Limited criteria considered - fair presentation | **4 - 6** | |
| | e) At least one criterion considered - poor presentation | **0 - 3** | |
| **2** | **Design Feature Comparison -** Selection of two appropriate images; Main dimensions inserted; Comparison of main design features; Contrasting of main design features; Effective layout and presentation of information combining images, sketches & annotations | | |
| | a) Extensive range of relevant criteria considered - excellent presentation | **13 - 15** | |
| | b) Most relevant criteria considered - very good presentation | **10 - 12** | |
| | c) Some relevant criteria considered - good presentation | **7 - 9** | |
| | d) Limited criteria considered - fair presentation | **4 - 6** | |
| | e) At least one criterion considered - poor presentation | **0 - 3** | |
| **3** | **Freehand Graphical Representation –** Proportion; Form/Volume; Use of Tone/Line for effective rendering; Detailed communication of main design features to include 3D presentation quality drawing; Layout & presentation | | |
| | a) Extensive range of relevant criteria considered - excellent presentation | **17 - 20** | |
| | b) Most relevant criteria considered - very good presentation | **13 - 16** | |
| | c) Some relevant criteria considered - good presentation | **9 - 12** | |
| | d) Limited criteria considered - fair presentation | **5 - 8** | |
| | e) At least one criterion considered - poor presentation | **0 - 4** | |
| **4** | **SolidWorks Parts, Assembly, Drawing and eDrawing files** | | |
| | • **Adherence to required filing structure** | **4** | |
| | • **Creation of a minimum of 3 Part files** | **6** | |
| | • **Part models** - Proficiency in Parametric CAD; Selection of most appropriate profile; Sketches fully defined; Features renamed; Appropriate type of extrusions used | **12** | |
| | • **Assembly** – Creation of Assembly environment; Accuracy of parts to facilitate correct assembly; Correct mating of parts; Application of appropriate appearances | **6** | |
| | • **Factor of difficulty** | **3** | |
| | • **eDrawing of CAD model** | **2** | |
| **5** | **Hardcopy outputs from SolidWorks -** Detailed orthographic views of the Assembly; Rendered pictorial view of the Assembly; Exploded view of the CAD model; Inclusion of main dimensions; Scaling, layout and presentation | | |
| | a) Extensive range of relevant criteria considered - excellent presentation | **17 - 20** | |
| | b) Most relevant criteria considered - very good presentation | **13 - 16** | |
| | c) Some relevant criteria considered - good presentation | **9 - 12** | |
| | d) Limited criteria considered - fair presentation | **5 - 8** | |
| | e) At least one criterion considered - poor presentation | **0 - 4** | |
| **6** | **Photorealistic Representation** | | |
| | Produce photorealistic computer generated images of the artefact | **7** | |
| **7** | **Graphical exploration of design solutions -** Exploration of theme/possible solution(s); Justification of chosen solution(s); Use of appropriate images/graphics; Effective layout and presentation of information combining images, sketches & annotations | | |
| | a) Extensive range of relevant criteria considered - excellent presentation | **17 - 20** | |
| | b) Most relevant criteria considered - very good presentation | **13 - 16** | |
| | c) Some relevant criteria considered - good presentation | **9 - 12** | |
| | d) Limited criteria considered - fair presentation | **5 - 8** | |
| | e) At least one criterion considered - poor presentation | **0 - 4** | |
| **8** | **Presentation of Modification/Concept Design –** Proportion, Form/Volume, Use of Tone/Line for effective rendering, Detailed communication of modified/concept design features; Layout and presentation | | |
| | a) Extensive range of relevant criteria considered - excellent presentation | **9 - 10** | |
| | b) Most relevant criteria considered - very good presentation | **7 - 8** | |
| | c) Some relevant criteria considered - good presentation | **5 - 6** | |
| | d) Limited criteria considered - fair presentation | **3 - 4** | |
| | e) At least one criterion considered - poor presentation | **0 - 2** | |
| **9** | **Hardcopy outputs from SolidWorks -** CAD model; Detailed orthographic views of the proposed solution; Rendered pictorial view of the CAD model, Inclusion of main dimensions; Scaling, layout and presentation | | |
| | • **Application of CAD skills** | **5** | |
| | a) Extensive range of relevant criteria considered - excellent presentation | **13 - 15** | |
| | b) Most relevant criteria considered - very good presentation | **10 - 12** | |
| | c) Some relevant criteria considered - good presentation | **7 - 9** | |
| | d) Limited criteria considered - fair presentation | **4 - 6** | |
| | e) At least one criterion considered - poor presentation | **0 - 3** | |

| **Sub-total** | | **Marks deducted for pages in excess of maximum** | | **Total** | |
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