



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2016

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
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Leaving Certificate Examination 2016

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 (13)

- (i) Appropriate use of given major and minor axes3
- (ii) Required constructions for additional points2
- (iii) Locate required additional points on curve4
- (iv) Complete the curve.....4

(b) Focal points (5)

- (v) Locate required focal points5
- (vi) *Presentation*2

Total = 20

QUESTION A-2

MARKS

Perspective of RHS (11)

- (i) Radiate lines to correct vanishing point(s)4
- (ii) Locate remaining points4
- (iii) Complete RHS3

Perspective of Back (7)

- (iv) Radiate lines to correct vanishing point2
- (v) Draw top line2
- (vi) Draw bottom line3
- (vii) *Presentation*2

Total = 20

QUESTION A-3

MARKS

(a) Truncated Cone B (10)

- (i) Projection from centre in elevation2
- (ii) Locate centre in plan3
- (iii) Outline of cone B3
- (iv) Complete plan.....2

(b) Sphere C (8)

- (v) Constructions in elevation2
- (vi) Projections to plan2
- (vii) Locate centre in plan2
- (viii) Draw sphere C in plan.....2

- (ix) *Presentation*2

Total = 20

QUESTION A-4

MARKS

(a) Elevation (12)

- (i) Projections from plan.....4
- (ii) Points correctly defined on the elevation4
- (iii) Complete elevation of the structure.....4

(b) End View (6)

- (iv) Projections to end view2
- (v) Identify correct points2
- (vi) Complete the end view2

- (vii) *Presentation*2

Total = 20

QUESTION B-1**MARKS**

(a) Initial setup (5)	
(i) Draw the equilateral triangle	3
(ii) Draw the 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 the elevation in the correct position	2
(vi) Projections to set up plan	2
(vii) Semicircle in plan.....	1
(viii) Draw the plan in the correct position.....	2
(c) Axonometric Projection of rectangular sections (9)	
(ix) Projections from the elevation	2
(x) Projections from the plan	2
(xi) Complete the axonometric projection of front faces.....	2
(xii) Complete the axonometric projection of side faces.....	3
(d) Axonometric Projection of semi-circular end (17)	
(xiii) Divisions on semi-circle in elevation	3
(xiv) Corresponding divisions in plan	4
(xv) Projections of semi-circle from elevation.....	3
(xvi) Projections of semi-circle from plan	3
(xvii) Draw axonometric projection of the front semi-circular section	2
(xviii) Complete the axonometric projection of the semi-circular section	2
(xix) <i>Presentation</i>	4

Total = 45

QUESTION B-2

MARKS

- (a) Elevation (13)**
- (i) Elevation of base section 6
 - (ii) Outline of upper section 5
 - (iii) Complete the upper section of the cooker hood 2
- (b) Plan (15)**
- (iv) Outline of the base section 6
 - (v) 50mm × 50mm square outline of upper section 4
 - (vi) Complete the plan..... 5
- (c) Auxiliary elevation (13)**
- (vii) X_1Y_1 parallel to plan of surface A 2
 - (viii) Projections from plan 1
 - (ix) Transfer of heights from elevation 2
 - (x) Draw surface A 2
 - (xi) Complete auxiliary elevation 6
 - (xii) **Presentation** 4

Total = 45

QUESTION B-3**MARKS****(a) Plan and Elevation (33)**

- (i) Draw the plan of the piers 6
- (ii) Draw the plan of the fence 3
- (iii) Draw the elevation of the piers as given 6
- (iv) Draw the elevation of the fence as given 4

Interpenetration on Left Hand Side (LHS)

- (v) Projections from LHS of plan 3
- (vi) Locate points on LHS in elevation 3
- (vii) Complete LHS of elevation 3

Interpenetration on Right Hand Side (RHS)

- (viii) Projection from RHS of plan 1
- (ix) Locate points on RHS in elevation 2
- (x) Complete RHS of elevation 2

(b) End View (8)

- (xi) Transfer of widths from plan..... 2
- (xii) Projection of heights from elevation 2
- (xiii) End view of piers 2
- (xiv) Complete end view 2
- (xv) ***Presentation*** 4

Total = 45

QUESTION C-1

MARKS

(a) Profile (21)	
(i) Measure heights and draw horizontal lines at 5m intervals	6
(ii) Projections from intersections between line AB and contours	7
(iii) Draw outline of profile	8
(b) Earthworks for roadway (20)	
(iv) Parallel lines at 5m intervals	5
(v) Identify points on cutting curve	4
(vi) Identify points on embankment curve	6
(vii) Draw earthworks curve	5
(viii) <i>Presentation</i>	4
	<hr/>
	<i>Total = 45</i>

QUESTION C-2

MARKS

(a) Elevation and Plan (25)

- (i) Outline of surface ABCD in plan6
- (ii) Elements in plan (incl. division)7
- (iii) Outline of surface in elevation6
- (iv) Elements in elevation (incl. division or proj.)4
- (v) Curve in elevation2

(b) End view of Hyperbolic Paraboloid (16)

- (vi) Determine heights and widths for surface ABCD6
- (vii) Draw the outline of the hyperbolic paraboloid4
- (viii) Draw the elements4
- (ix) Curve in end view2

- (x) *Presentation*4

Total = 45

QUESTION C-3**MARKS****(a) Elevation and Plan (14)**

- (i) Draw the elevation.....8
- (ii) Draw the outline plan4
- (iii) Complete the plan2

(b) End View (8)

- (iv) Determine heights and widths for end view.....4
- (v) Complete the end view4

(c) Surface Development (19)

- (vi) Appropriate layout of surface development2
- (vii) Development of bottom surface2
- (viii) Development of front and back surfaces.....4
- (ix) Development of two chamfered surfaces2
- (x) Development of vertical surface1
- (xi) Development of top horizontal surface2
- (xii) Development of long inclined surface2
- (xiii) Division of circular section2
- (xiv) Development of curved surface.....2
- (xv) *Presentation*4

Total = 45

QUESTION C-4**MARKS**

(a) Link mechanism (19)	
(i) Set up line diagram (O, A, B & C.)	8
(ii) Draw circle about O	2
(iii) Division of circle	2
(iv) Arm AC in rotated positions	2
(v) Points on locus.....	2
(vi) Draw locus	3
(b) Displacement Diagram (22)	
(vii) 360° division (widths on displacement diagram.)	6
(viii) Correct use of 50mm height	2
(ix) Establish follower position at 0°, 90°, 180° and 360°	4
(x) 0° to 90°, Dwell	2
(xi) 90° to 180°, Uniform Velocity	2
(xii) 180° to 360°, Uniform Acceleration and Retardation (UAR)	3
(xiii) Complete the Displacement Diagram	3
(xiv) <i>Presentation</i>	4
	<hr/>
	<i>Total = 45</i>

QUESTION C-5**MARKS*****Assembly (11)***

- (i) Relative positioning of components 8
- (ii) Use of Section View 3

Base (7)

- (iii) Outline 5
- (iv) Hole 2

Vertical Side (7)

- (v) Outline 5
- (vi) Holes 2

Centre Support (10)

- (vii) Outline 4
- (viii) Holes 3
- (ix) Octagon 3

Pins (3)

- (x) 25mm pins 2
- (xi) 40mm pin 1

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.

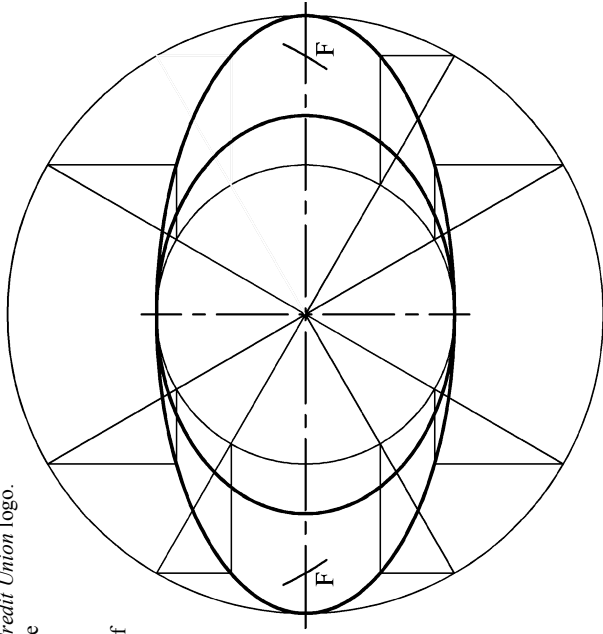
A-1. The graphic below shows the *Irish Credit Union* logo.

It consists of two ellipses which share the same minor axis.

The drawing on the right shows the completed inner ellipse. A portion of the second ellipse is also drawn.

(a) Locate additional points on the curve and draw the second ellipse.

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

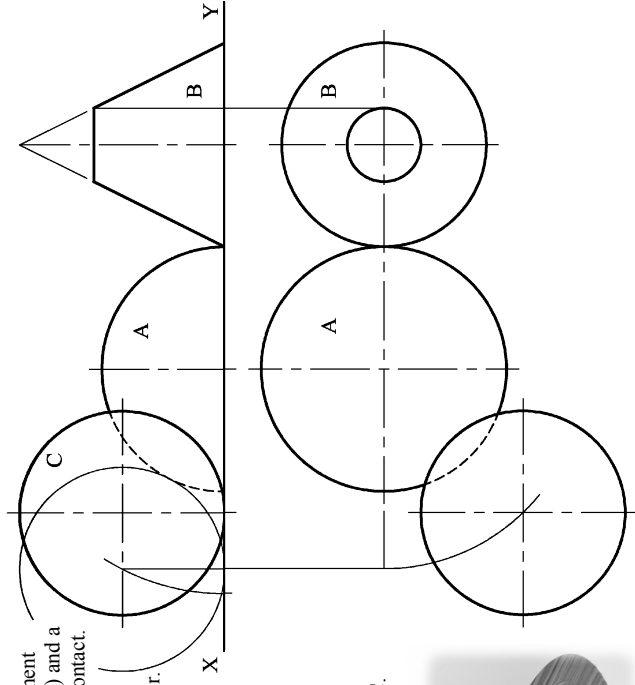
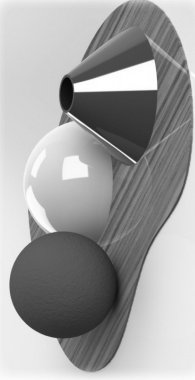


A-3.

The 3D graphic of gym equipment below, shows a hemisphere (A) and a truncated cone (B) in mutual contact. A sphere (C) is also shown in contact with the hemisphere. All three solids rest on the floor.

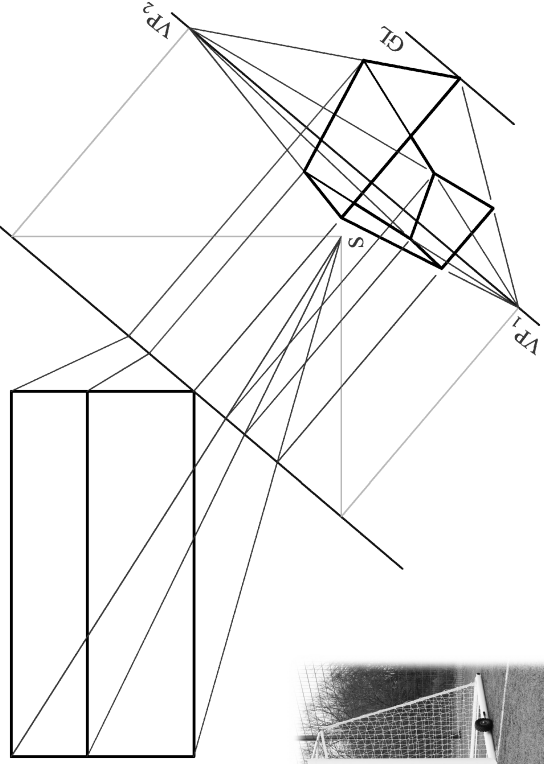
The drawing on the right shows the elevation and partially completed plan of the gym equipment.

- (a) Draw the plan of the truncated cone B.
 (b) Draw the plan of sphere C.



A-2.

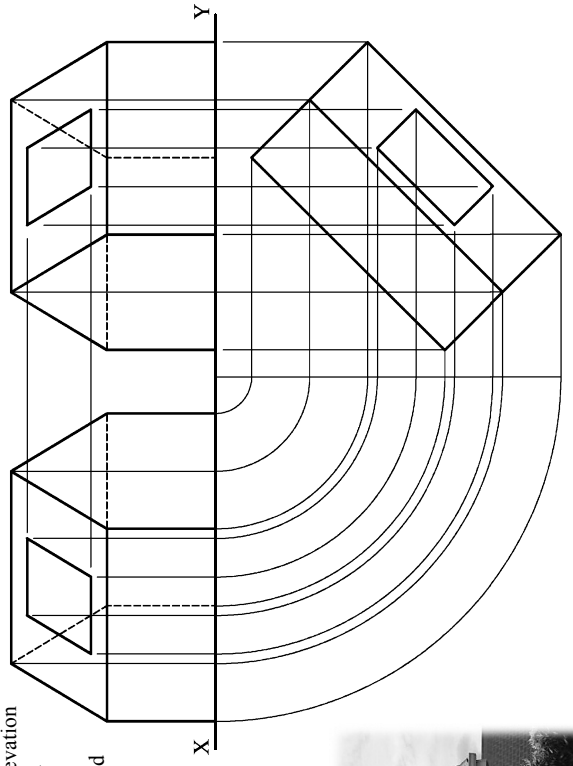
The 3D graphic below shows a set of goalposts similar to those used in the *UEFA* championship. The drawing on the right shows the plan and partially completed perspective view of the goalposts. Complete the perspective drawing of the goalposts.

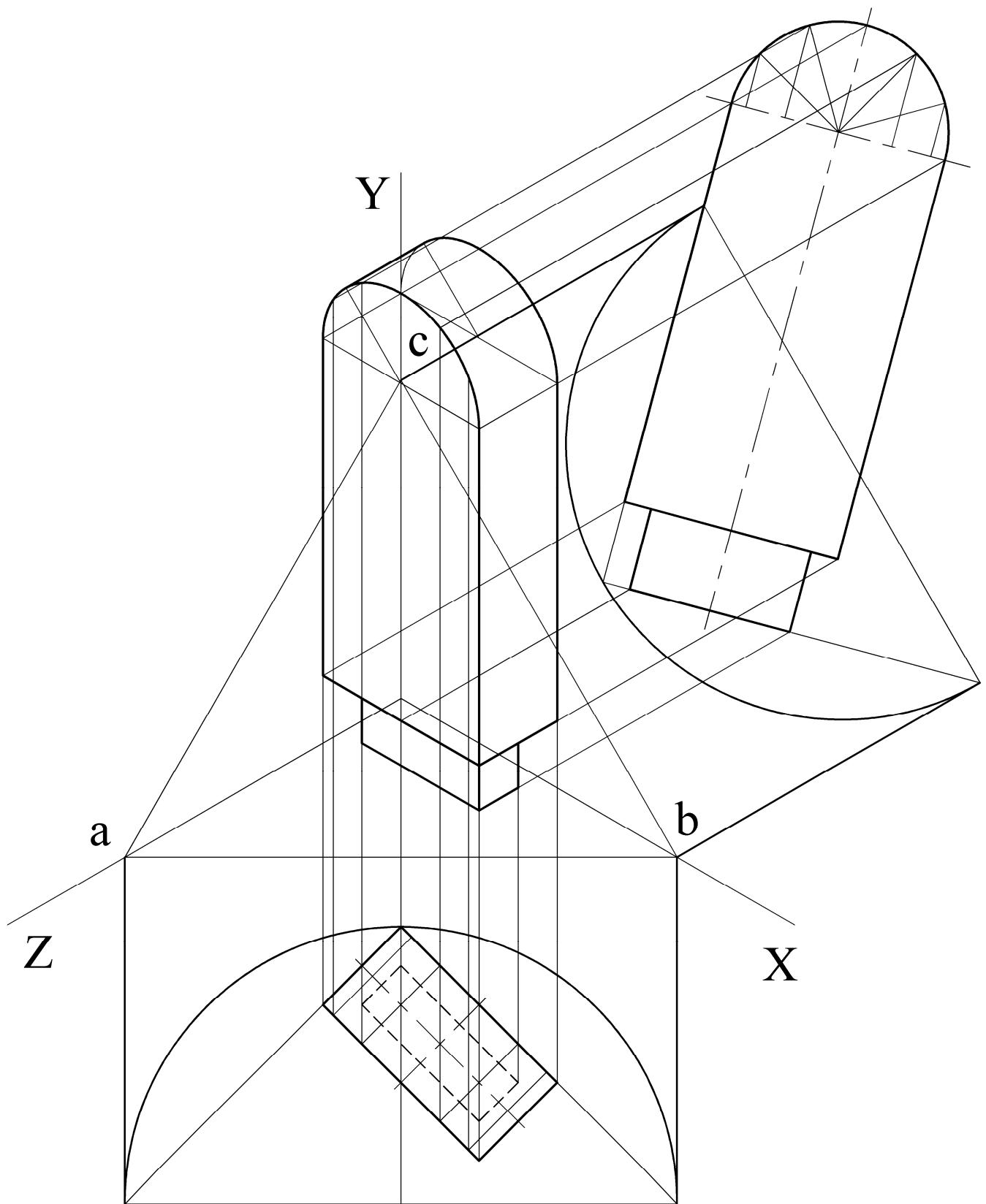


A-4.

The image below shows a house with a solar panel located on its roof. The plan, the partially completed elevation and partially completed end view of the house and solar panel are also shown.

- (a) Complete the elevation of the house and solar panel.
 (b) Complete the end view.





Design & Communication Graphics – Ord. Level



Marking Scheme

Question B-1

Scale: n/a

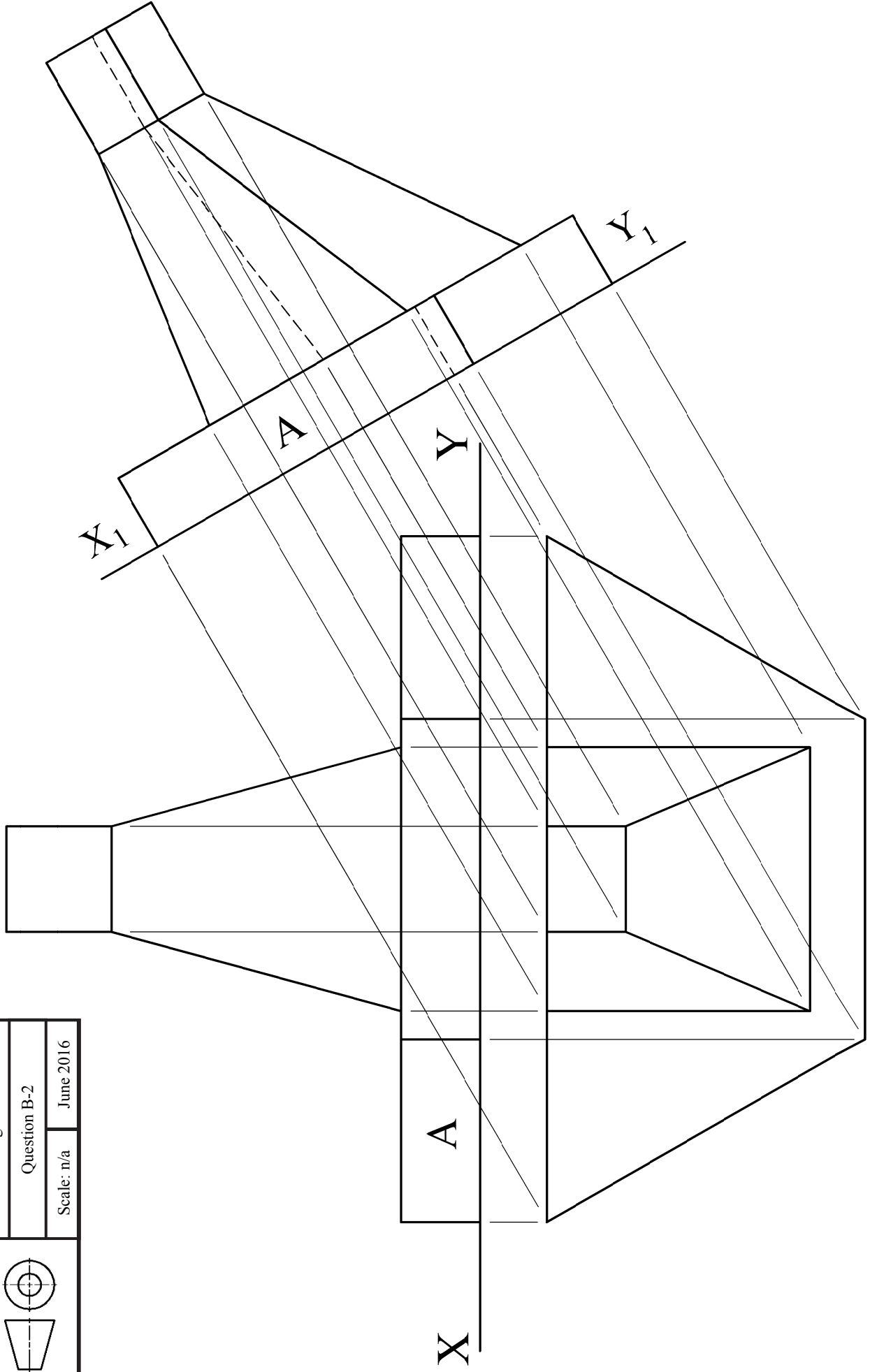
June 2016

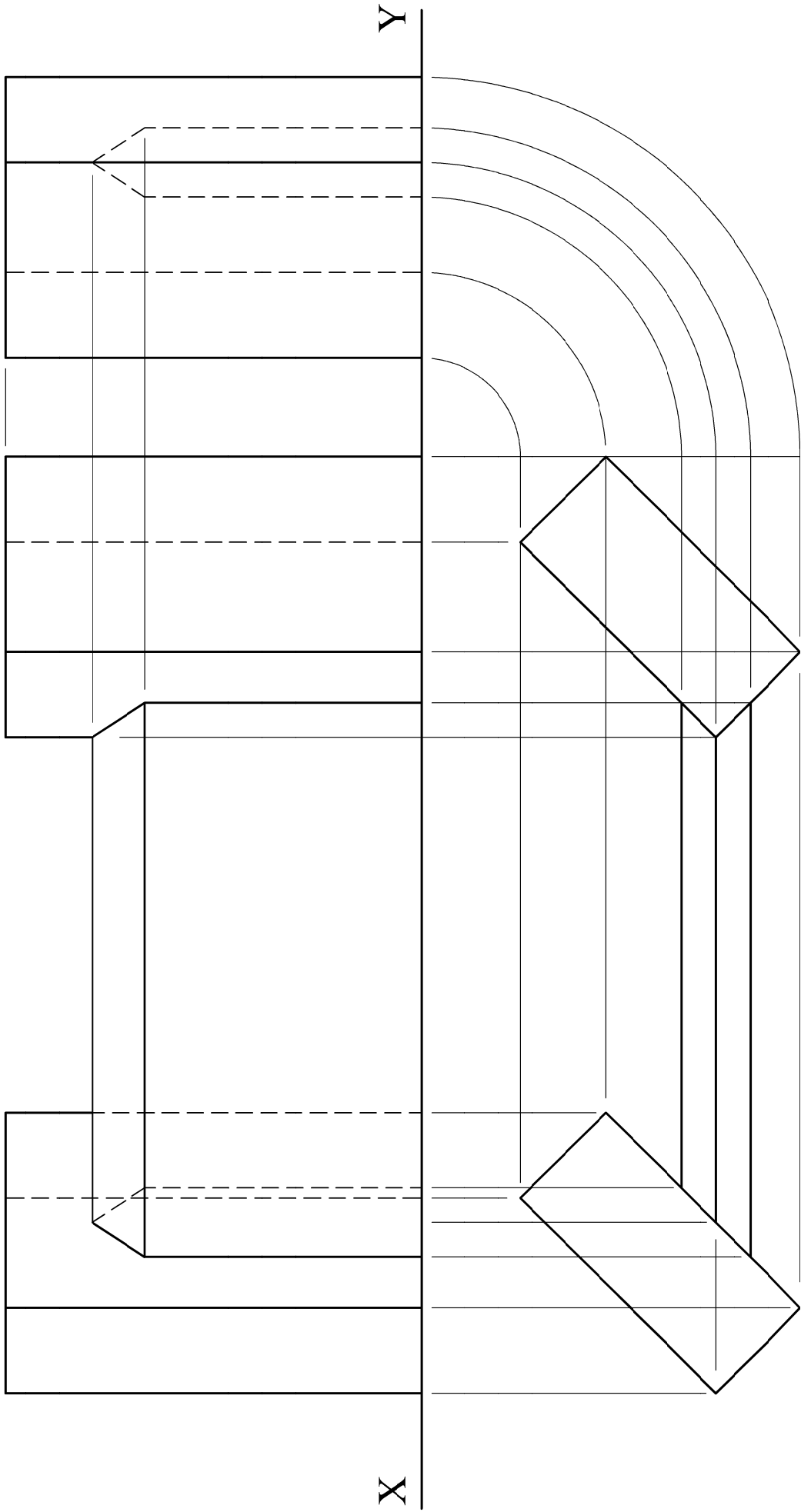
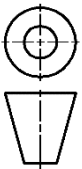


Marking Scheme

Question B-2

Scale: n/a June 2016



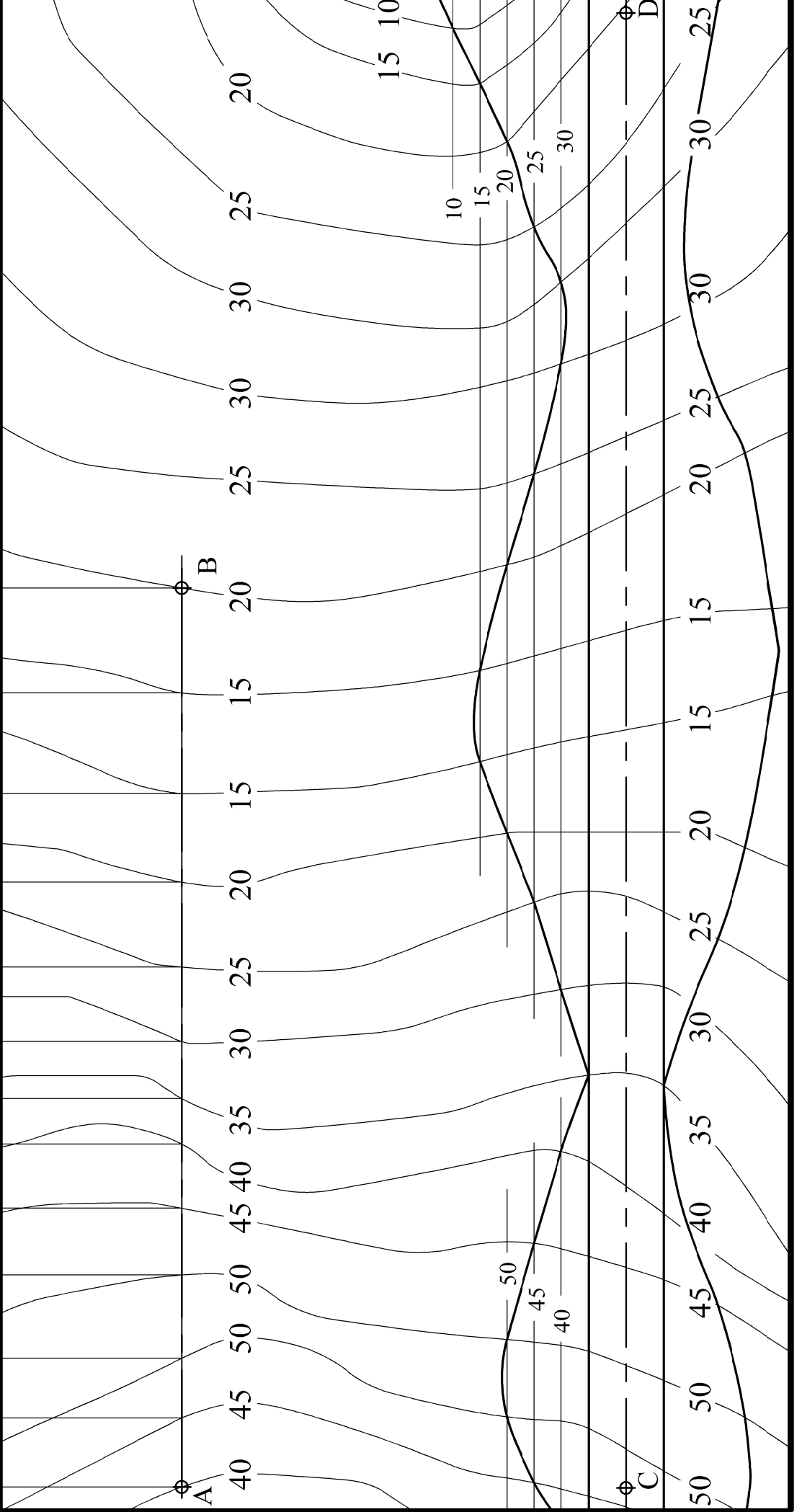
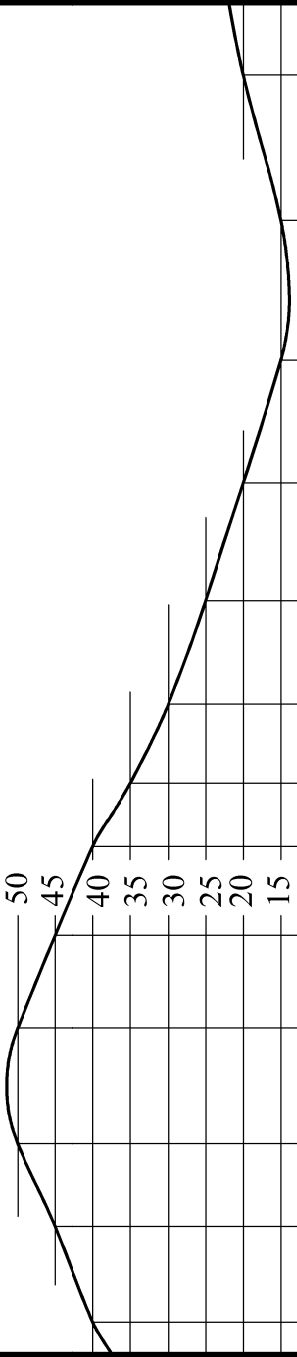
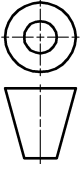


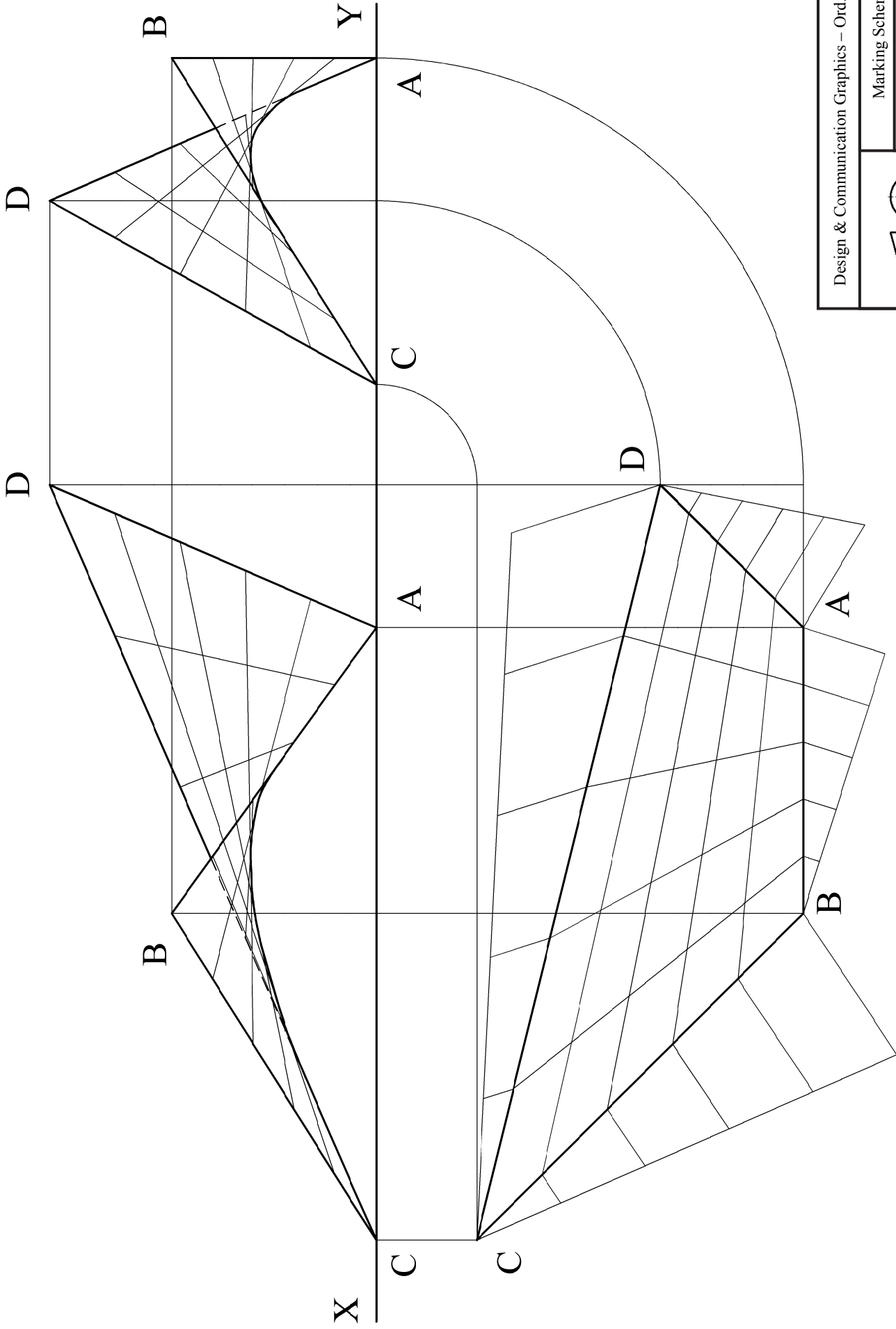
Design & Communication Graphics – Ord. Level

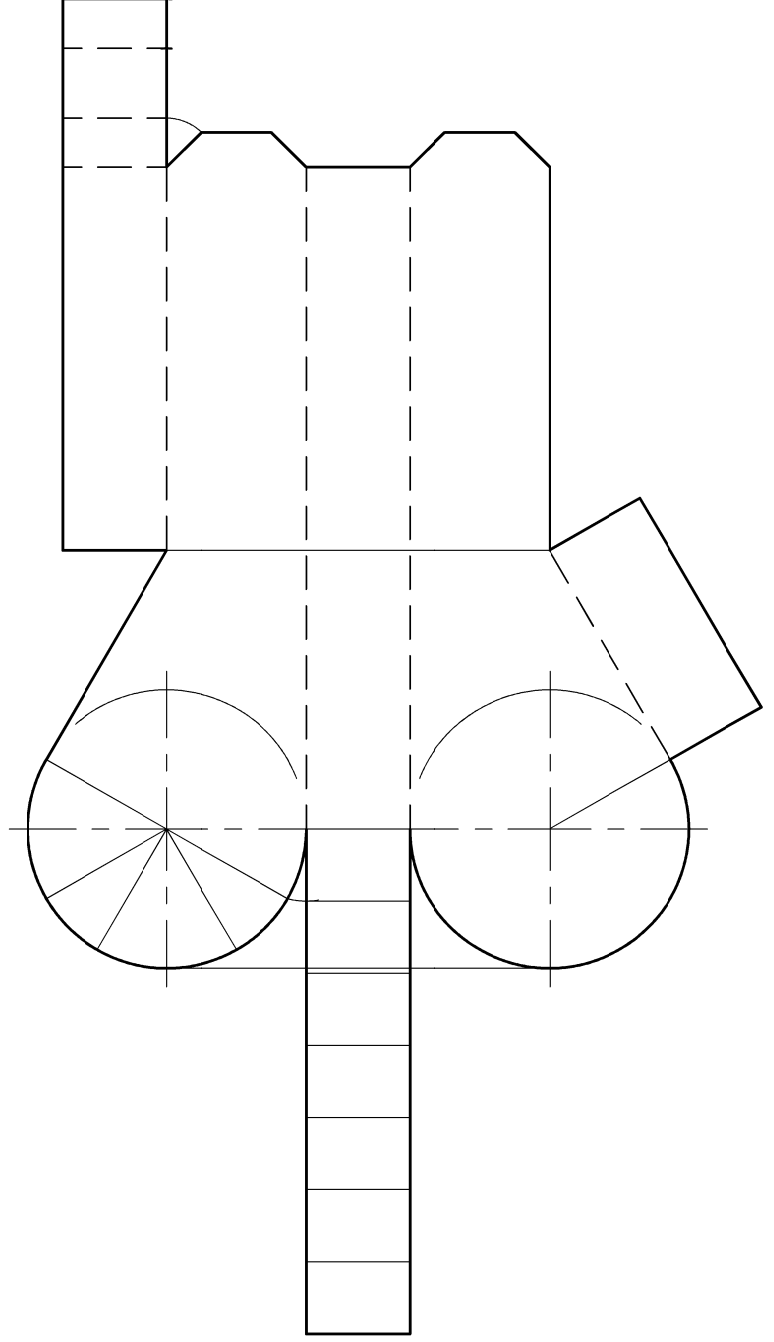
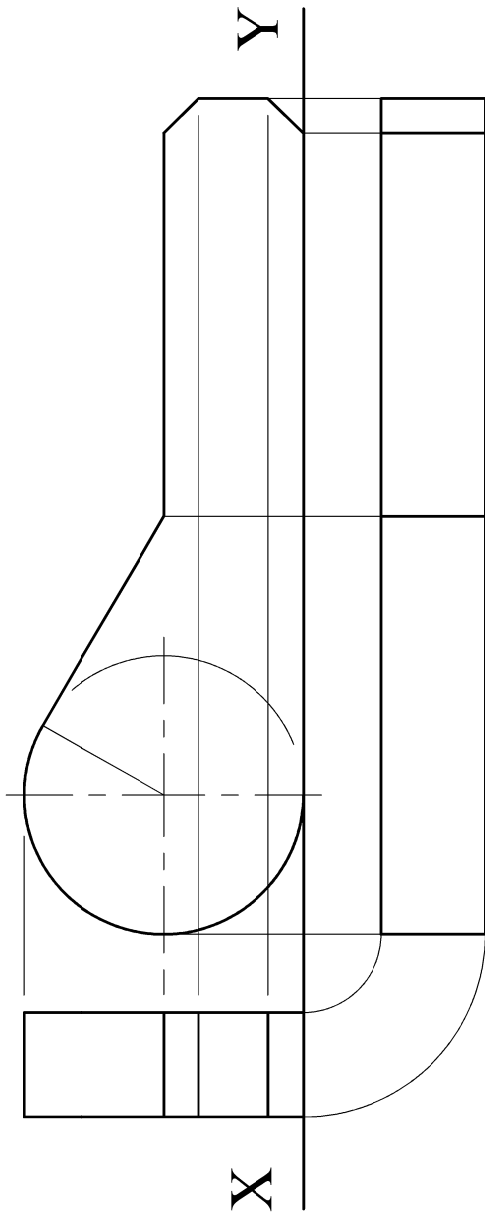
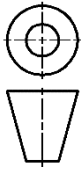
Marking Scheme

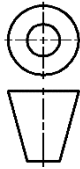
Question C-1

Scale: n/a June 2016





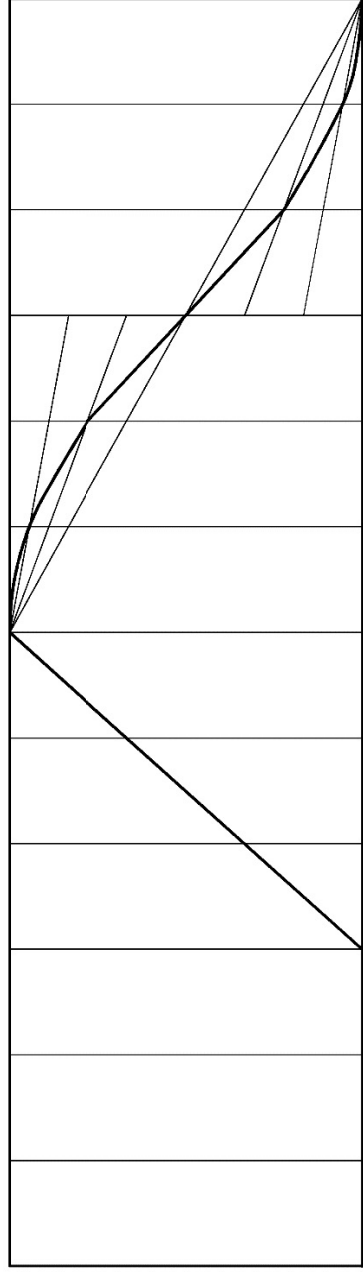
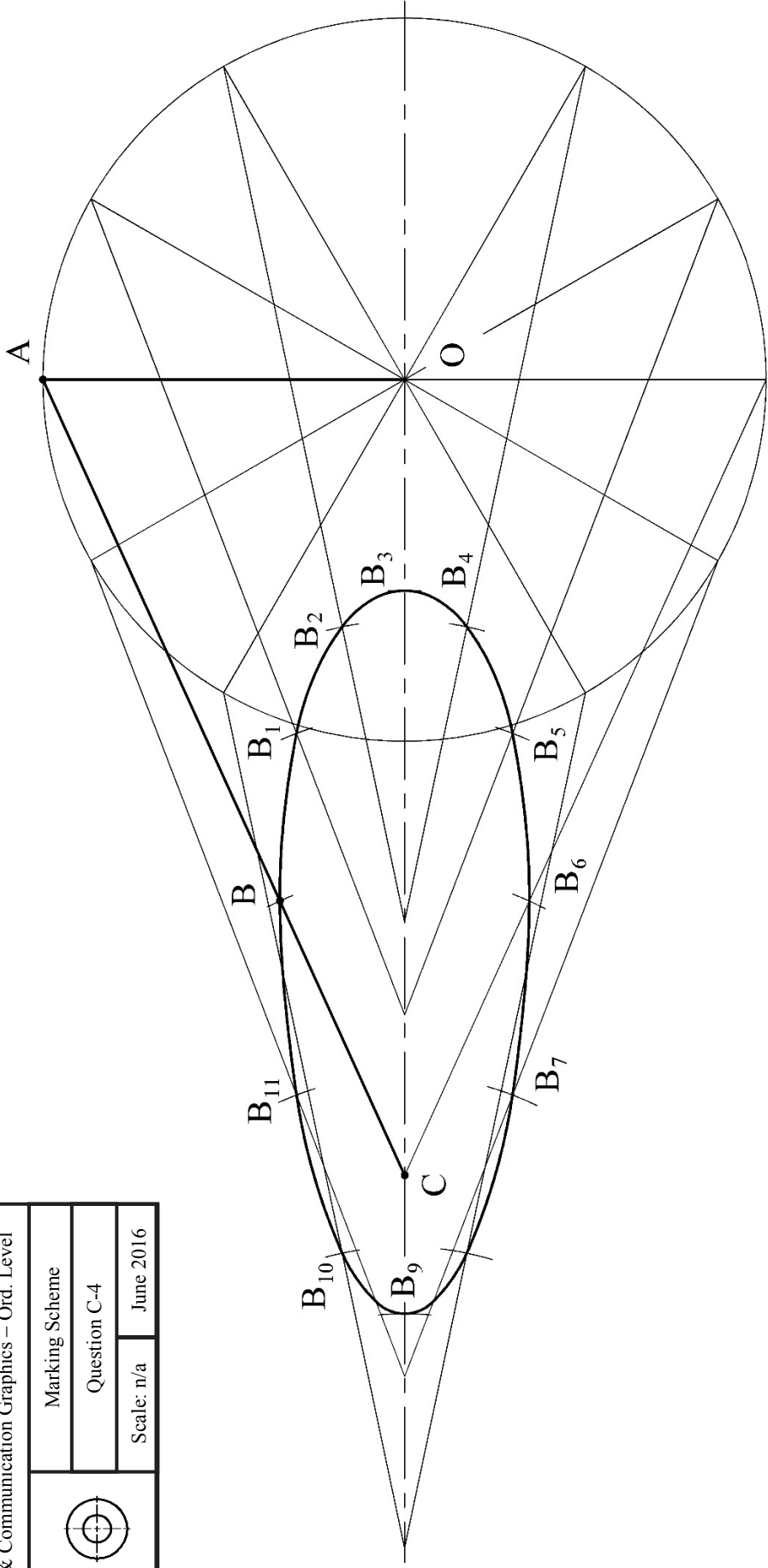




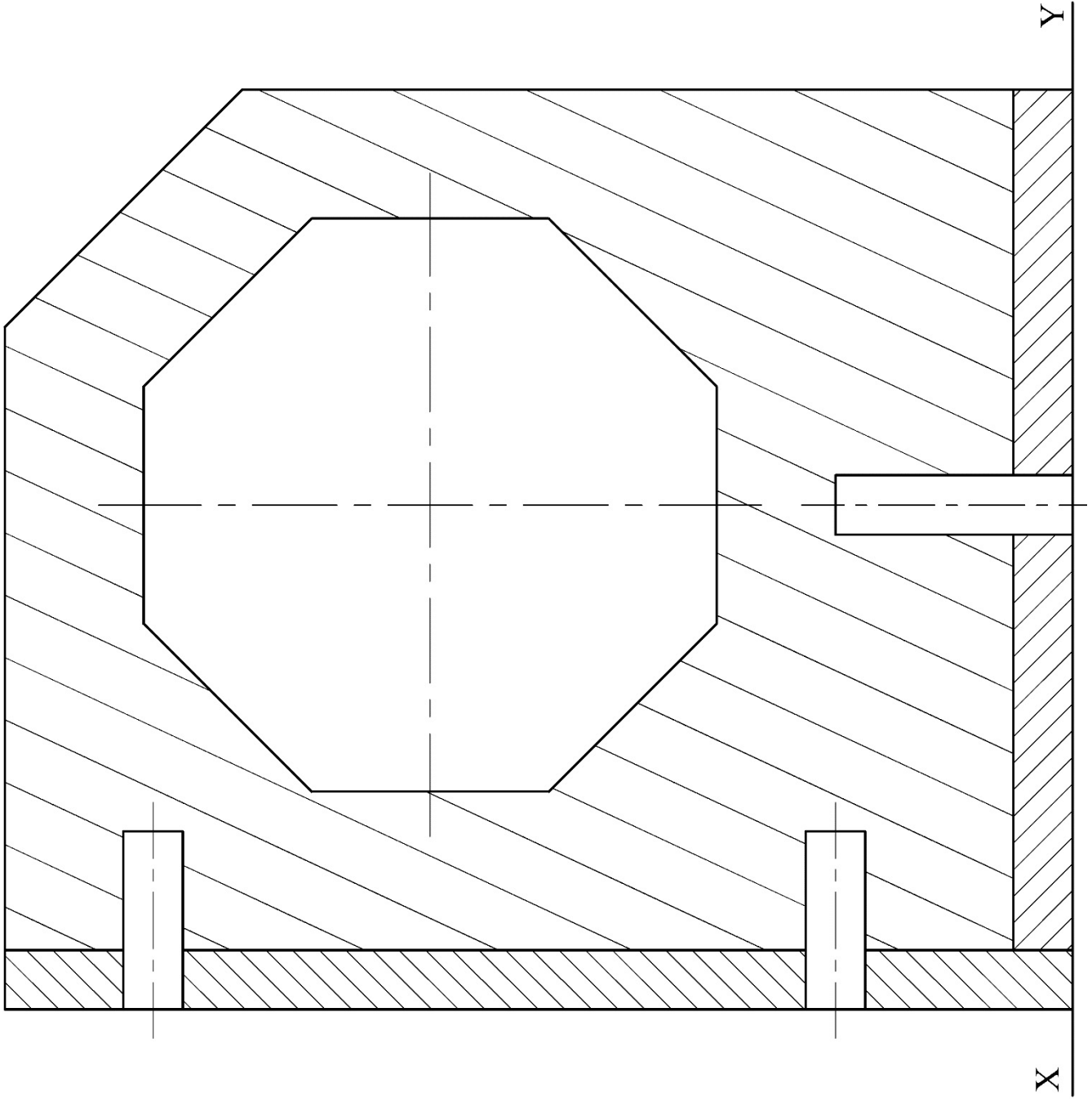
Marking Scheme

Question C-4

Scale: n/a June 2016



0° 90° 180° 360°



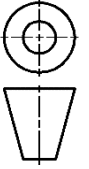
Design & Communication Graphics – Ord. Level

Marking Scheme

Question C-5

Scale: n/a

June 2016





Design and Communication Graphics

Student Assignment - Ordinary Level

Assessment Sheet 2016

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

