



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2019

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

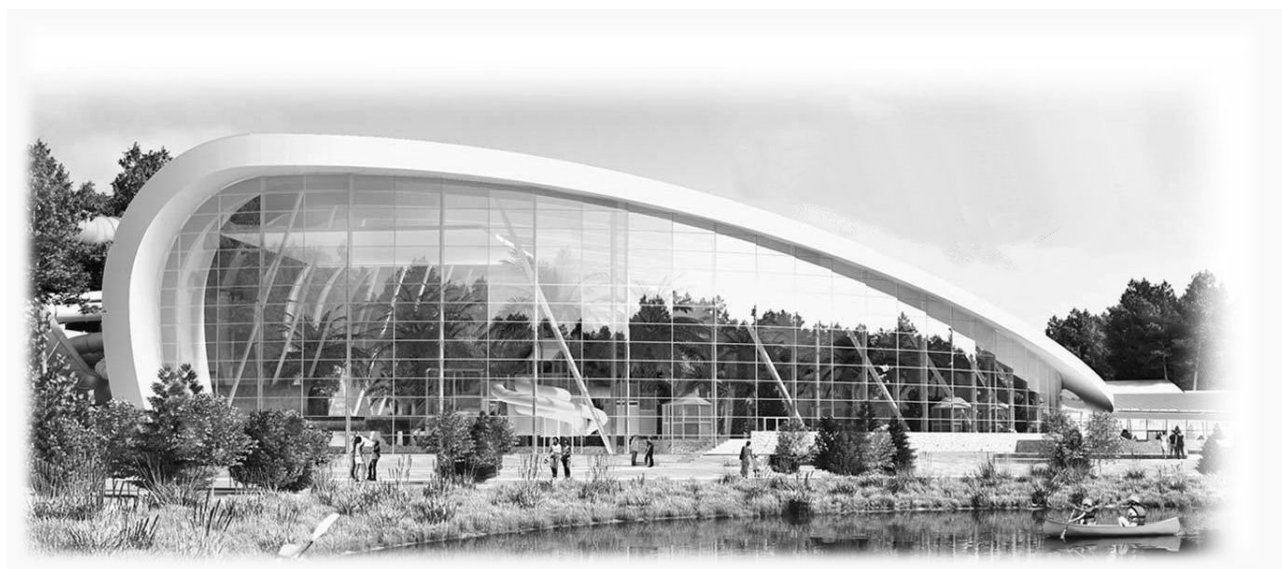
Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in 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.



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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) Plan of sphere A (4)**

- (i) Centre in plan2
- (ii) Draw sphere A2

(b) Sphere B in elevation (9)

- (iii) Extended normal at point P1
- (iv) Locate new centre for sphere B2
- (v) Draw sphere B in position C6

(c) Plan of sphere B (5)

- (vi) Projections from centre in elevation1
- (vii) Locate centre in plan1
- (viii) Draw sphere B2
- (ix) Complete the plan1

- (x) *Presentation*2

Total = 20

QUESTION A-2**MARKS****Perspective (18)**

- (i) Radiate lines to correct vanishing points5
- (ii) Projections from plan2
- (iii) Complete base section7
- (iv) Complete top section3
- (v) Complete perspective1

- (vi) *Presentation*2

Total = 20

QUESTION A-3**MARKS****(a) Points on left hand side (11)**

- (i) Division of vertical line5
- (ii) Complete division of top line2
- (iii) Construction lines (2 sets)2
- (iv) Identify remaining points on LHS2

(b) Points on right hand side (3)

- (v) Locate points on RHS curve3

(c) Parabolic curve (4)

- (vi) Complete curve on LHS2
- (vii) Draw curve on RHS2
- (viii) *Presentation*2

Total = 20**QUESTION A-4****MARKS****(a) Drawing inner surface (14)**

- (i) Mark the correct thickness of the structure6
- (ii) Complete the drawing of the inner surface8

(b) Points of contact (4)

- (iii) Constructions to establish points of contact2
- (iv) Define points of contact on the inner surface1
- (v) Define the points of contact on the outer surface1
- (vi) *Presentation*2

Total = 20

QUESTION B-1**MARKS****(a) Given Elevation and Plan (20)**

- (i) Draw the outline elevation as given10
- (ii) Complete the elevation4
- (iii) Draw the outline of the plan as given4
- (iv) Complete the plan as given2

(b) Interpenetration***Interpenetration on Left Hand Side (5)***

- (v) Projection from LHS of elevation1
- (vi) Locate points on LHS in plan2
- (vii) Complete LHS of plan2

Interpenetration on Right Hand Side (6)

- (viii) Projections from RHS of elevation2
- (ix) Locate points on RHS in plan2
- (x) Complete RHS of plan2

(c) End View (10)

- (xi) Transfer of widths from plan.....2
- (xii) Projection of heights from elevation2
- (xiii) End view of structure outline3
- (xiv) Complete end view3
- (xv) ***Presentation***4

Total = 45

QUESTION B-2**MARKS****(a) Initial setup (5)**

- (i) Draw equilateral triangle3
- (ii) Draw X, Y and Z axes2

(b) Elevation and Plan (10)

- (iii) Projections to set up elevation.....2
- (iv) Semicircle in elevation1
- (v) Draw elevation in the correct position2
- (vi) Projections to set up plan2
- (vii) Semicircle in plan (or 45° lines).....1
- (viii) Draw plan in the correct position2

(c) Axonometric Projection of main body (10)

- (ix) Projections from elevation2
- (x) Projections from plan2
- (xi) Axonometric projection of lower section.....2
- (xii) Axonometric projection inclined surfaces2
- (xiii) Axonometric projection of top outline.....2

(d) Axonometric Projection of circular hole (16)

- (xiv) Divisions on circle in plan5
- (xv) Corresponding divisions in elevation5
- (xvi) Projections from circle in plan2
- (xvii) Projections from elevation2
- (xviii) Draw axonometric projection of the circular hole2

- (xix) **Presentation**4

Total = 45

QUESTION B-3**MARKS****(a) Plan (16)**

- (i) Draw wall.....4
- (ii) Outline of steps6
- (iii) Complete structure6

(b) Elevation (12)

- (iv) Draw wall4
- (v) Outline of steps4
- (vi) Complete elevation.....4

(c) Auxiliary elevation (13)

- (vii) X_1Y_1 parallel to plan of surface A1
- (viii) Projections from plan1
- (ix) Transfer of heights from elevation3
- (x) Draw surface A3
- (xi) Complete auxiliary elevation5

- (xii) **Presentation**4

Total = 45

QUESTION C-1**MARKS****(a) Profile (30)**

- (i) Measure heights and draw horizontal lines12
- (ii) Projections from intersections between line AB and contours8
- (iii) Draw the profile10

(b) Triangle CDE (5)

- (iv) Plan of triangle CDE4
- (v) Elevation of triangle CDE1

(c) Strike and dip (6)

- (vi) Horizontal line in elevation1
- (vii) Strike in plan1
- (viii) Viewing direction for dip2
- (ix) Determine dip (2 heights, edge view)2

- (x) *Presentation*4

Total = 45

QUESTION C-2**MARKS****(a) Elevation and Plan (25)**

- (i) Outline of surface ABCD in plan.....6
- (ii) Elements in plan (incl. division)6
- (iii) Outline of surface in elevation6
- (iv) Elements in elevation (incl. division or proj.)5
- (v) Completion of elevation (curve and hidden detail).....2

(b) End view of Hyperbolic Paraboloid (16)

- (vi) Determine heights and widths for surface ABCD6
- (vii) Draw the outline of hyperbolic paraboloid surface4
- (viii) Draw elements4
- (ix) Completion of end view (curve and hidden detail).....2
- (x) *Presentation*4

Total = 45

QUESTION C-3**MARKS****(a) Elevation and Plan (23)**

- (i) Draw straight edges in elevation10
- (ii) Determine centre and draw arc(1,2).....3
- (iii) Draw outline plan6
- (iv) Complete plan4

(b) End View (8)

- (v) Draw outline6
- (vi) Complete end view2

(c) Surface Development (10)

- (vii) Appropriate layout of surface development1
- (viii) Development of bottom surface2
- (ix) Development of front and back surfaces.....2
- (x) Development of vertical left surface1
- (xi) Development of vertical right surface.....1
- (xii) Development of top surface.....1
- (xiii) Division of arc1
- (xiv) Development of curved surface.....1

- (xv) **Presentation**4

Total = 45

QUESTION C-4**MARKS****(a) Displacement Diagram (22)**

- (i) 360° division (widths on displacement diagram)4
- (ii) Correct use of 70mm height1
- (iii) Establish follower position at 0°, 30°, 120°, 180° and 360°5
- (iv) 0° to 30°, Dwell2
- (v) 30° to 120°, Rise 70mm with Uniform Velocity2
- (vi) 120° to 180°, Fall 14mm with Uniform Velocity2
- (vii) 180° to 360°, Simple Harmonic Motion (SHM) construction3
- (viii) Complete Displacement Diagram3

(b) Link mechanism (19)

- (ix) Set up line diagram (O, A, B & C.)8
- (x) Draw circle about O2
- (xi) Division of circle2
- (xii) Arm AC in rotated positions2
- (xiii) Points on locus.....2
- (xiv) Draw locus3
- (xv) *Presentation*4

Total = 45

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

- (i) Relative positioning of components8
- (ii) Use of Section View3

Base (8)

- (iii) Outline of base.....6
- (iv) Spigot.....2

Stem (9)

- (v) Outline4
- (vi) Hole for spigot2
- (vii) Remaining holes3

Branches (4)

- (viii) Profile view3
- (ix) Circular section1

Cap (6)

- (x) Locate arc centre2
- (xi) Draw cap4

Drawing Completion (3)

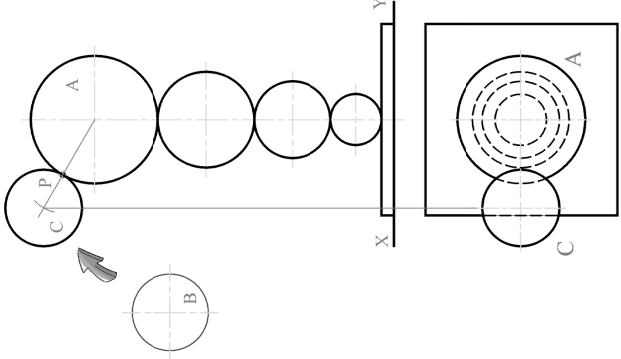
- (xii) Hatching and Centrelines ...(2,1).....3
- (xiii) ***Presentation***4

Total = 45

A-1. The 3D graphic below shows a modern sculpture in the grounds of Trinity College, Dublin. It consists of a series of spheres which are in contact as shown. The entire structure rests on a square base. The drawing on the right shows the elevation and the incomplete plan of the bottom three spheres centrally positioned on the square base.



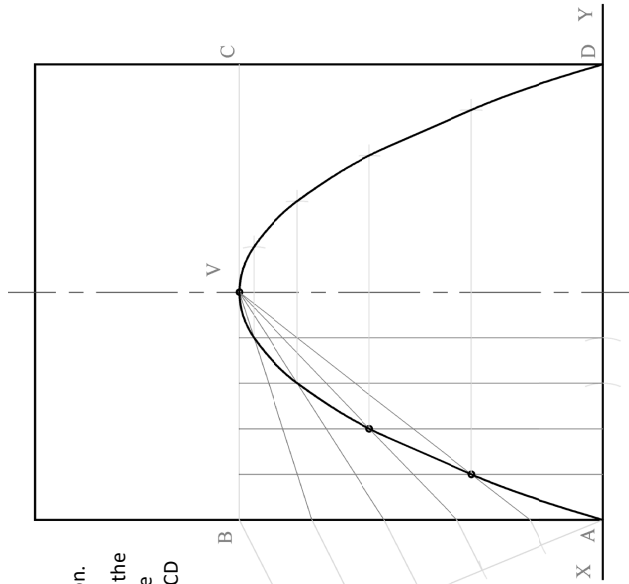
- (a) Draw the plan of sphere A.
- (b) Draw the elevation of the given sphere B when it has been moved into position C, as indicated by the arrow, so that it is in contact with sphere A at the point P.
- (c) Draw the plan of sphere B in its new position and complete the drawing of the structure.



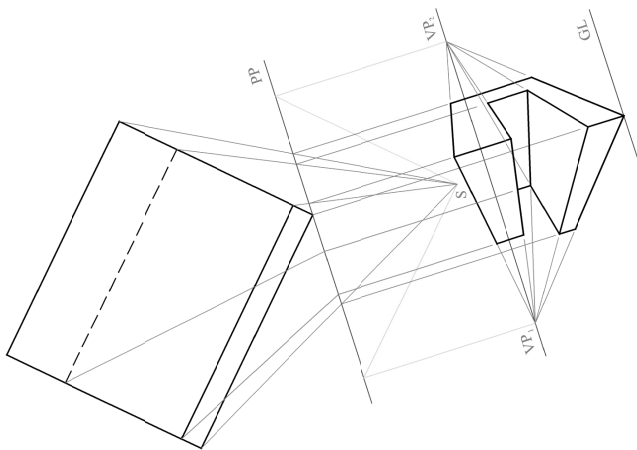
A-3. The images below show a cutter which is part of a paper punch.

The cutter appears as a parabola in elevation. The drawing shows the outline elevation of the cutter. A portion of the left hand side of the parabola, which is inscribed in rectangle ABCD and with its vertex at V, is also shown.

- (a) Locate the remaining points on the left hand side of the parabola.
- (b) Locate the points on the right hand side of the parabola.
- (c) Draw the complete parabola.

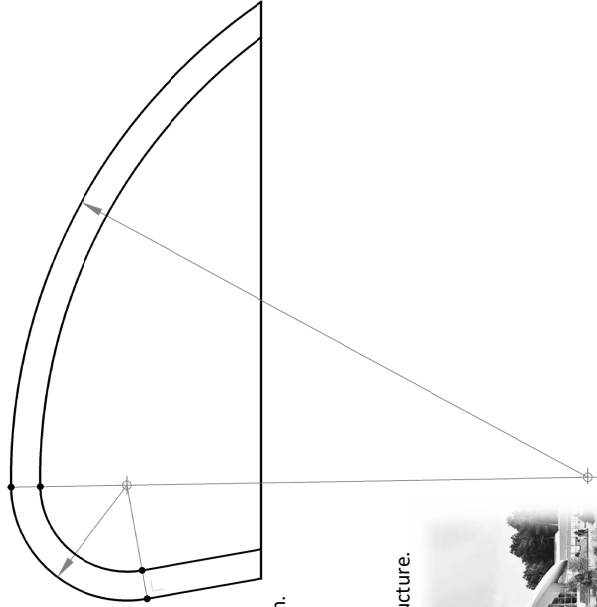


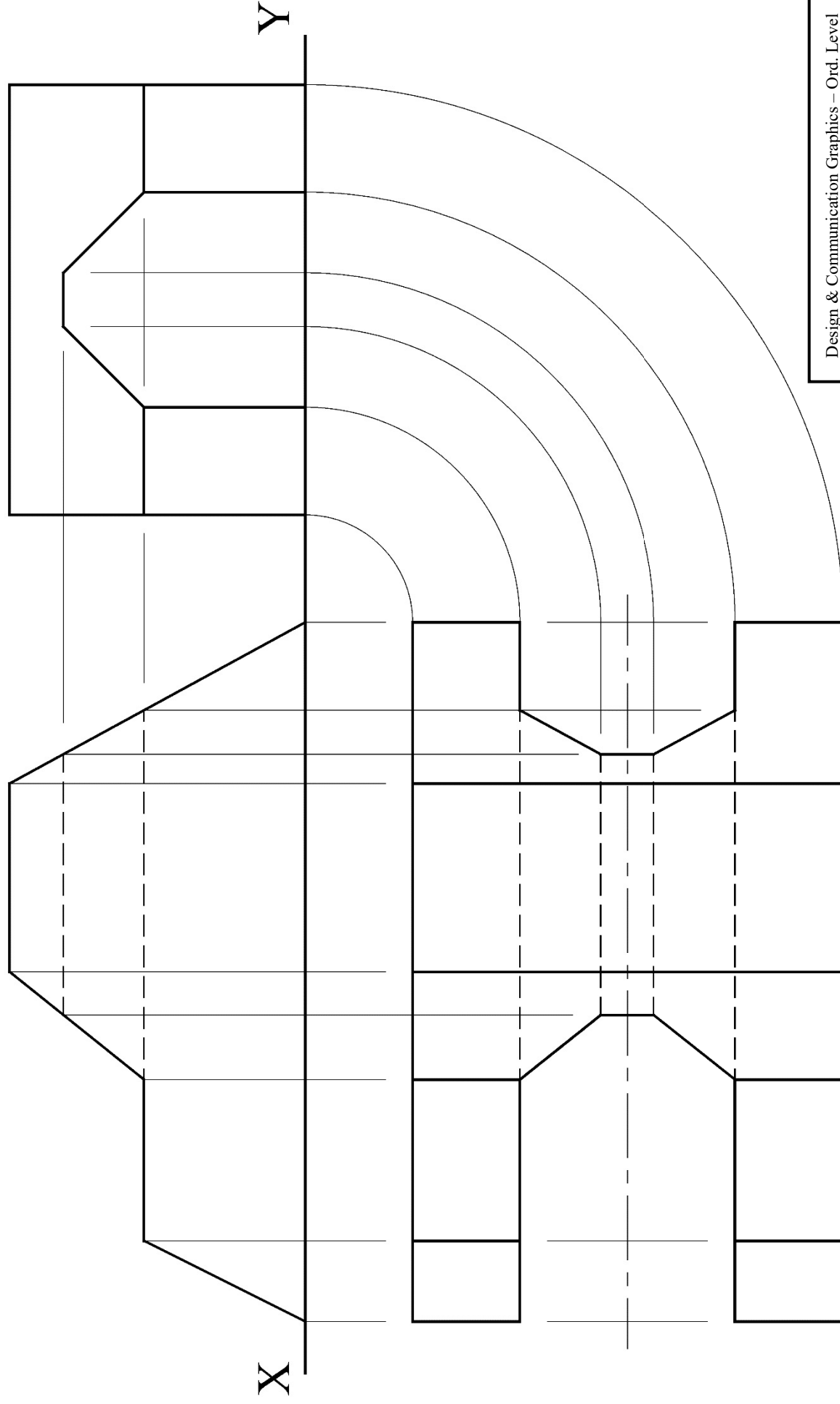
A-2. The image below shows a coffee machine. The drawing on the right shows the plan and the partially completed perspective view of the main body of a similar coffee machine. Complete the perspective drawing.



A-4. The image below shows an artist's impression of a structure in the 'Centre Parcs' holiday resort currently under construction in county Longford. The drawing on the right shows the outline design of a similar structure. The design of the structure is based on lines and tangential arcs. The structure has a uniform thickness. A small portion of the inner parallel surface is also shown.

- (a) Complete the drawing of the inner surface of the structure.
- (b) Show the exact points of contact between all arcs and lines in the structure.





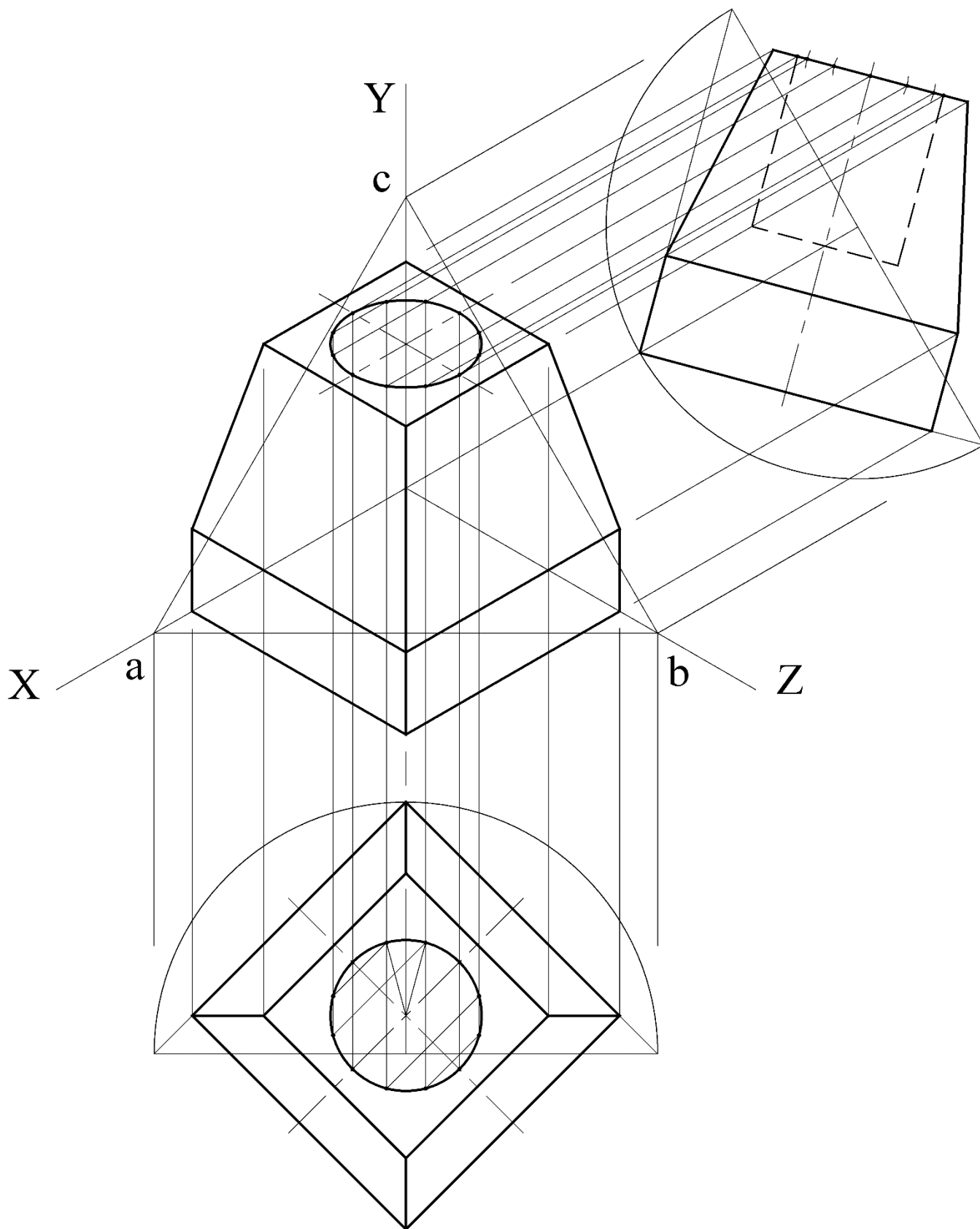
Design & Communication Graphics – Ord. Level

Marking Scheme

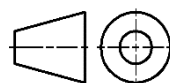
Question B-1

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Design & Communication Graphics – Ord. Level

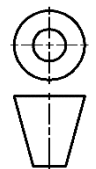


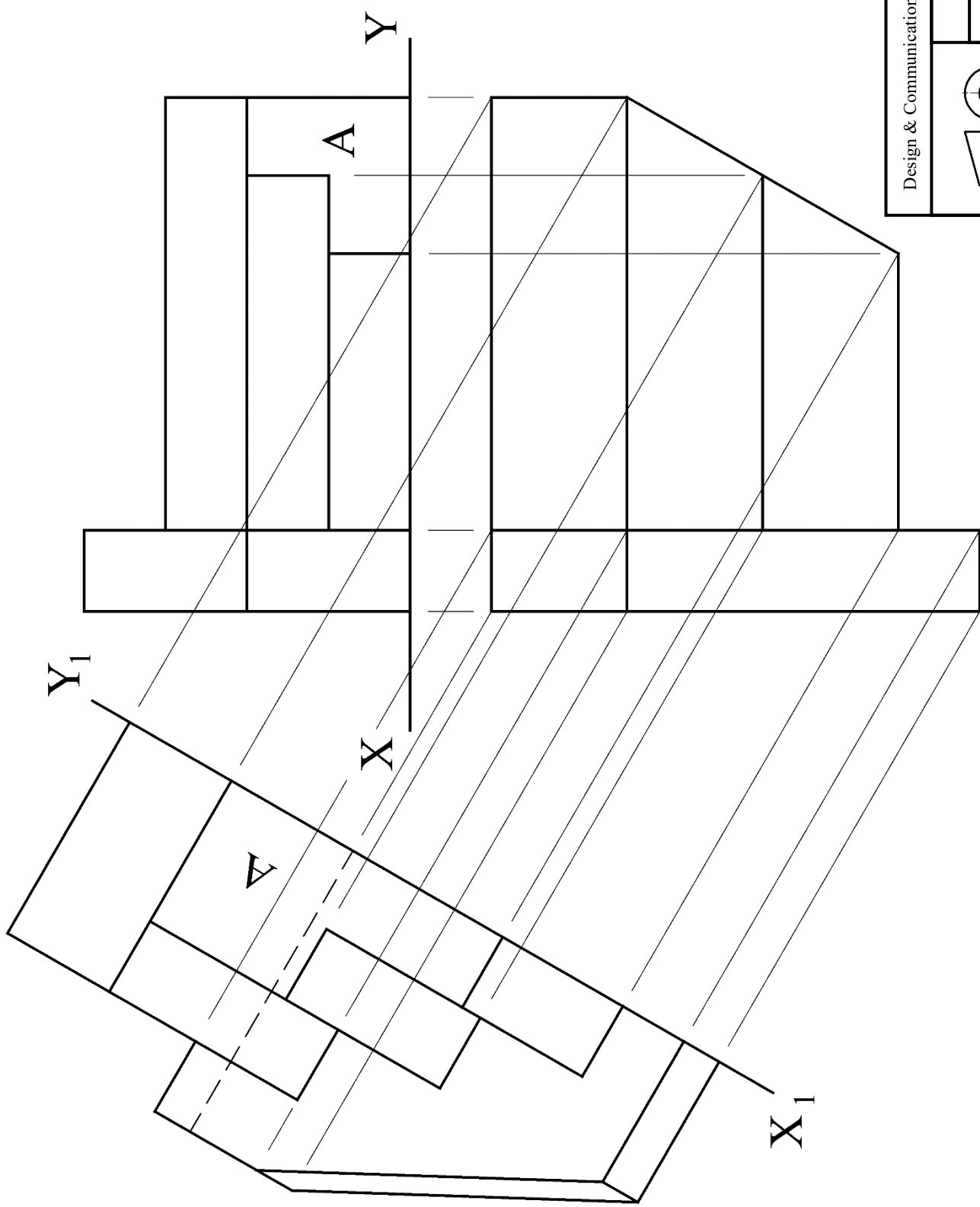
Marking Scheme

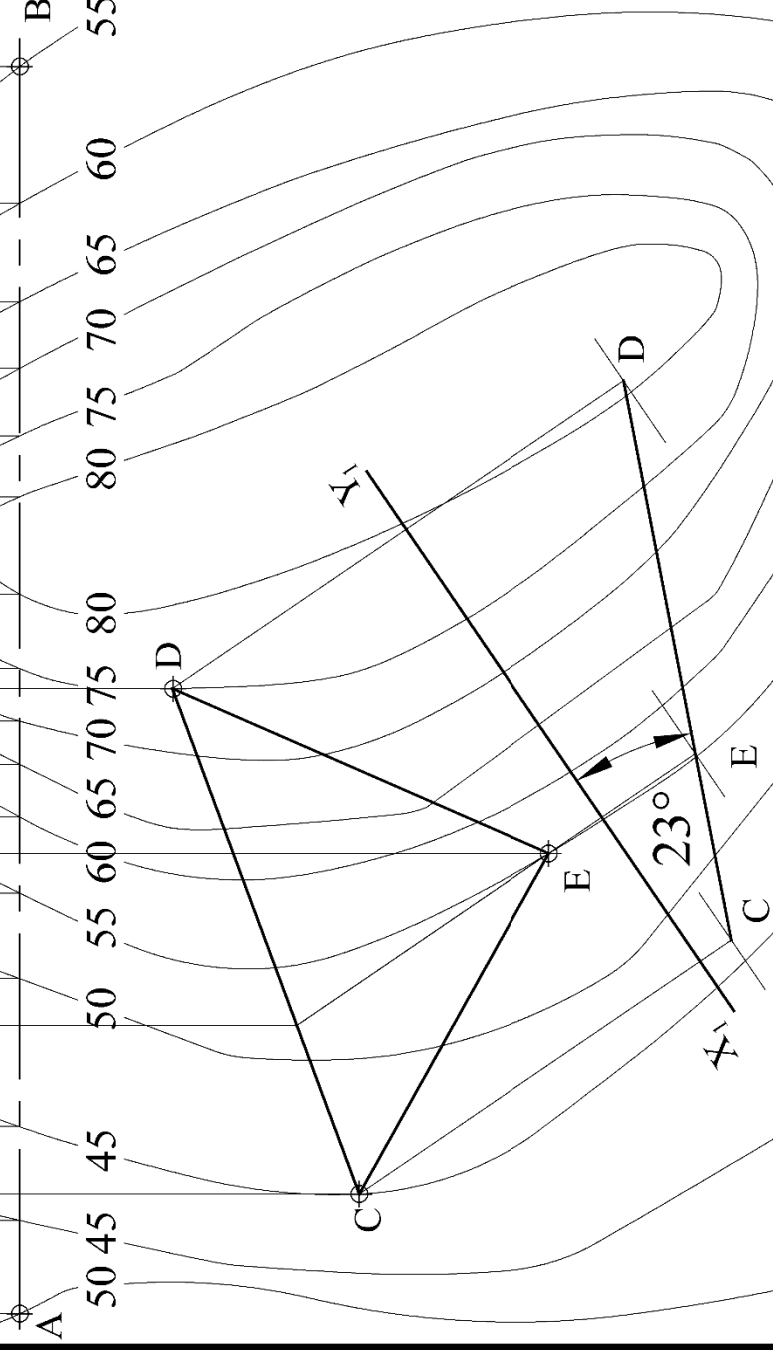
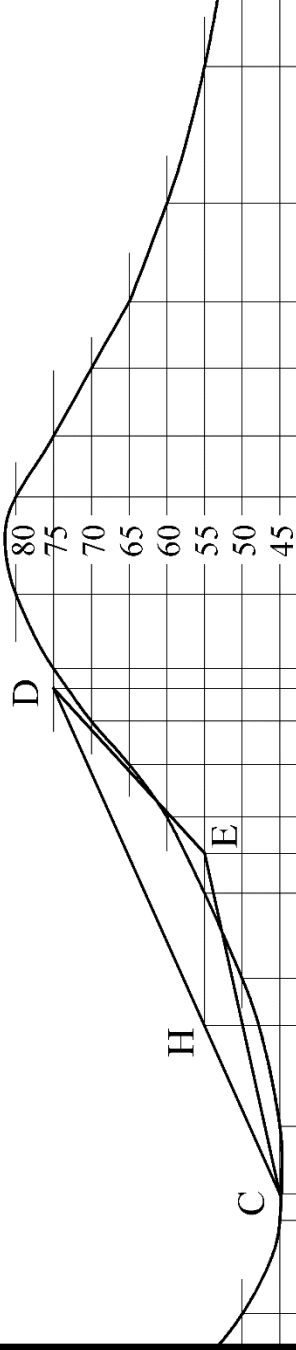
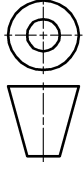
Question B-2

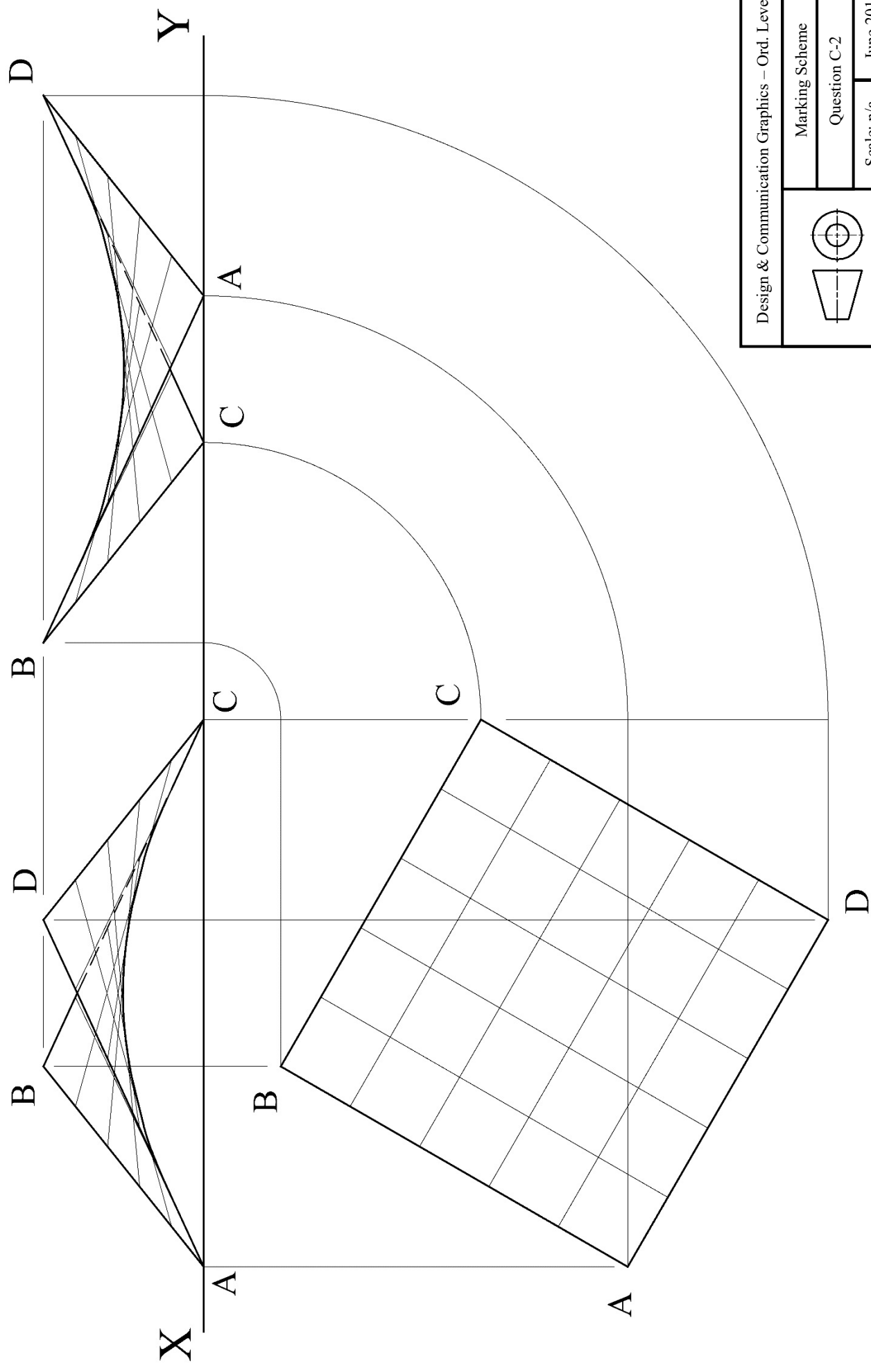
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June 2019

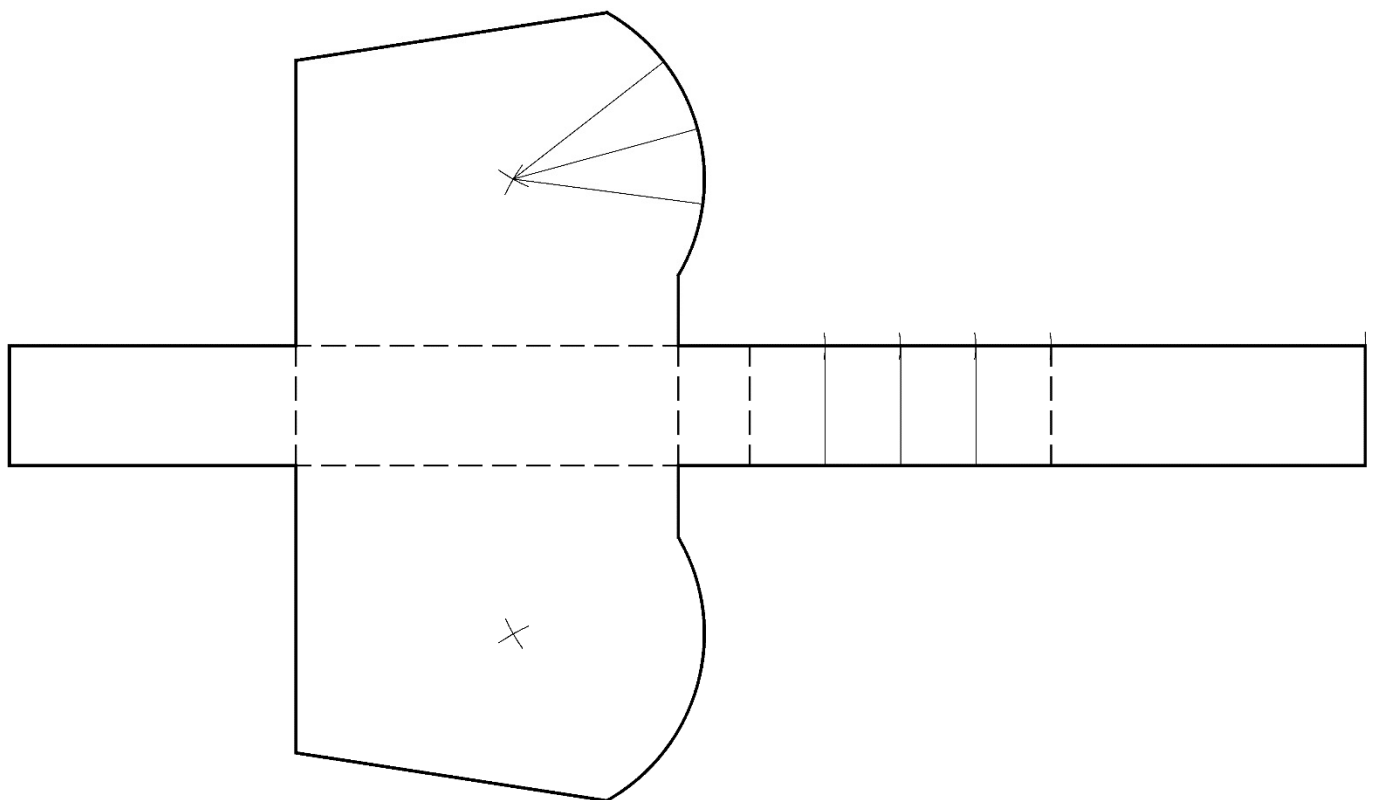
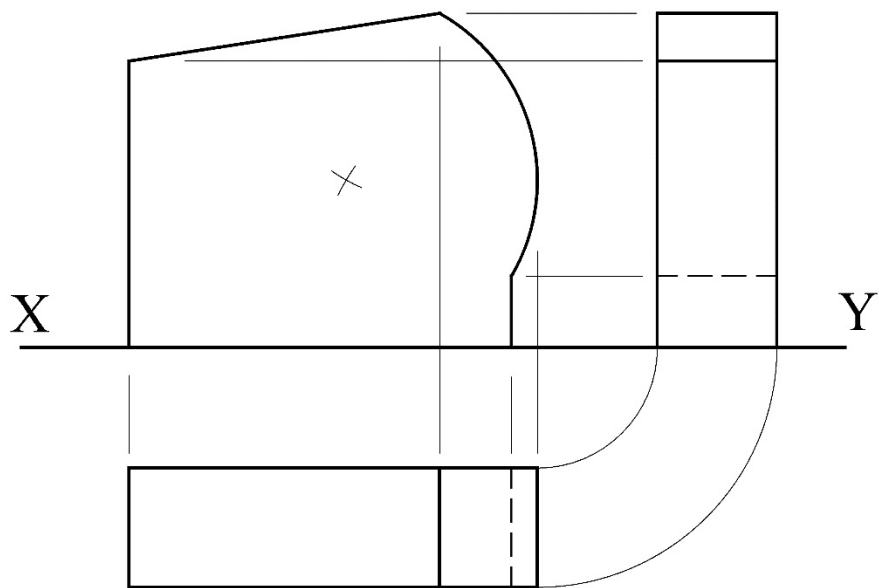
Design & Communication Graphics – Ord. Level		
	Marking Scheme	
	Question B-3	
	Scale: n/a	June 2019



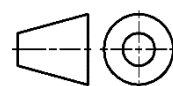




Design & Communication Graphics – Ord. Level		
		Marking Scheme
		Question C-2
Scale: n/a	June 2019	



Design & Communication Graphics – Ord. Level

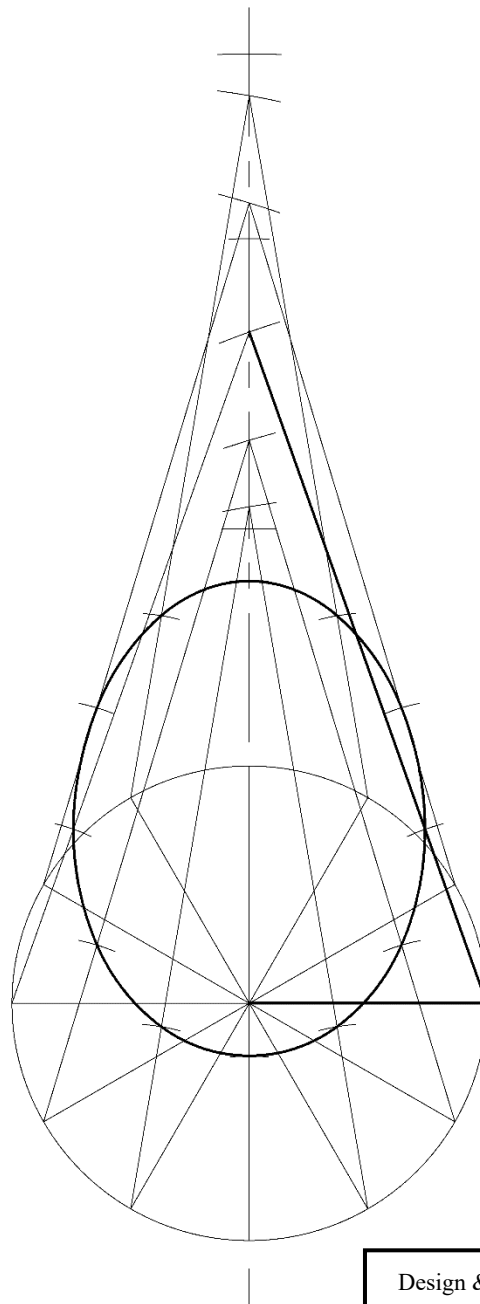
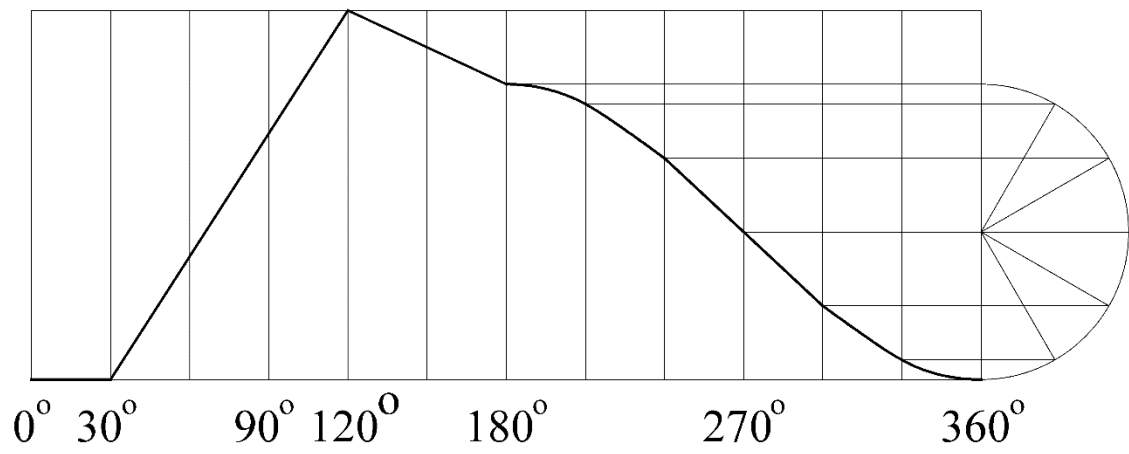


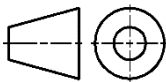
Marking Scheme

Question C-3

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June 2019



Design & Communication Graphics – Ord. Level	
	Marking Scheme
	Question C-4
	Scale: n/a June 2019



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Design and Communication Graphics

Student Assignment - Ordinary Level

Assessment Sheet 2019

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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