



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2017

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 2017

Design and Communication Graphics Ordinary Level



Marking Scheme and Sample Solutions

(Other valid solutions are acceptable and are marked accordingly)

QUESTION A-1

MARKS

Perspective of Steps (18)

- (i) Radiate lines from given side of steps to correct vanishing point4
- (ii) Projections from plan3
- (iii) Radiate lines on back to correct vanishing point3
- (iv) Locate points on back of steps4
- (v) Complete the perspective4
- (vi) *Presentation*2

Total = 20

QUESTION A-2

MARKS

(a) First semi-parabola (13)

- (i) Complete division of AB2
- (ii) Division of VA2
- (iii) Radiate lines from V2
- (iv) Lines parallel to VC2
- (v) Locate required additional points on curve2
- (vi) Complete the curve3

(b) Second semi-parabola (5)

- (vii) Locate points on second semi-parabola2
- (viii) Draw second semi-parabola3
- (ix) *Presentation*2

Total = 20

QUESTION A-3

MARKS

Rotation (18)

- | | | |
|-------|--|----------|
| (i) | Swing arcs from P for front section..... | 3 |
| (ii) | Swing arcs from P for rear section | 3 |
| (iii) | Locate points on front section | 4 |
| (iv) | Locate points on rear section | 3 |
| (v) | Complete the rotation | 5 |
| (vi) | Presentation | <u>2</u> |

Total = 20

QUESTION A-4

MARKS

(a) Truncated Cone B (10)

- | | | |
|-------|---|---|
| (i) | Projection from centre in elevation | 2 |
| (ii) | Locate centre in plan | 2 |
| (iii) | Outline of cone B | 3 |
| (iv) | Complete plan of sphere and cone | 3 |

(b) Cylinder C (8)

- | | | |
|--------|--|----------|
| (v) | Projection from centre of C in elevation | 2 |
| (vi) | Swing Arc of combined radii from A in plan | 2 |
| (vii) | Locate centre in plan | 2 |
| (viii) | Draw Cylinder C in plan | 2 |
| (ix) | Presentation | <u>2</u> |

Total = 20

QUESTION B-1

	<u>MARKS</u>
(a) Given plan and elevation (16)	
(i) Draw given plan	8
(ii) Draw given elevation	8
(b) Overhanging portion (9)	
(iii) Projections from elevation	2
(iv) Locate points in plan	3
(v) Complete the outline of overhanging portion in plan	4
(c) Interpenetration (8)	
(vi) Projections from the elevation	2
(vii) Locate points on interpenetration in plan.....	3
(viii) Complete the plan.....	3
(d) End View (8)	
(ix) Transfer of widths from plan	2
(x) Projection of heights from elevation	2
(xi) End view of pyramid	2
(xii) End view of stage	2
 (xiii) Presentation	 4
Total = 45	

QUESTION B-2

MARKS

- (a) **Initial setup (5)**
- (i) Draw the equilateral triangle3
- (ii) Draw the X, Y and Z axes2
- (b) **Elevation and Plan (10)**
- (iii) Projections to set up elevation.....2
- (iv) Semicircle in elevation1
- (v) Draw the elevation in the correct position2
- (vi) Projections to set up plan2
- (vii) Semicircle in plan (or 45 ° lines)1
- (viii) Draw the plan in the correct position2
- (c) **Axonometric Projection of main body (10)**
- (ix) Projections from the elevation2
- (x) Projections from the plan2
- (xi) Draw the axonometric projection of front face2
- (xii) Draw the axonometric projection of visible end2
- (xiii) Draw the axonometric projection of the top surface2
- (d) **Axonometric Projection of circular lens (16)**
- (xiv) Divisions on circle in elevation3
- (xv) Corresponding divisions in plan4
- (xvi) Projections of circle from elevation2
- (xvii) Projections of circle from plan3
- (xviii) Draw axonometric projection of the front circular section2
- (xix) Complete the axonometric projection of the circular section2
- (xx) **Presentation**4

Total = 45

QUESTION B-3

	<u>MARKS</u>
(a) Elevation (17)	
(i) Outline elevation of plinth	8
(ii) Complete elevation of plinth	2
(iii) Draw pump	7
(b) Plan (11)	
(iv) Plan the plinth.....	6
(v) Outline of pump	4
(vi) Complete the plan.....	1
(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	2
(x) Draw surface A	2
(xi) Complete auxiliary elevation	7
(xii) <i>Presentation</i>	4
Total = 45	

QUESTION C-1

MARKS

- (a) Profile (26)**
- (i) Measure heights and draw horizontal lines **10**
 - (ii) Projections from intersections between line AB and contours **8**
 - (iii) Draw the profile **8**
- (b) Triangle CDE (6)**
- (iv) Plan of triangle CDE **4**
 - (v) Elevation of triangle CDE **2**
- (c) Strike and dip (9)**
- (vi) Horizontal line in elevation **1**
 - (vii) Strike in plan **2**
 - (viii) Viewing direction for dip **3**
 - (ix) Determine dip (2 heights, edge view) **3**
- (x) Presentation** **4**

Total = 45

QUESTION C-2

MARKS

(a) Plan (20)

- | | |
|--------------------------------------|---|
| (i) Draw outer circle | 6 |
| (ii) Draw inner circle | 6 |
| (iii) Division of inner circle | 4 |
| (iv) Twelve elements | 4 |

(b) Elevation (17)

- | | |
|--|---|
| (v) Draw base of structure..... | 4 |
| (vi) Draw top of structure | 4 |
| (vii) Projections of elements from plan..... | 3 |
| (viii) Locate extremities of elements | 3 |
| (ix) Draw elements | 3 |

(c) Freehand curves in elevation (4)

- | | |
|--------------------------------|---|
| (x) Draw freehand curves | 4 |
|--------------------------------|---|

- | | |
|--------------------------------|---|
| (xi) <i>Presentation</i> | 4 |
|--------------------------------|---|

Total = 45

QUESTION C-3

MARKS

(a) Elevation and Plan (19)

- | | |
|--|---|
| (i) Draw straight lines in elevation..... | 6 |
| (ii) Determine centres and draw arcs(2,2)..... | 4 |
| (iii) Draw the outline plan | 6 |
| (iv) Complete the plan | 3 |

(b) End View (8)

- | | |
|----------------------------------|---|
| (v) Draw the outline | 6 |
| (vi) Complete the end view | 2 |

(c) Surface Development (14)

- | | |
|---|---|
| (vii) Appropriate layout of surface development | 2 |
| (viii) Development of bottom surface | 2 |
| (ix) Development of front and back surfaces..... | 2 |
| (x) Development of two curved surfaces | 4 |
| (xi) Development of two inclined surface | 2 |
| (xii) Development of top surface | 2 |

- | | |
|----------------------------------|---|
| (xiii) <i>Presentation</i> | 4 |
|----------------------------------|---|

Total = 45

QUESTION C-4

MARKS

(a) Displacement Diagram (24)

(i) 360° division (widths on displacement diag.)	4
(ii) Correct use of 60mm height	2
(iii) Establish follower position at 0°, 90°, 180° and 360°	4
(iv) 0° to 90°, Uniform Velocity	3
(v) 90° to 180°, Dwell	2
(vi) 180° to 360°, construction for Simple Harmonic Motion (SHM)	6
(vii) Complete Displacement Diagram (freehand curve).....	3

(b) Cam Profile (17)

(viii) Cam centre and nearest approach	2
(ix) Camshaft	1
(x) Angular divisions corresponding to displacement diagram	3
(xi) Correct direction of rotation	1
(xii) Identify points on the profile	6
(xiii) Draw the cam profile	4
(xiv) <i>Presentation</i>	4

Total = 45

QUESTION C-5

MARKS

Assembly (11)

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

Base (7)

- | | |
|--------------------------|---|
| (iii) Flat portion | 4 |
| (iv) Spigot..... | 3 |

Main Body (12)

- | | |
|-------------------|---|
| (v) Outline | 8 |
| (vi) Holes | 4 |

Brass Insert (8)

- | | |
|---------------------|---|
| (vii) Outline | 5 |
| (viii) Hole | 3 |

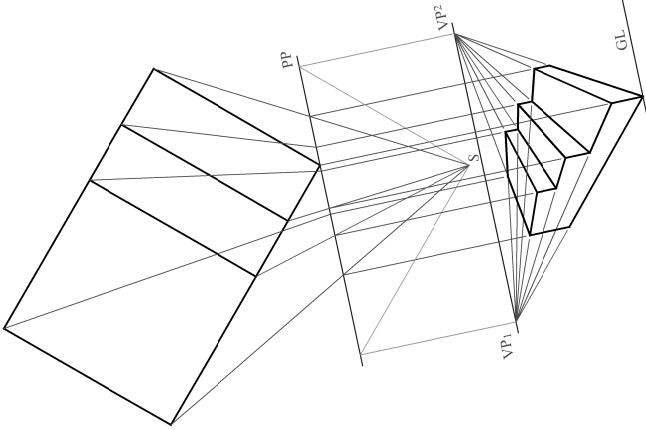
Drawing Completion (3)

- | | |
|--|---|
| (ix) Hatching and Centrelines ...(2,1) | 3 |
| (x) <i>Presentation</i> | 4 |
-

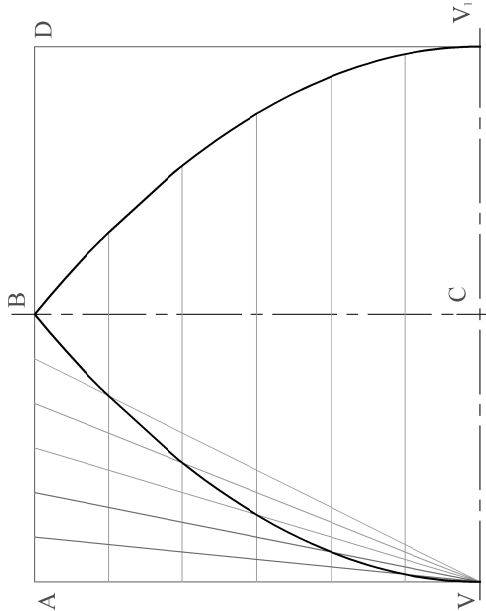
Total = 45

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

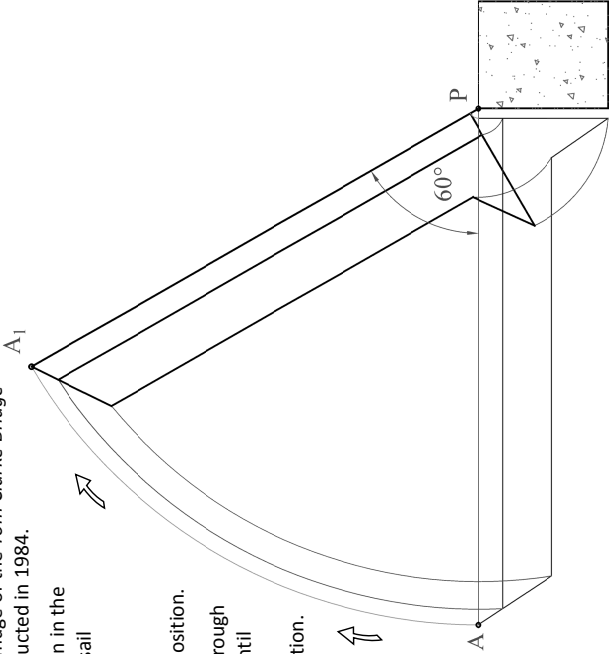
- A-1.** The 3D graphic below shows three steps which form the entrance to a home.
The drawing on the right shows the plan and a partially completed perspective view of similar steps.
Complete the perspective drawing of the steps.



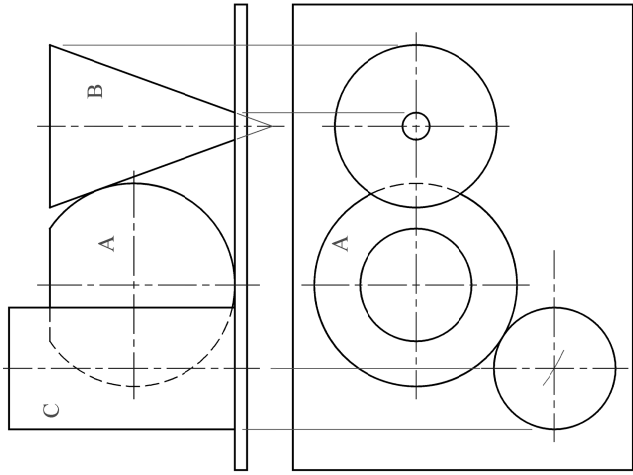
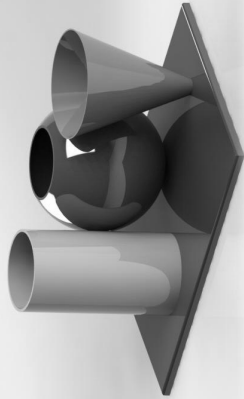
- A-2.** *Glamping* or glamorous camping appeals to those seeking adventure in their holiday.
The graphic below shows an image of a glamping hut which is based on two semi-parabolas.
In the given drawing a portion of one parabola is inscribed in the rectangle **VABC**. Its vertex is located at **V**.
(a) Locate the remaining points on the semi-parabola in the rectangle **VABC** and complete this curve.
(b) The second semi-parabola, in rectangle **V₁DBC**, is a mirror image of the first parabola, with **BC** as the axis of symmetry.
Draw the second parabola.



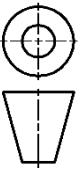
- A-3.** The 3D graphic below shows an image of the *Tom Clarke Bridge* in Dublin. This bridge was constructed in 1984.
The bridge can be raised as shown in the graphic to enable large boats to sail further up the river Liffey.
The elevation of the bridge is shown on the right in its closed position.
The bridge is rotated upwards through an angle of 60° , about point **P**, until point **A** reaches **A₁**.
Draw the bridge in the open position.

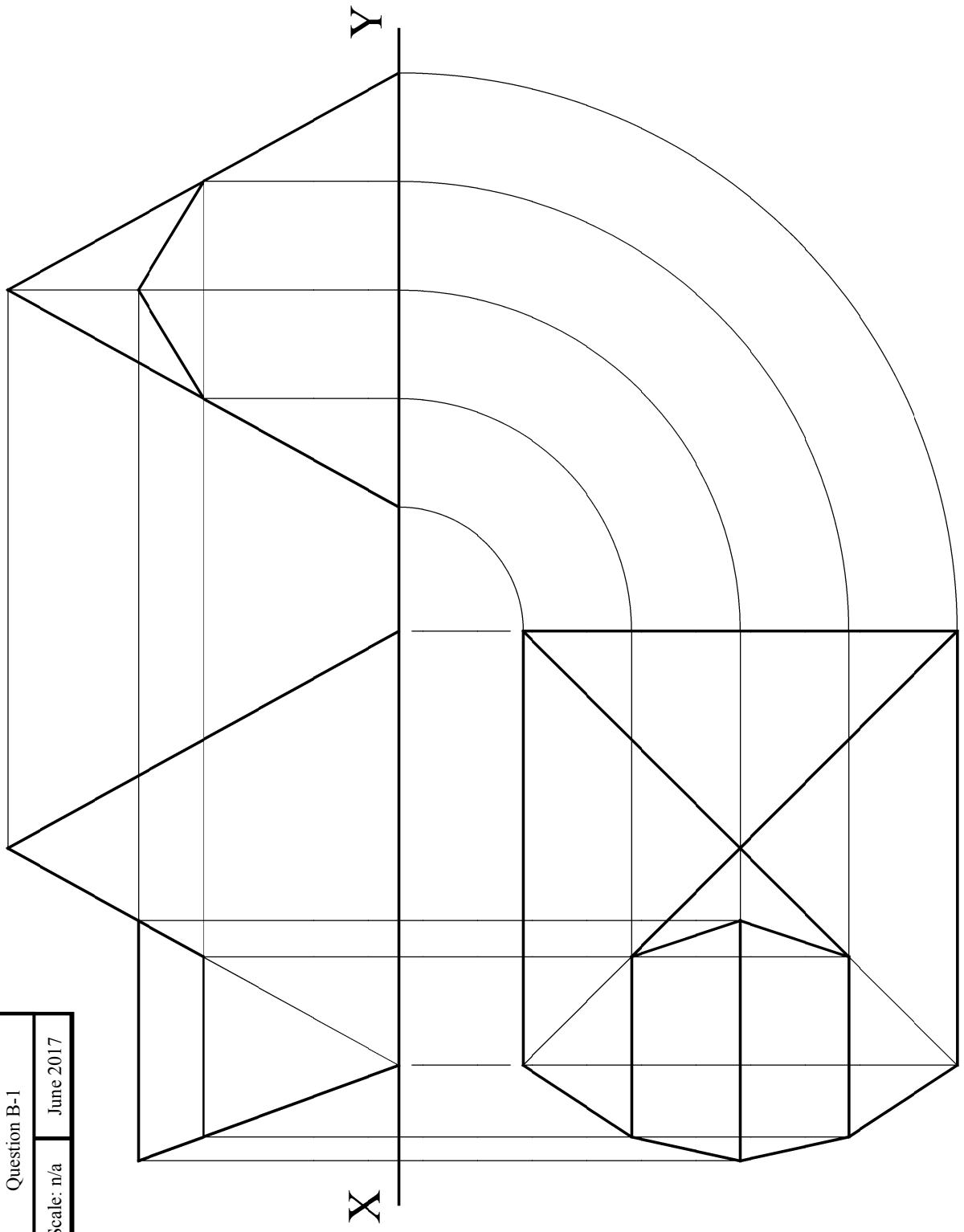


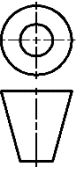
- A-4.** A *Desk Tidy*, in the form of geometrical objects which are in mutual contact, is shown in the 3D graphic below. The solids rest on a rectangular base.
The drawing on the right shows the elevation and partially completed plan of the desk tidy. It consists of a cylinder, a sphere and a cone. The sphere and cone have been truncated as shown.

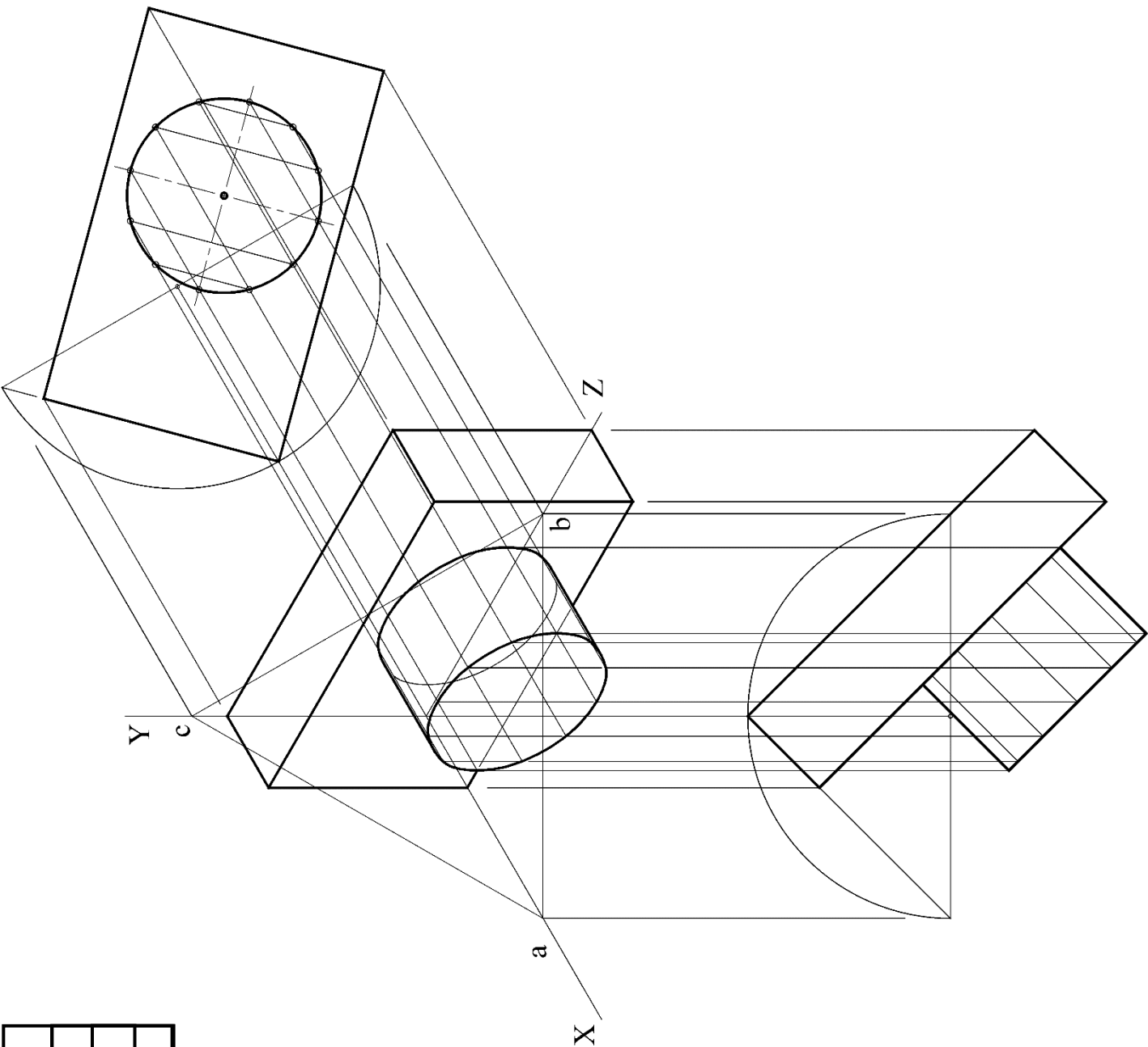


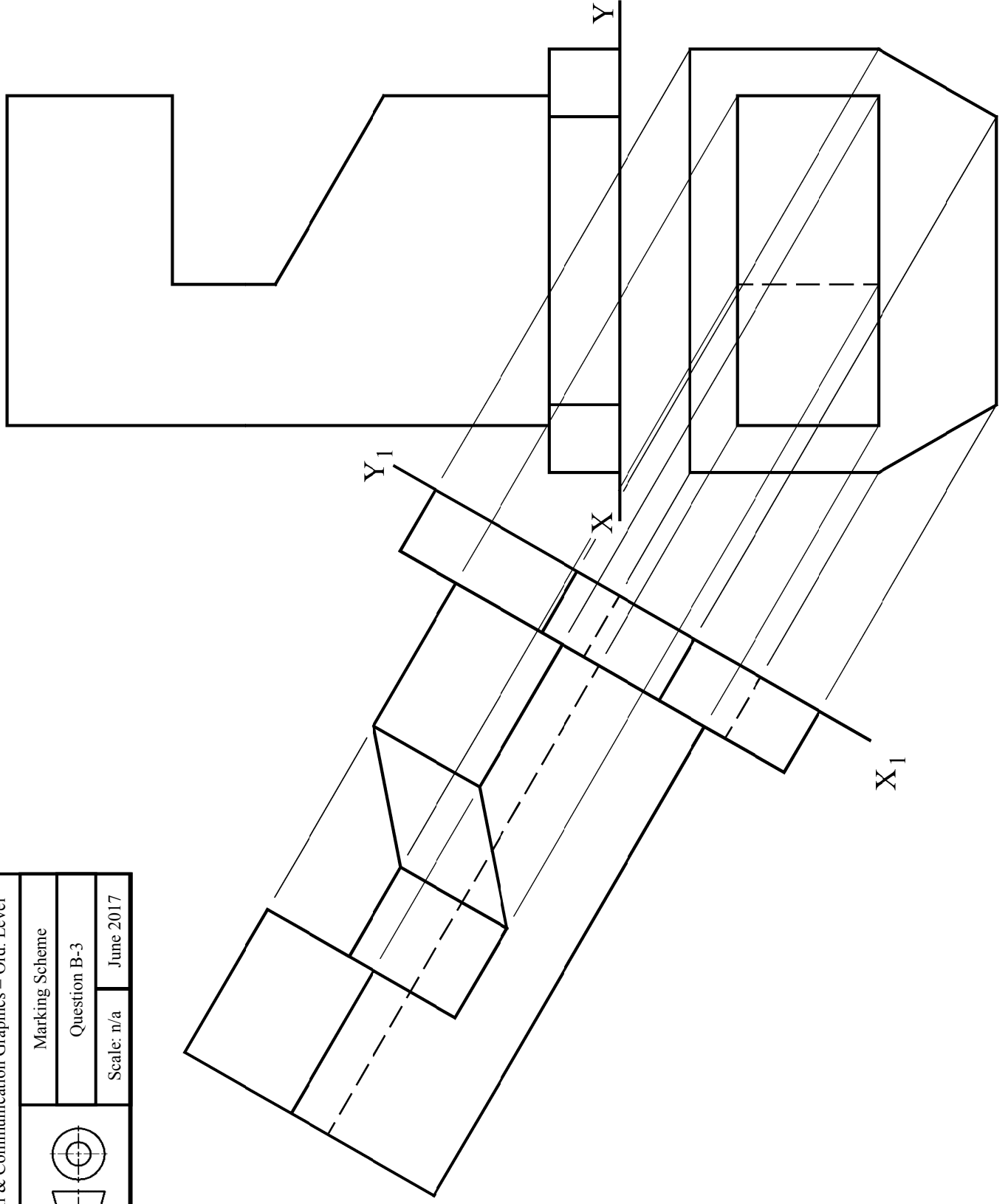
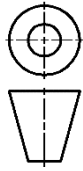
- (a)** Draw the plan of the truncated cone **B**.
(b) Draw the plan of cylinder **C**.

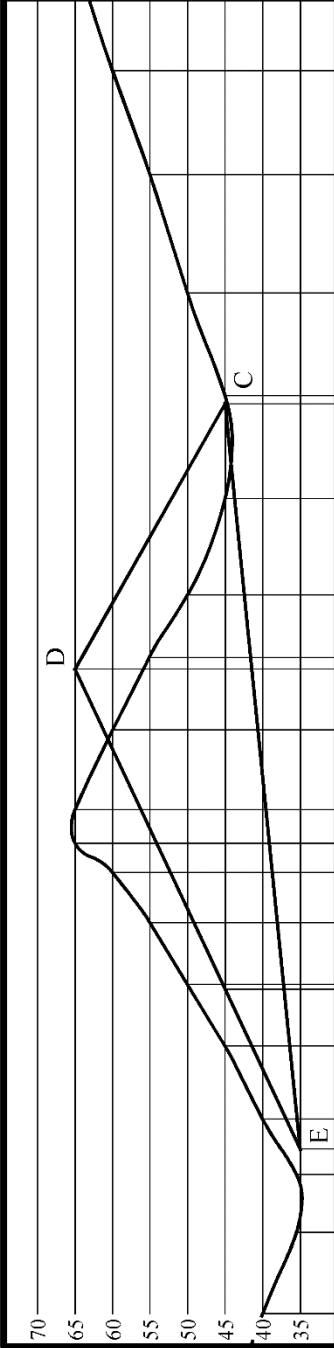
Design & Communication Graphics – Ord. Level		
	Marking Scheme	
	Question B-1	
Scale: n/a	June 2017	



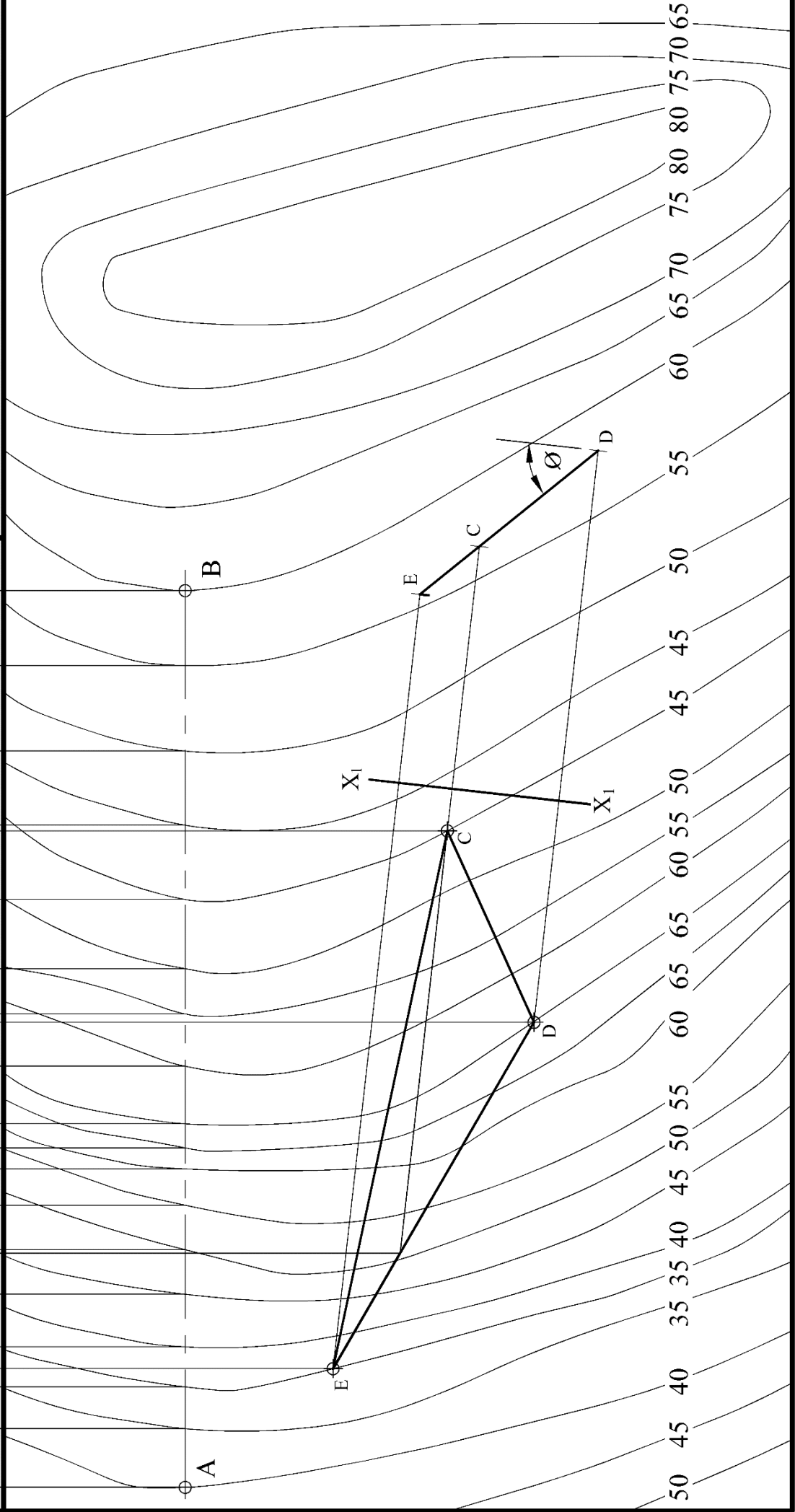
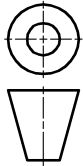
Design & Communication Graphics – Ord. Level		
	Marking Scheme	
	Question B-2	
Scale: n/a	June 2017	

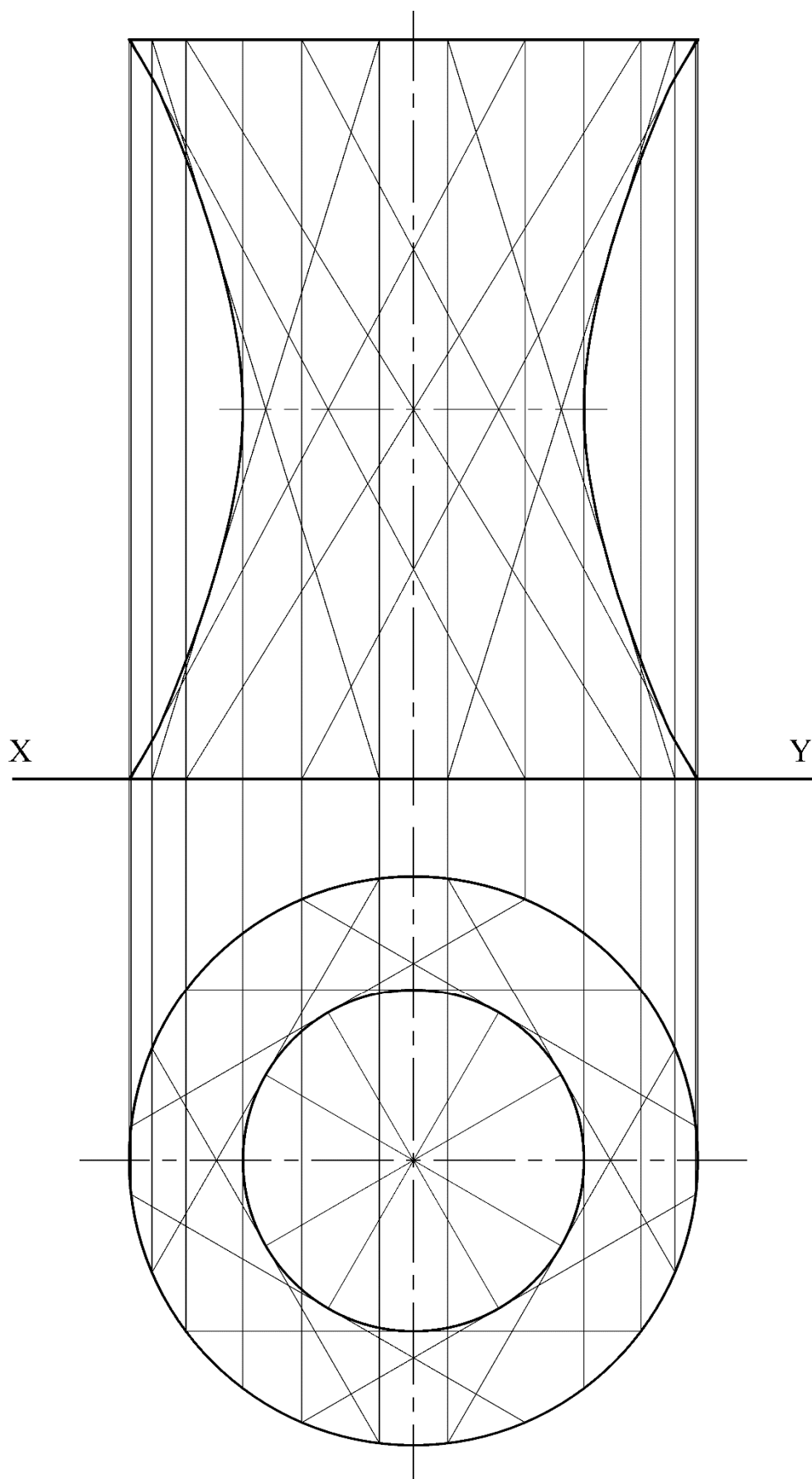
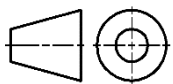


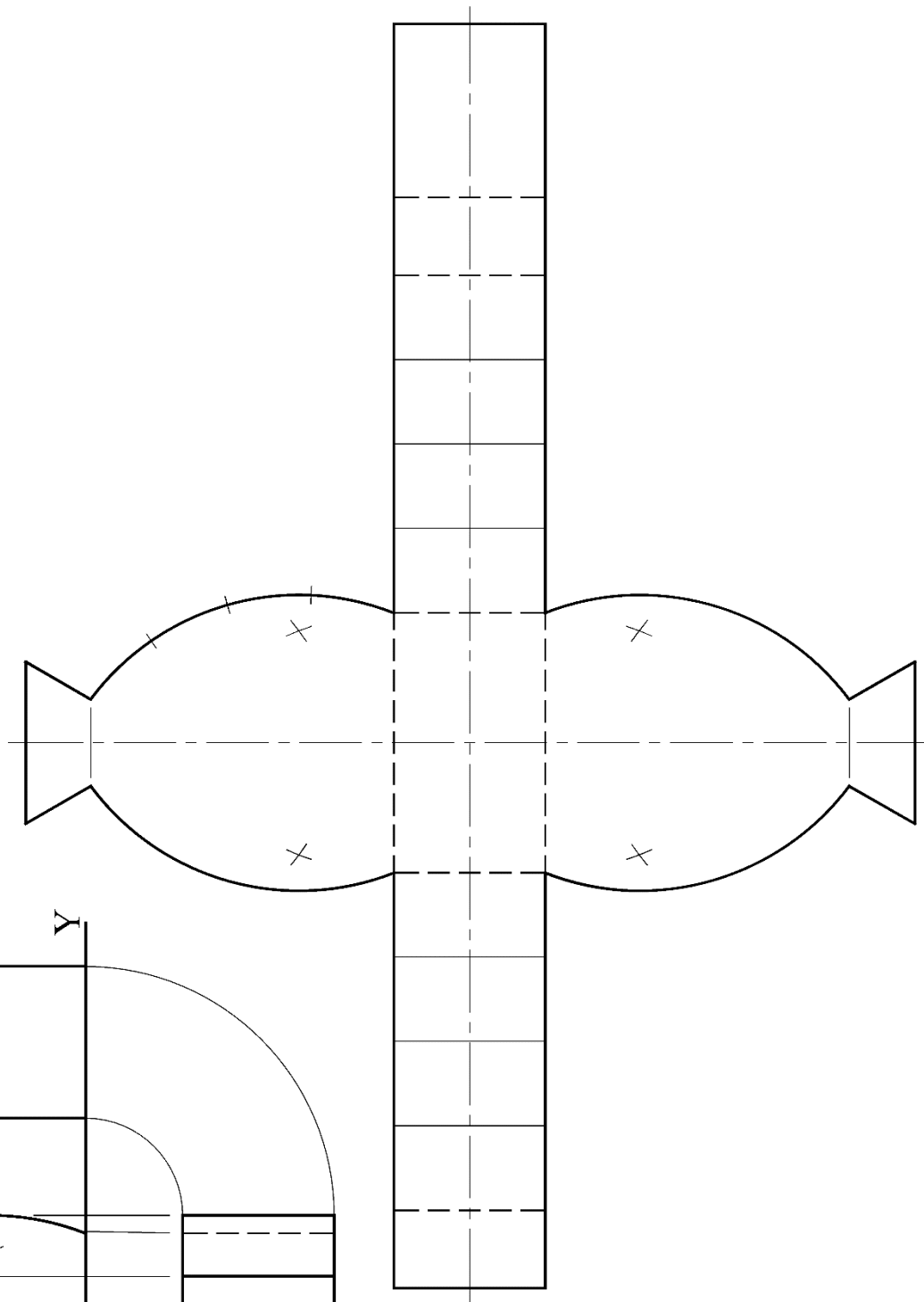
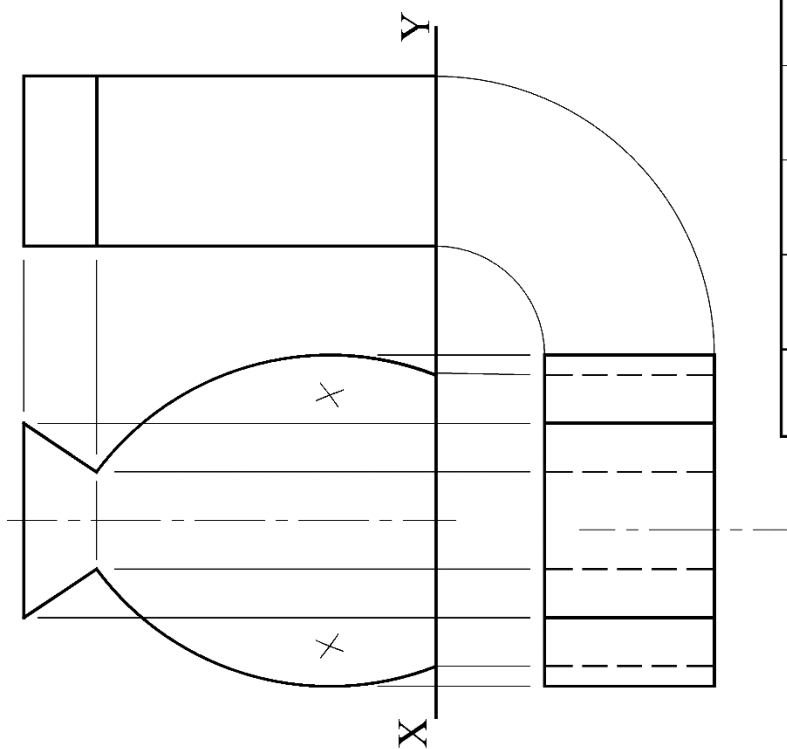
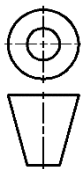


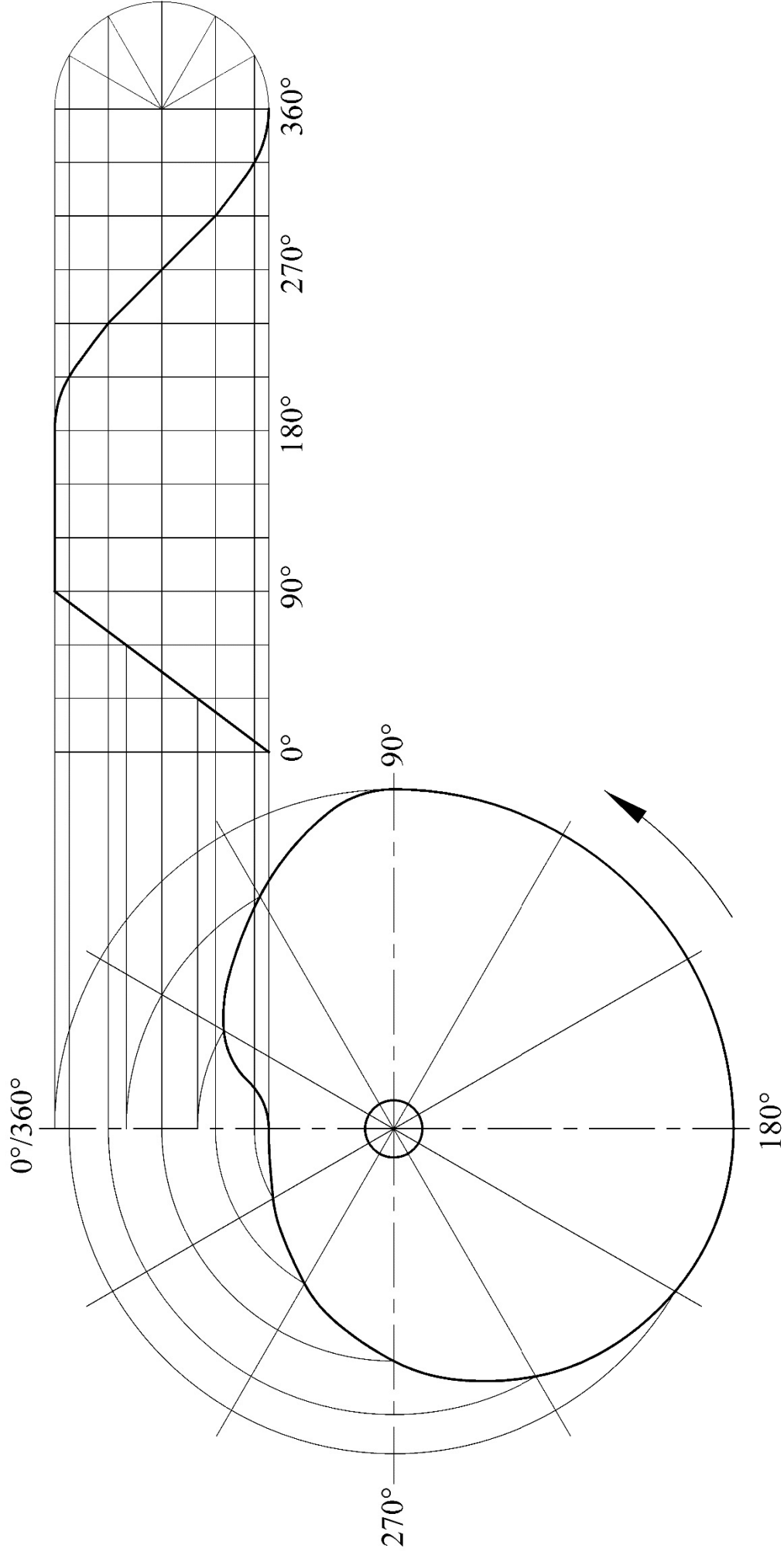


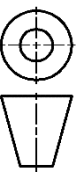
Design & Communication Graphics – Ord. Level	
Marking Scheme	
Question C-1	
Scale: n/a	June 2017

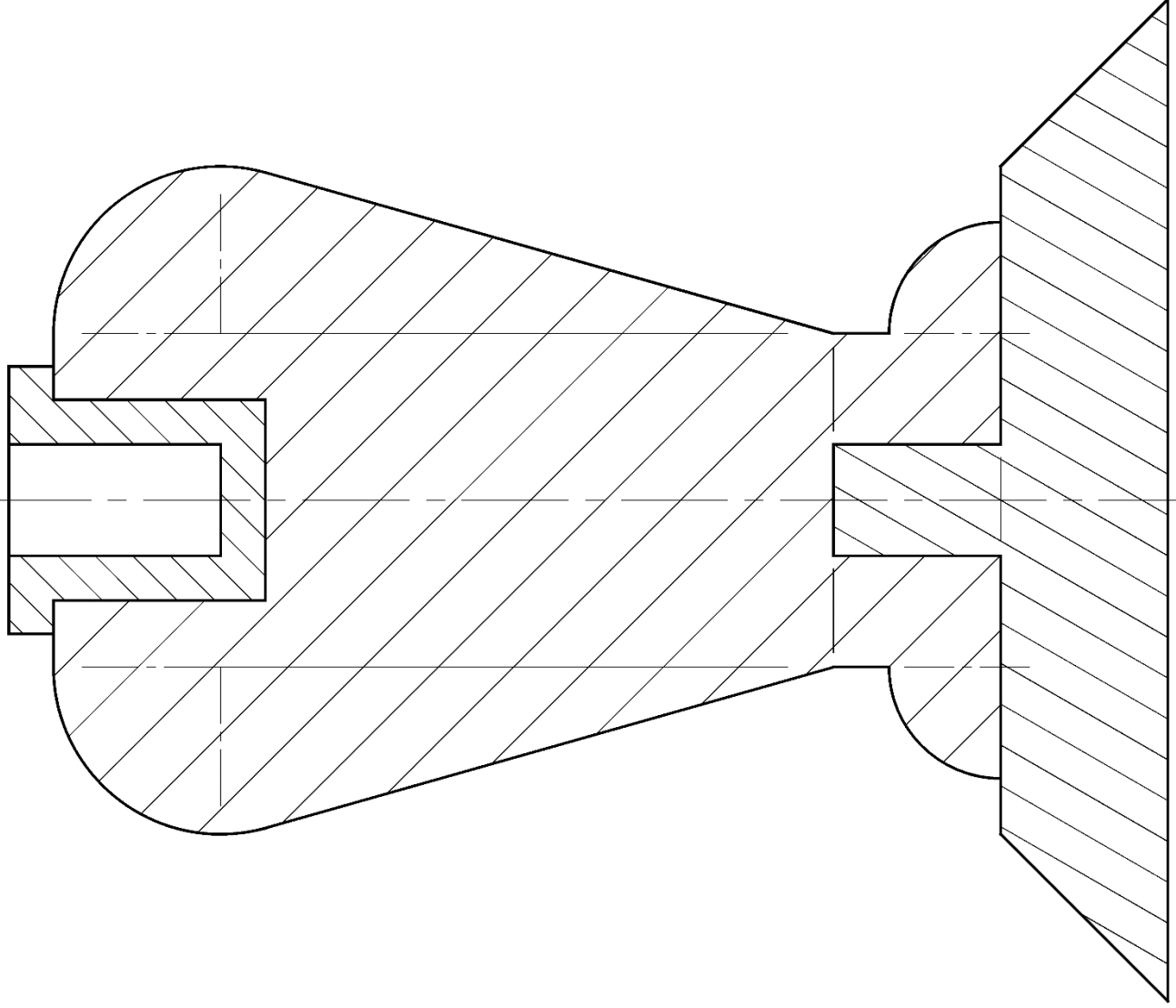


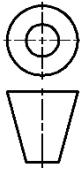






Design & Communication Graphics – Ord. Level			
		Marking Scheme	
		Question C-4	
Scale: n/a		June 2017	



Design & Communication Graphics – Ord. Level	
	Marking Scheme
	Question C-5
Scale: n/a	June 2017



Design and Communication Graphics

Student Assignment - Ordinary Level

Assessment Sheet 2017

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
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		

