



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2024

Marking Scheme

Design and Communication Graphics

Higher 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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Leaving Certificate Examination 2024



Design and Communication Graphics

Higher Level

Marking Scheme

Note: Other valid solutions are acceptable and are marked accordingly.

Question A-1**MARKS****(a) Complete the perspective drawing of the stand (18)**

- (i) Completion of back of stand – vertical surface..... 6
- (ii) Completion of back of stand – inclined surface..... 3
- (iii) Locate side profile of shelf on perspective 5
- (iv) Completion of the shelf and stand..... 4

(b) Determine and indicate the overall height of the stand (2)

- (v) Correct height of stand indicated in millimetres 2

Total = 20**Question A-2****MARKS****(a) Complete the elevation of stand (16)**

- (i) Traces of required cutting planes parallel to **HT** in plan..... 3
- (ii) Projections of intersection with plan of **VT** to elevation 2
- (iii) Locate points in elevation 6
- (iv) Complete the elevation 4
- (v) Hidden detail 1

(b) Determine and indicate angle of inclination of top surface to HP (4)

- (vi) Projections to locate inclination of surface to **HP** 3
- (vii) Indicate correct angle of inclination 1

Total = 20

Question A-3**MARKS****(a) Shortest horizontal distance between skew lines (19)**

- (i) Draw line from **D** parallel to **AB** (or **B** parallel to **CD**) in elevation 3
- (ii) Draw line from **D** parallel to **AB** (or **B** parallel to **CD**) in plan 3
- (iii) Determine plan of horizontal line on either plane 3
- (iv) X_1Y_1 perpendicular to plan of horizontal line..... 2
- (v) Projections of **AB** and **CD** on X_1Y_1 2
- (vi) X_2Y_2 perpendicular to X_1Y_1 line..... 2
- (vii) Projections of **AB** and **CD** on X_2Y_2 2
- (viii) Projections of required shortest horizontal distance to plan and elevation 2

(b) True length between points A and C (1)

- (ix) True length between points **A** and **C** indicated in millimetres 1

Total = 20**Question A-4****MARKS****(a) Complete plan of solids (10)**

- (i) Projection of centre of sphere to plan 2
- (ii) Required construction in elevation to determine centre of sphere 3
- (iii) Locate centre point of sphere in plan 3
- (iv) Draw plan of sphere using correct radius 2

(b) Plan and elevation of sphere at point P (10)

- (v) Locate point **P** on extreme generator in elevation 3
- (vi) Construction to determine centre of sphere in elevation (1,2)..... 2
- (vii) Locate centre point of sphere in plan 2
- (viii) Draw plan and elevation of sphere 3

Total = 20

Question B-1**MARKS**

- (a) Plan and Elevation of studio desk (20)**
- (i) Draw given outline plan of the inverted square based pyramid 12
- (ii) Draw given elevation of the inverted square based pyramid..... 8
- (b) Dihedral Angle between surfaces A and B (20)**
- (iii) X_1Y_1 parallel to line of intersection 6
- (iv) Projection of planes and line of intersection on new X_1Y_1 4
- (v) New X_2Y_2 perpendicular to line of intersection 5
- (vi) Projection of planes as lines and indicating dihedral angle..... 5
- (c) Inclination of surface B to horizontal plane and true shape of surface B (13)**
- (vii) X_1Y_1 perpendicular to strike line on surface **B** 3
- (viii) Projection of surface **B** to auxiliary view 3
- (ix) Determine the true inclination of surface **B** to horizontal plane 2
- (x) X_2Y_2 line parallel to edge view of surface **B** 2
- (xi) Projection of true shape of surface **B** to auxiliary view 3
- (d) Elevation and Plan of a line inclined at 50° to HP from point P (7)**
- (xii) Establish 50° inclination from **P** to HP in elevation 2
- (xiii) Projections of true angle in plan view..... 2
- (xiv) Determine the projections of the required line in plan..... 2
- (xv) Determine the projections of the required line in elevation..... 1

Total = 60

Question B-2

	MARKS
(a) Draw given surface development of salad box (16)	
(i) Base of the salad box	4
(ii) Sides of the salad box.....	8
(iii) Top of the salad box.....	4
 (b) Draw the elliptical plastic window (18)	
(iv) Establish major axis of ellipse	2
(v) Locate point P	2
(vi) Determine the length of the minor axis of the ellipse	3
(vii) Construction to determine points on ellipse	8
(viii) Draw elliptical curve(any = 1).....	3
 (c) Draw elevation and plan of salad box (26)	
(ix) Determine the height of the box in elevation	2
(x) Draw outline of elevation.....	4
(xi) Determine points on elliptical curve in elevation	4
(xii) Draw elevation curve(any = 1).....	2
(xiii) Draw outline of the plan	6
(xiv) Draw the elliptical curve on top surface in plan	3
(xv) Determine points on elliptical curve on front surface in plan	2
(xvi) Draw curve in plan(any = 1)	2
(xvii) Hidden detail	1
Total =	60

Question B-3

	MARKS
(a) Axonometric axes and scalene triangle (8)	
(i) Draw axonometric axes X and Y orientated as shown (1,1)	2
(ii) Draw scalene triangle abc	4
(iii) Draw Z axis	2
(b) Draw plan and end elevation, orientated as shown (23)	
(iv) Correct development of YZ plane in required orientation	6
(v) Draw end elevation as given	6
(vi) Correct development of XZ plane in required orientation	6
(vii) Draw plan as given	5
(c) Complete the trimetric projection of the puzzle stand (25)	
(viii) Projections from end elevation and plan.....	4
(ix) Draw axonometric of triangular prism.....	7
(x) Determine points on top circular curve in axonometric view	5
(xi) Draw top circular curve(Any = 1)	2
(xii) Determine points on curve of intersection with inclined surface	3
(xiii) Draw curved line of intersection(Any = 1)	2
(xiv) Complete cylindrical holder	2
(d) Complete the trimetric projection of the sphere (4)	
(xv) Locate and draw sphere	4
Total =	60

Question C-1**MARKS****(a) Earthworks on rafting course (39)****Earthworks between A and B (Level) – Embankment**

- (i) Draw parallel lines at 7.5 mm intervals 4
- (ii) Identify intersections with contours and draw curves 4

Earthworks between A and B (Level) – Cutting

- (iii) Draw parallel lines at 10 mm intervals 4
- (iv) Identify intersections with contours and draw curves 4

Earthworks on curve section between B and C (Level) – Cutting

- (v) Draw parallel arcs at 10 mm interval 3
- (vi) Identify intersections with contours and draw curve 3

Earthworks between C and D (Rising) - Cutting

- (vii) Establish 55 m height on course 2
- (viii) Draw required 10 mm arc at new position and draw tangent 3
- (ix) Draw parallel lines at 10 mm intervals 3
- (x) Identify intersections with contours and draw curve 3

Earthworks between C and D (Rising) - Embankment

- (xi) Draw required 7.5 mm arc at C and draw tangent 2
- (xii) Draw parallel lines at 7.5 mm intervals 2
- (xiii) Identify intersections with contours and draw curve 2

(b) Profile on EF (13)

- (xiv) Measure and draw height lines at 5 mm intervals 2
- (xv) Projections from intersection between line EF and contours 2
- (xvi) Draw curved profile through contours 4
- (xvii) Draw intersection with course cuttings and level rafting course 5

(c) Height for zipline support pole above point F (8)

- (xviii) Locate tower height at E 2
- (xix) Draw circle radius 10 m above highest position and draw tangent 4
- (xx) Determine and indicate required height for pole at F 2

Total = 60

Question C-2**MARKS****(a) Draw given elevation including elements (18)**

- (i) Draw parallelogram **ABCD** 6
- (ii) Locate and draw the elements of hyperbolic paraboloid 6
- (iii) Complete elevation outline of net..... 6

(b) Project end view of surface ABCD (10)

- (iv) Draw outline elements of hyperbolic paraboloid 4
- (v) Locate and draw inner elements 6

(c) Complete end view by extending elements (20)

- (vi) Extend elements in elevation 4
- (vii) Establish points in end view by extending elements..... 8
- (viii) Construction to determine point **P** 2
- (ix) Construction to determine an intermediate point in end view 3
- (x) Draw required curve **AP** (any = 1) 3

(d) Curvature of the surface through points D and B (12)

- (xi) Use of line joining **B** and **D** in elevation 2
- (xii) Projections from intersections with elements in elevation to plan 3
- (xiii) Establish widths in plan 4
- (xiv) Draw required curvature(any = 1) 3

Total = 60

Question C-3**MARKS****(a) Draw the given plan and elevation of the chimena (23)**

- (i) Draw plan of chimena body and chimney 4
- (ii) Establish position and length of legs in plan 3
- (iii) Draw the elevation outline of the chimena 5
- (iv) Locate centre for opening and draw opening 6
- (v) Draw the legs in elevation and locate intersection points in plan 5

(b) Surface development of conical surface A (13)

- (vi) Location of apex on development 2
- (vii) Transfer longest generator length to surface development 2
- (viii) Establish 12 elements in surface development 4
- (ix) Transfer cut generator length to surface development 2
- (x) Complete the surface development 3

(c) Surface development of cylindrical surface B (19)

- (xi) Establish overall length and height in surface development 5
- (xii) Projection of heights of opening to surface development 2
- (xiii) Establish the length and position of the opening in surface development 4
- (xiv) Determine the development of the arc at the top of the opening 5
- (xv) Complete the surface development 3

(d) Determine and indicate inclination of leg to HP (5)

- (xvi) Use of appropriate method to determine the inclination of leg to HP 2
- (xvii) Determine and indicate the inclination of leg to HP 3

Total = 60

Question C-4**MARKS****(a) Plot the epicycloid (32)**

- (i) Draw given arc **PA** and circle **C** 6
- (ii) Divide the circle **C** into a number of equal parts (12 min.)..... 4
- (iii) Divide the arc **PA** into a corresponding equal number of parts 6
- (iv) Locate points on the locus as the circle rolls along the arc..... 12
- (v) Draw required epicycloid(any = 1) 4

(b) Archimedean spiral of a spiral galaxy (28)

- (vi) Draw the given diagram (pts **O**, **A** and **B**) 4
- (vii) Determine the length of radius vector at 30° 4
- (viii) Stepping of radius vector length to determine point **C**..... 4
- (ix) Establish 12 equal divisions (30° divisions) 4
- (x) Establish corresponding intermediate radii on angular divisions 8
- (xi) Draw required Archimedean spiral (any = 1) 4

Total = 60

Question C-5**MARKS****Sectional elevation (60)****Assembly (6)**

- (i) Relative positioning of main components 6

Main Body (12)

- (ii) Complete outline of main body 8
 (iii) Inner detail of the main body 4

Ratchet Pulley (12)

- (iv) Outline of the pulley 6
 (v) Inner detail of the pulley..... 6

Washers (2)

- (vi) Outline of two washers on axle (1,1) 2

Axle Bolt (4)

- (vii) Required detail of the axle bolt 4

Pin (2)

- (viii) Outline of the pin in axle 2

Handle (8)

- (ix) Outline of vertical arm of handle..... 4
 (x) Inner detail..... 2
 (xi) Horizontal handle..... 2

Pawl (3)

- (xii) Representation of the pawl 3

M6 x 20 Set Screws (4)

- (xiii) Representation of the set screw in axle 2
 (xiv) Representation of the set screw in pawl 2

Plain nut (1)

- (xv) Representation of the nut 1

Completion of drawing (6)

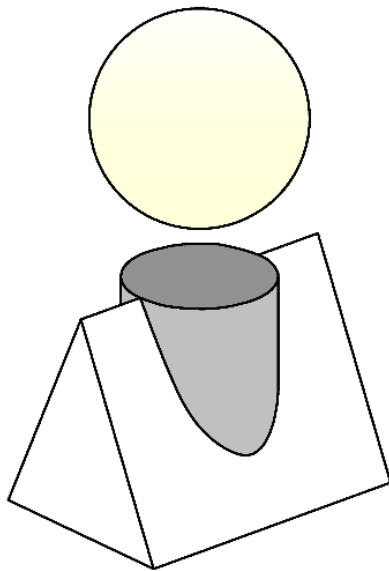
- (xvi) Presentation, hatching and centrelines 6

Total = 60



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Leaving Certificate Examination 2024



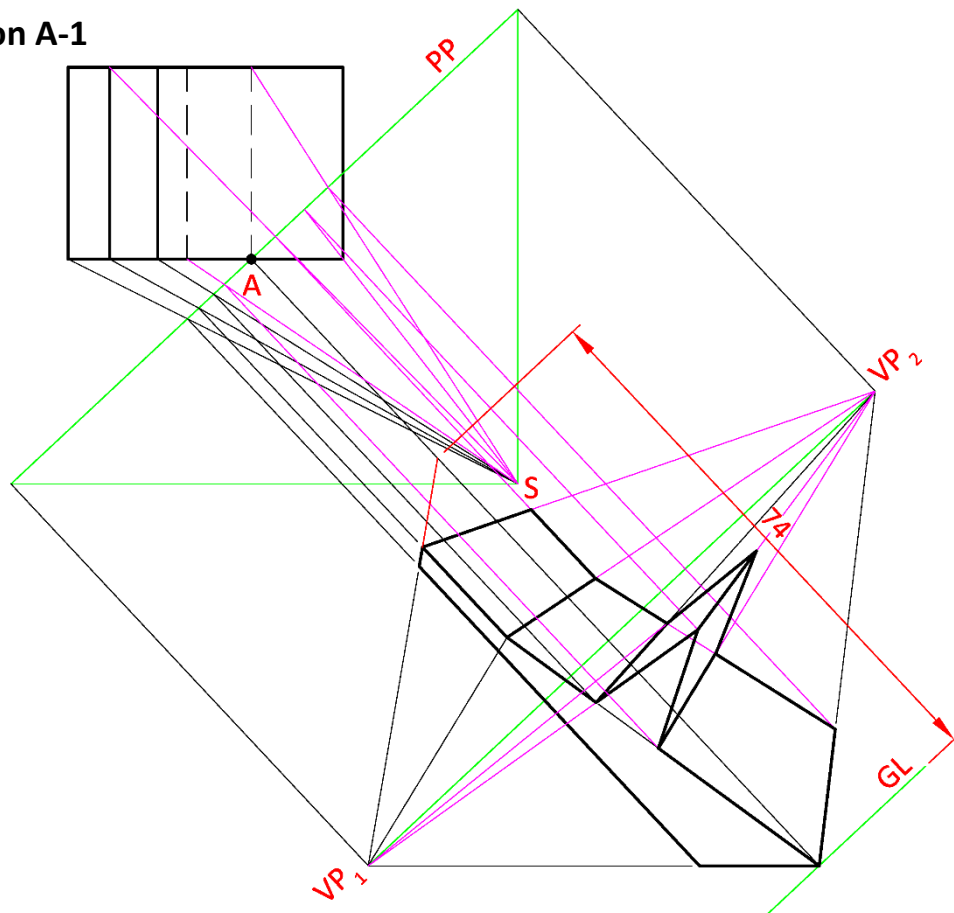
Design and Communication Graphics

Higher Level

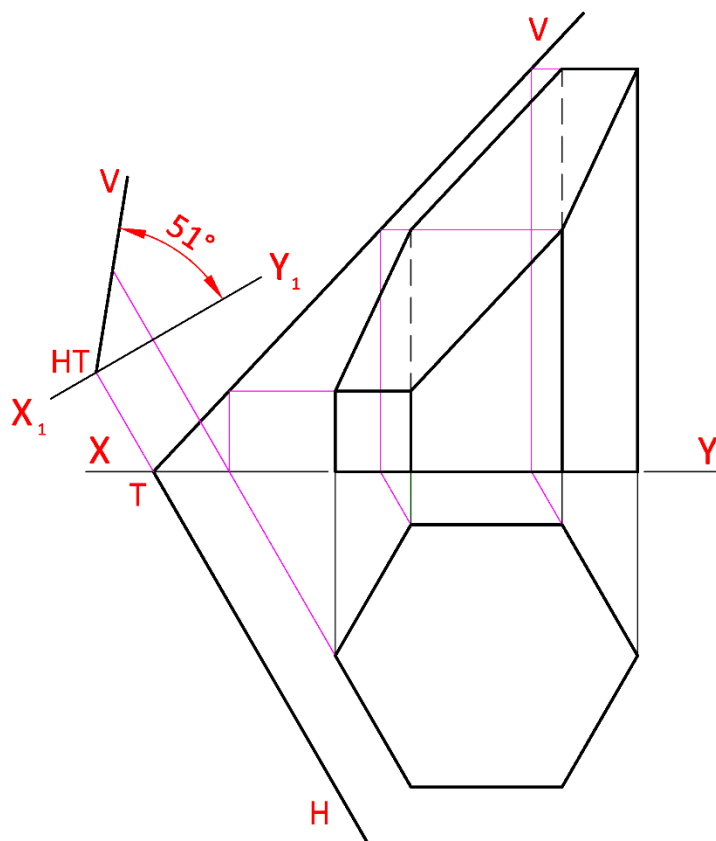
Sample Solutions

Note: Other valid solutions are acceptable and are marked accordingly.

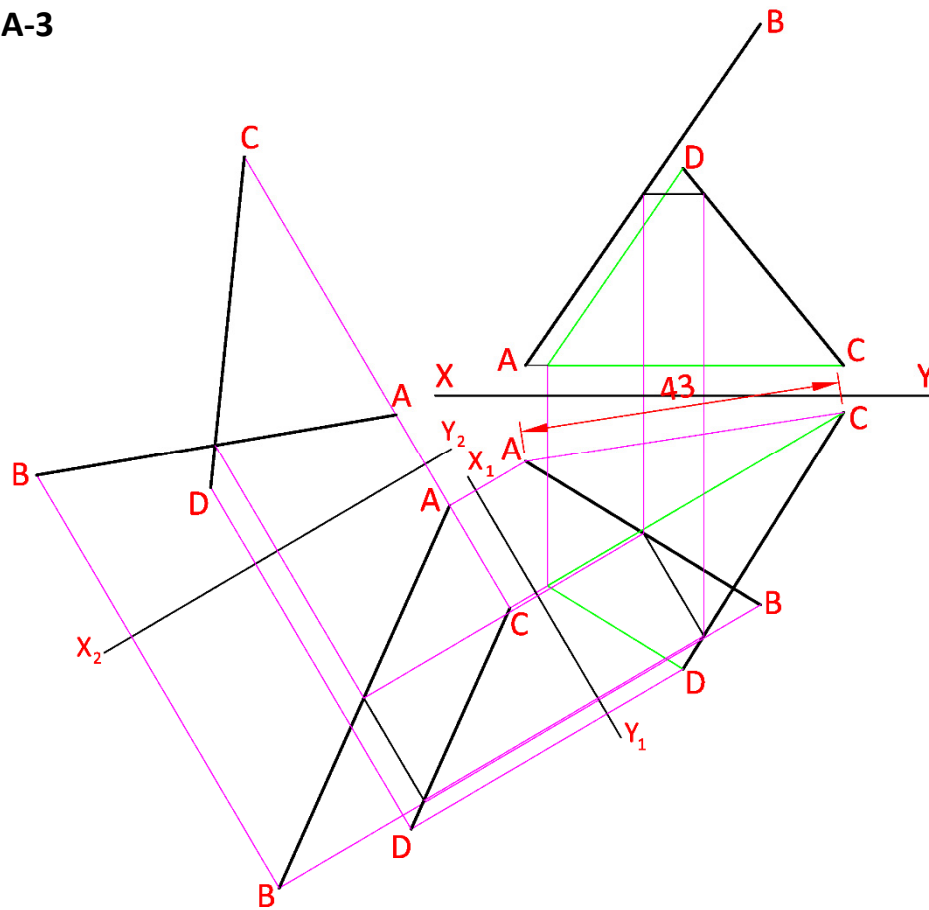
Question A-1



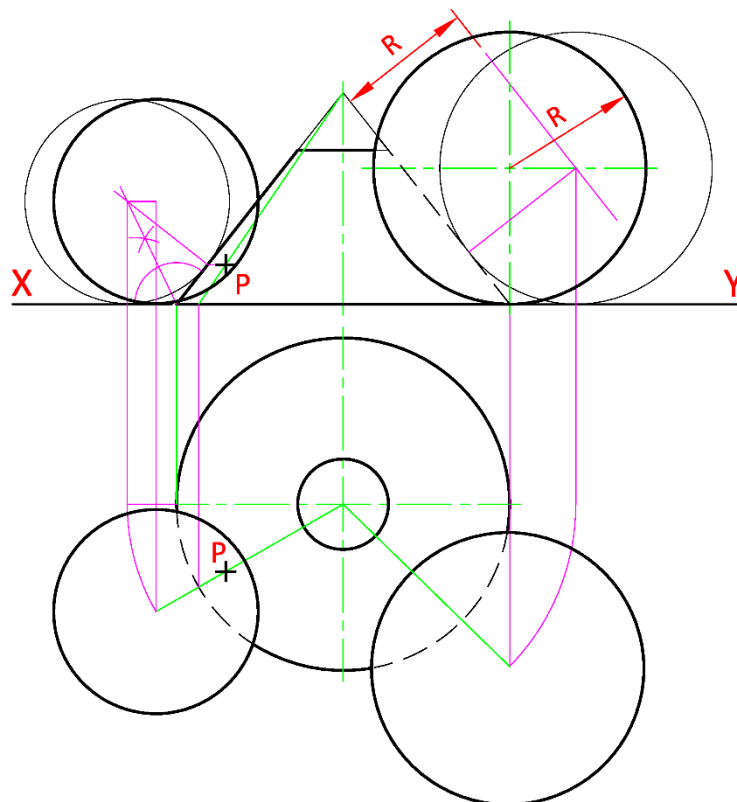
Question A-2

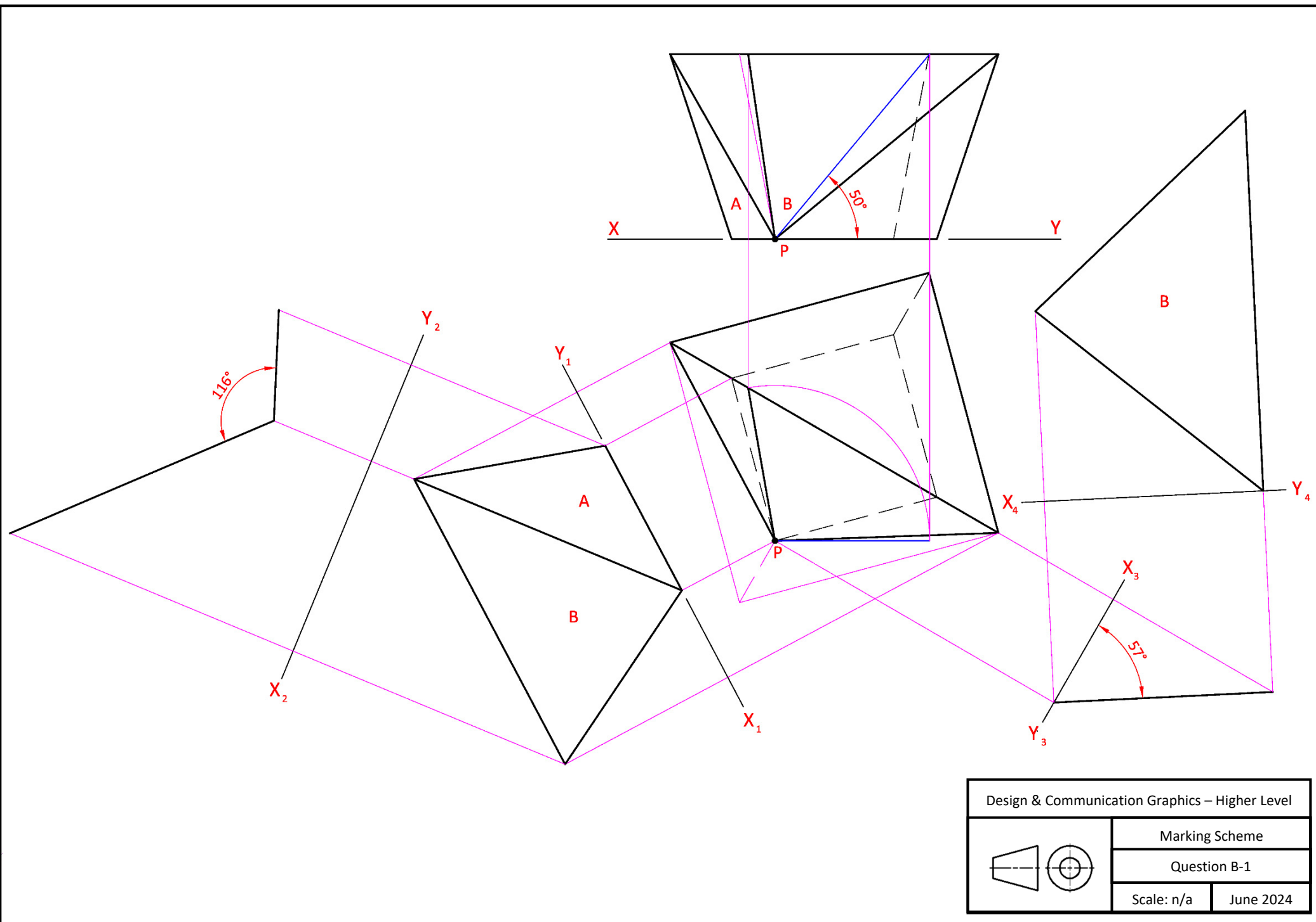


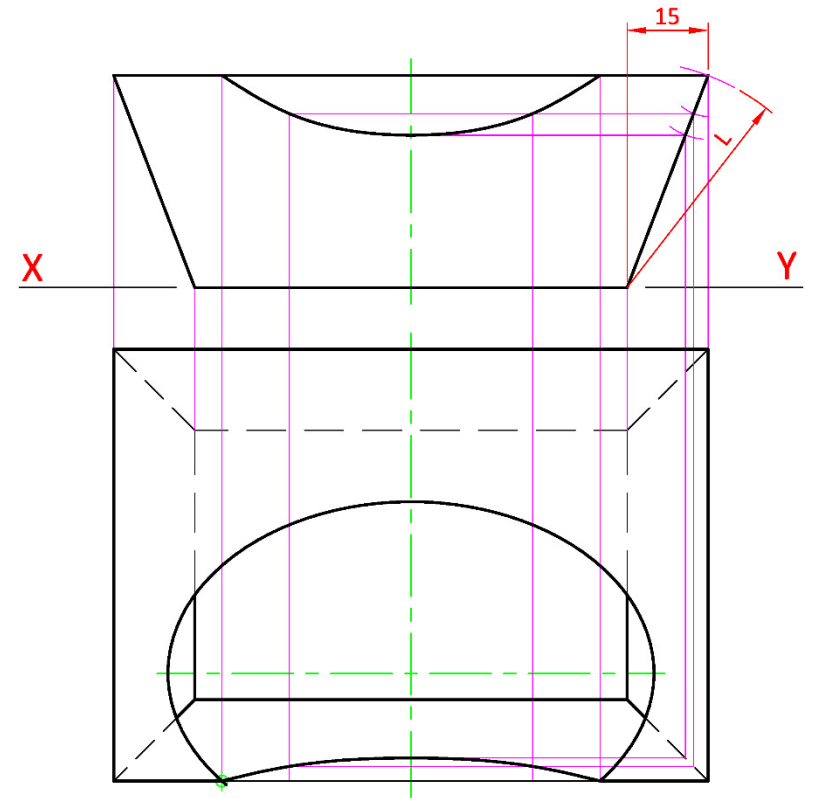
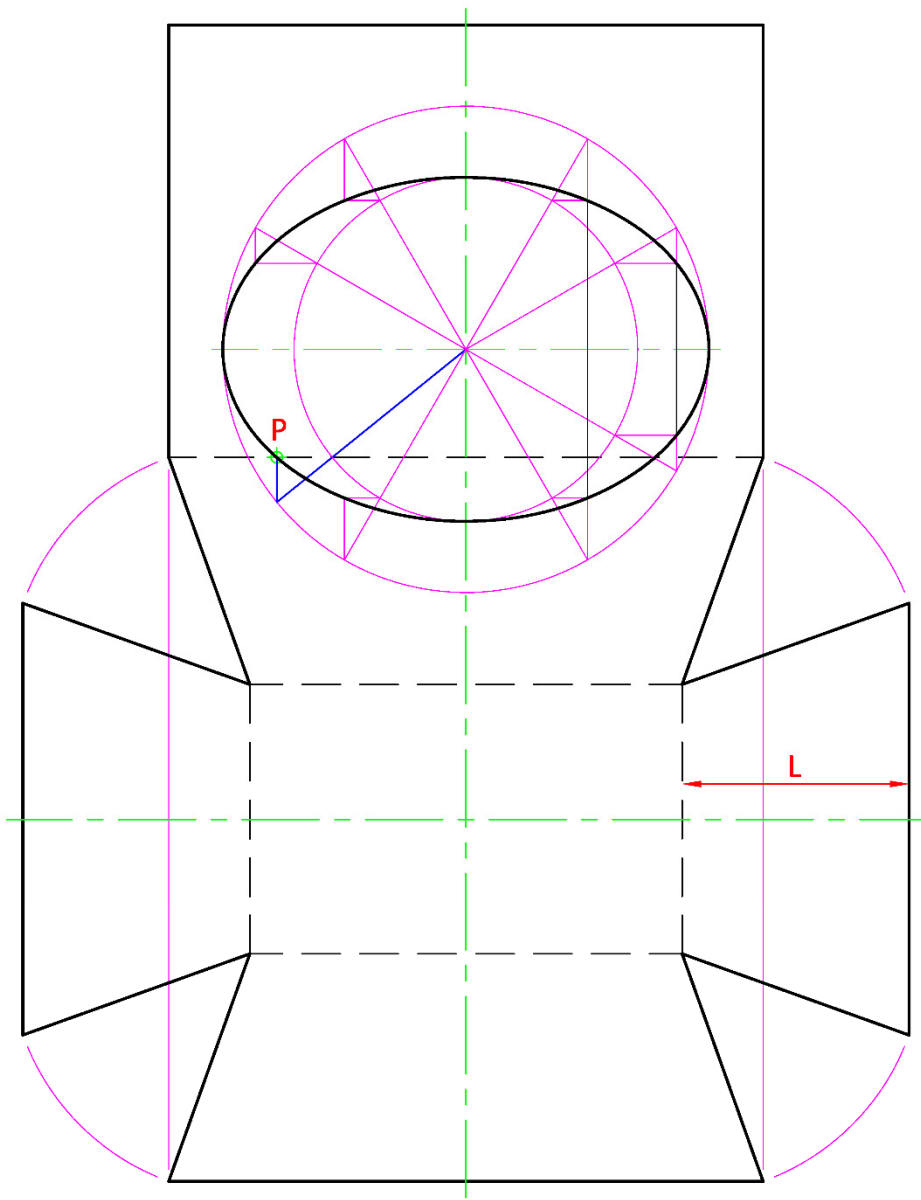
Question A-3



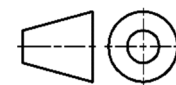
Question A-4







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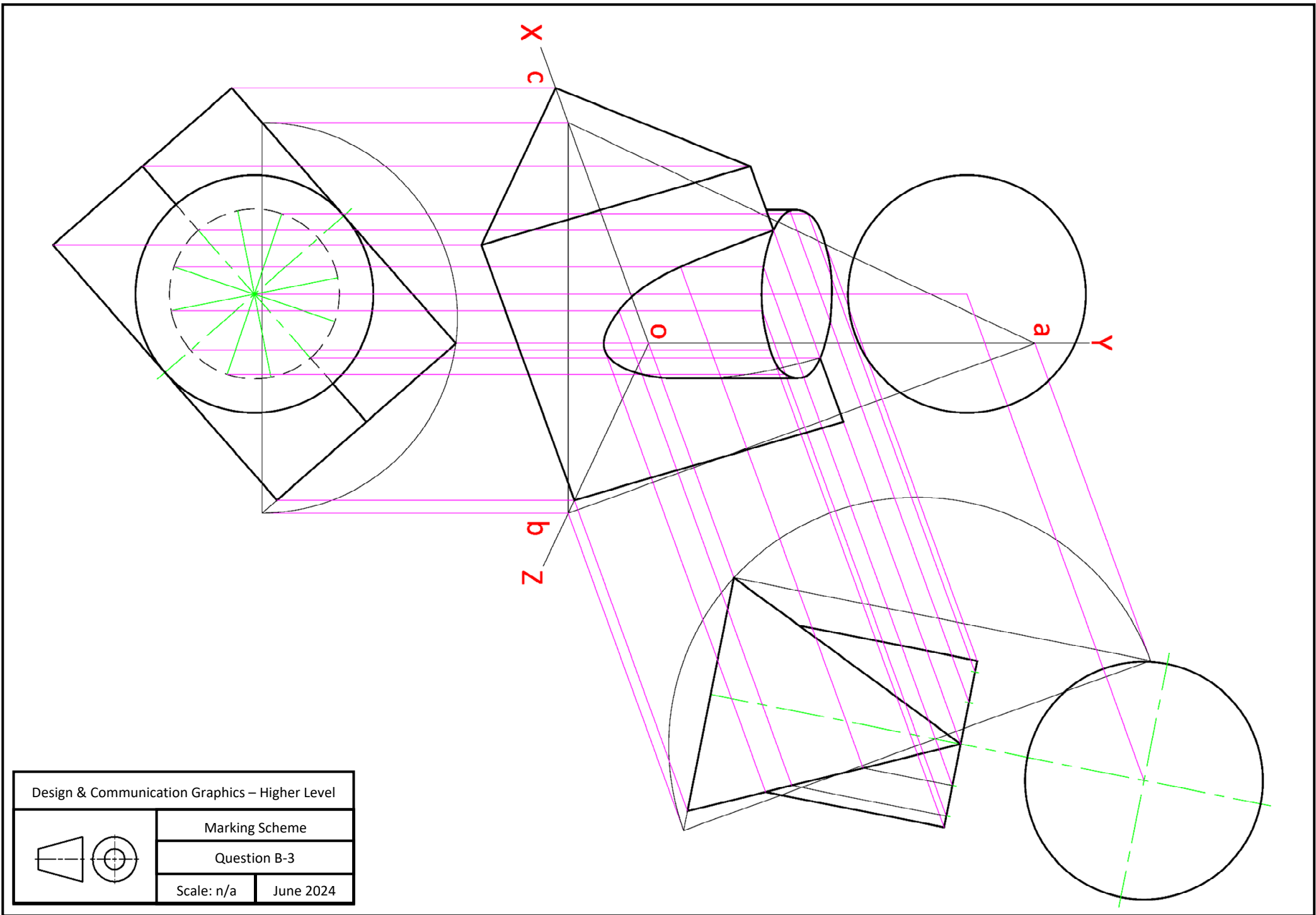


Marking Scheme

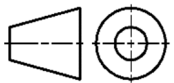
Question B-2

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Design & Communication Graphics – Higher Level

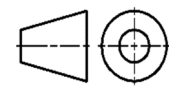
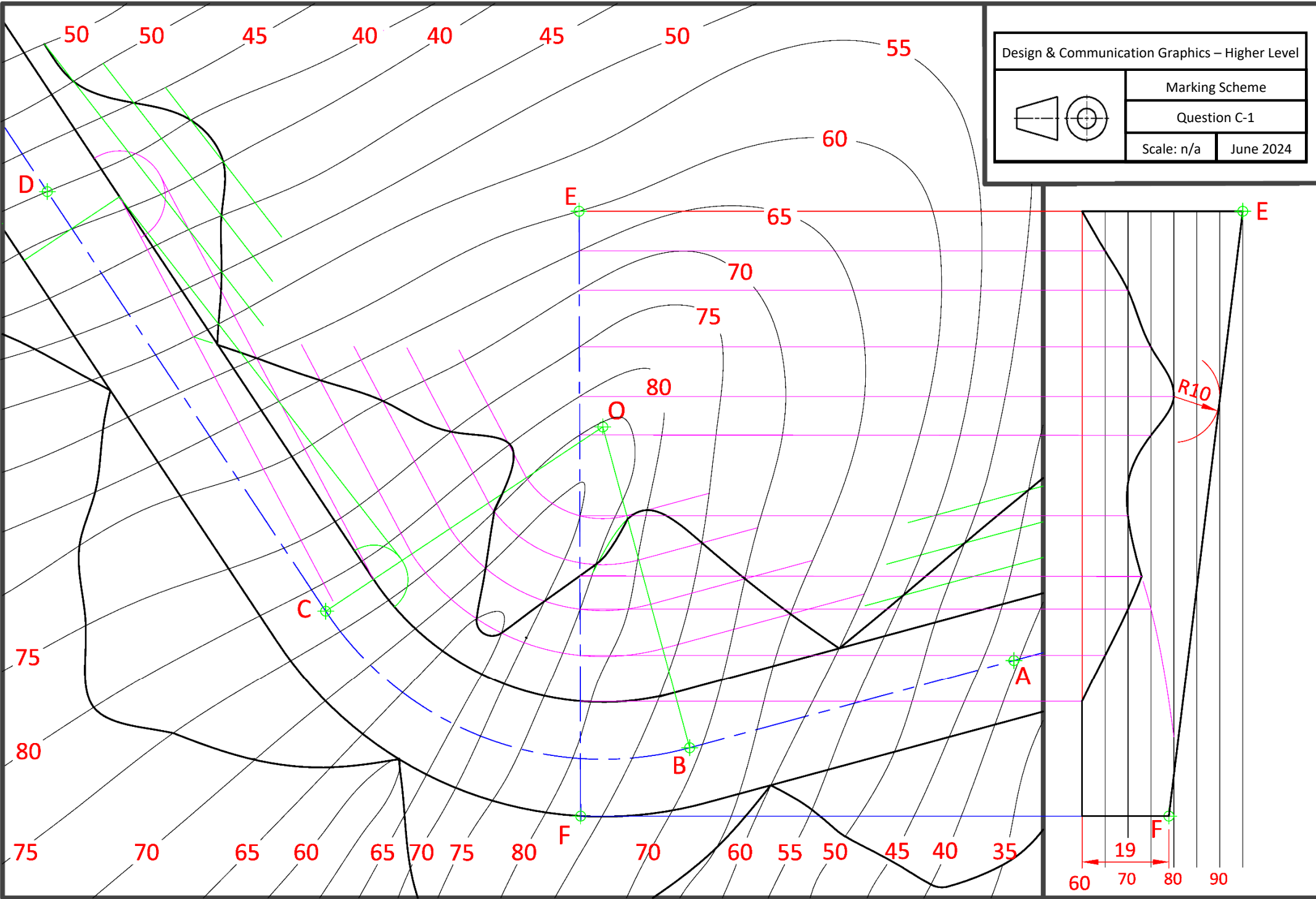


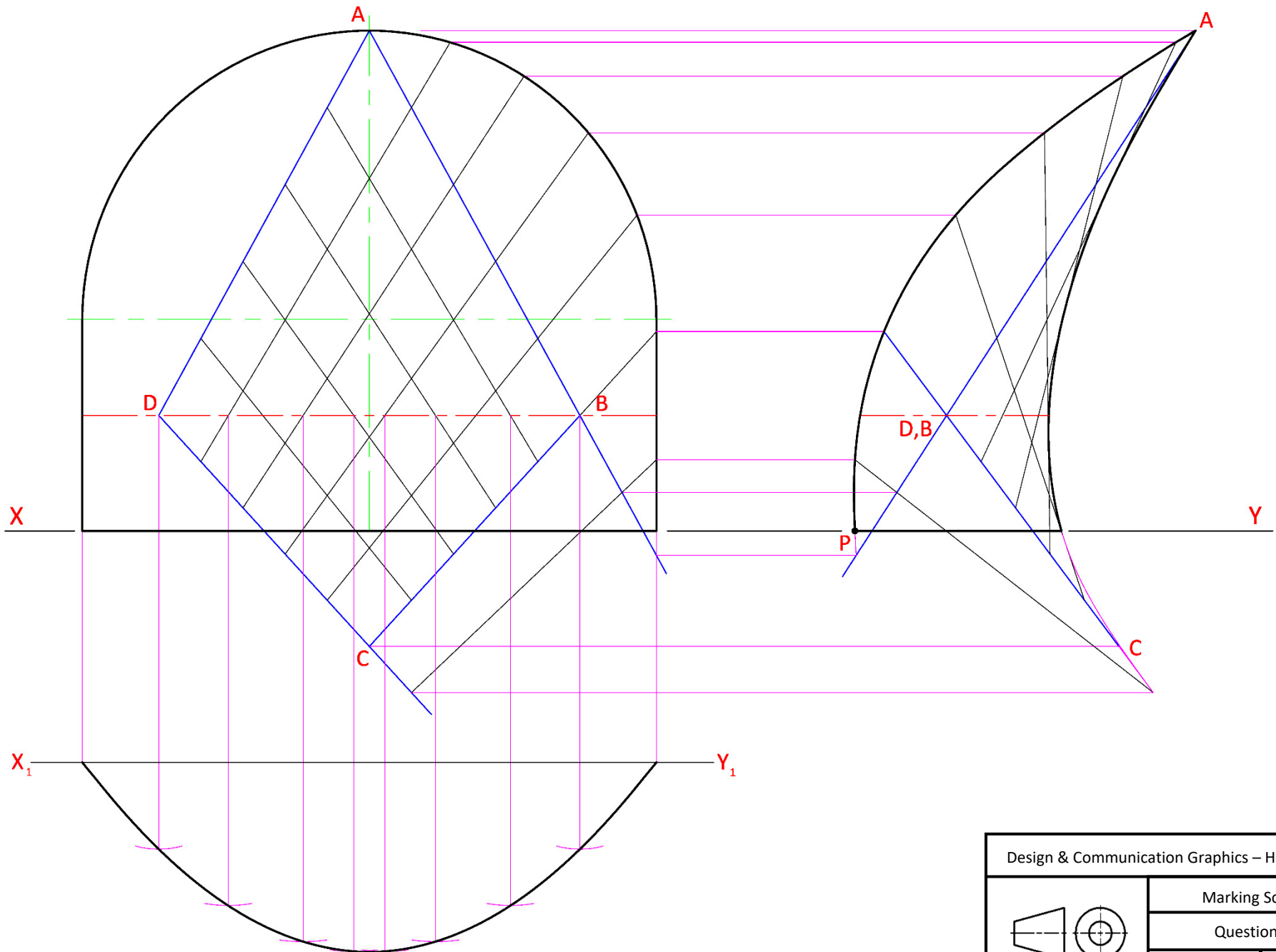
Marking Scheme

Question B-3

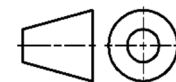
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Design & Communication Graphics – Higher Level

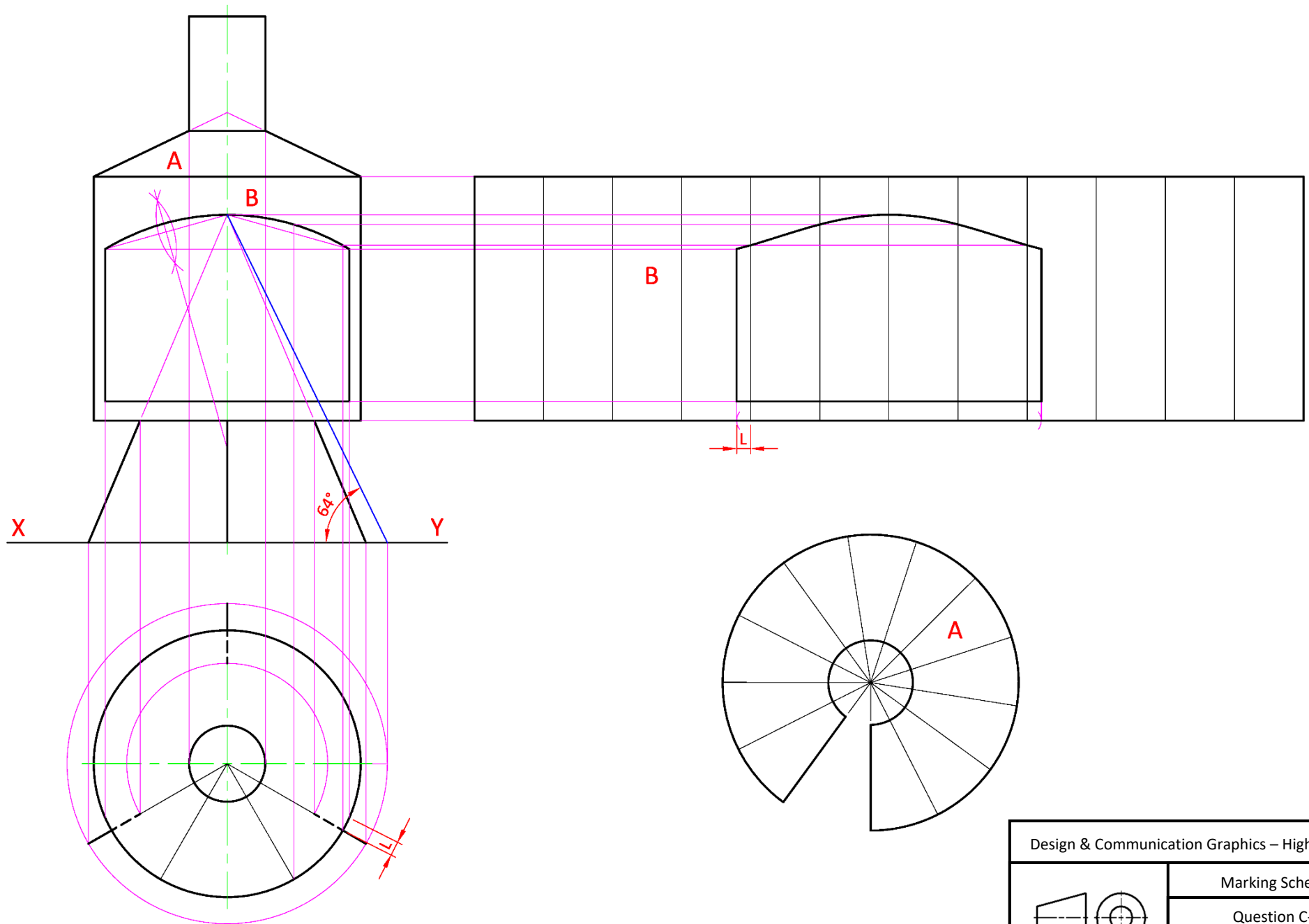


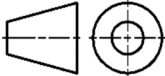
Marking Scheme

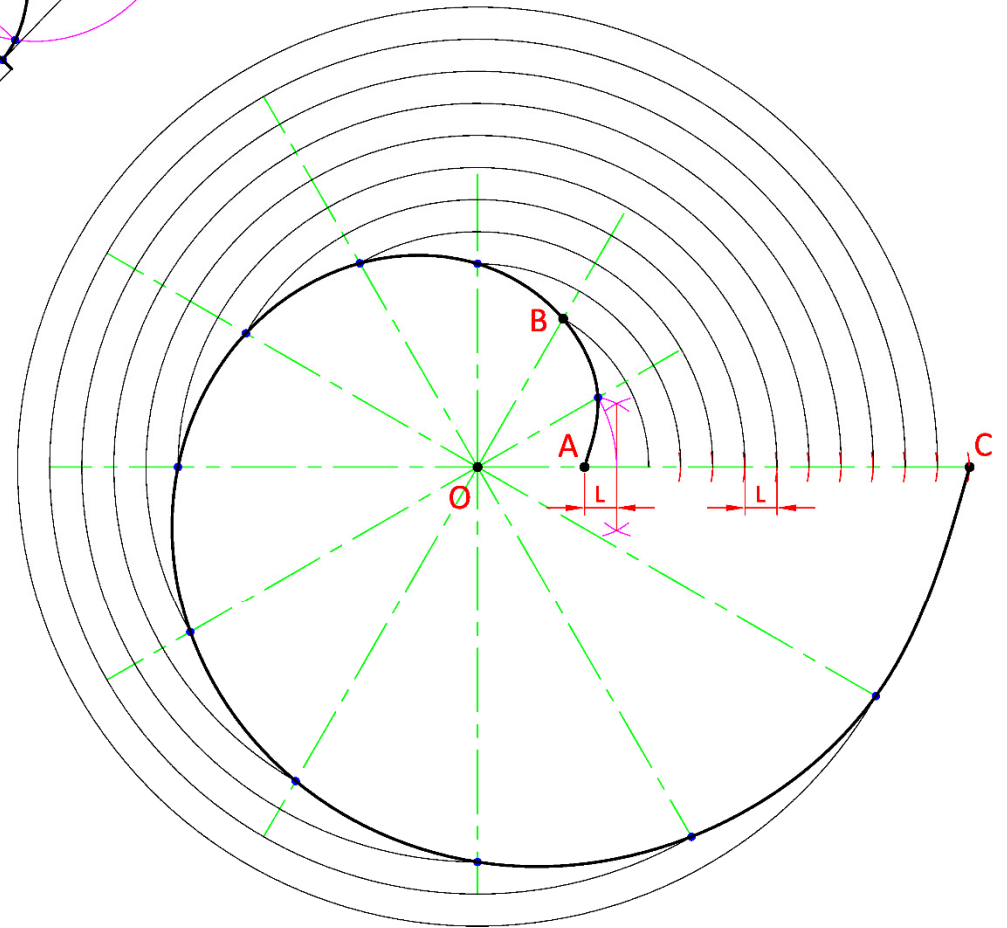
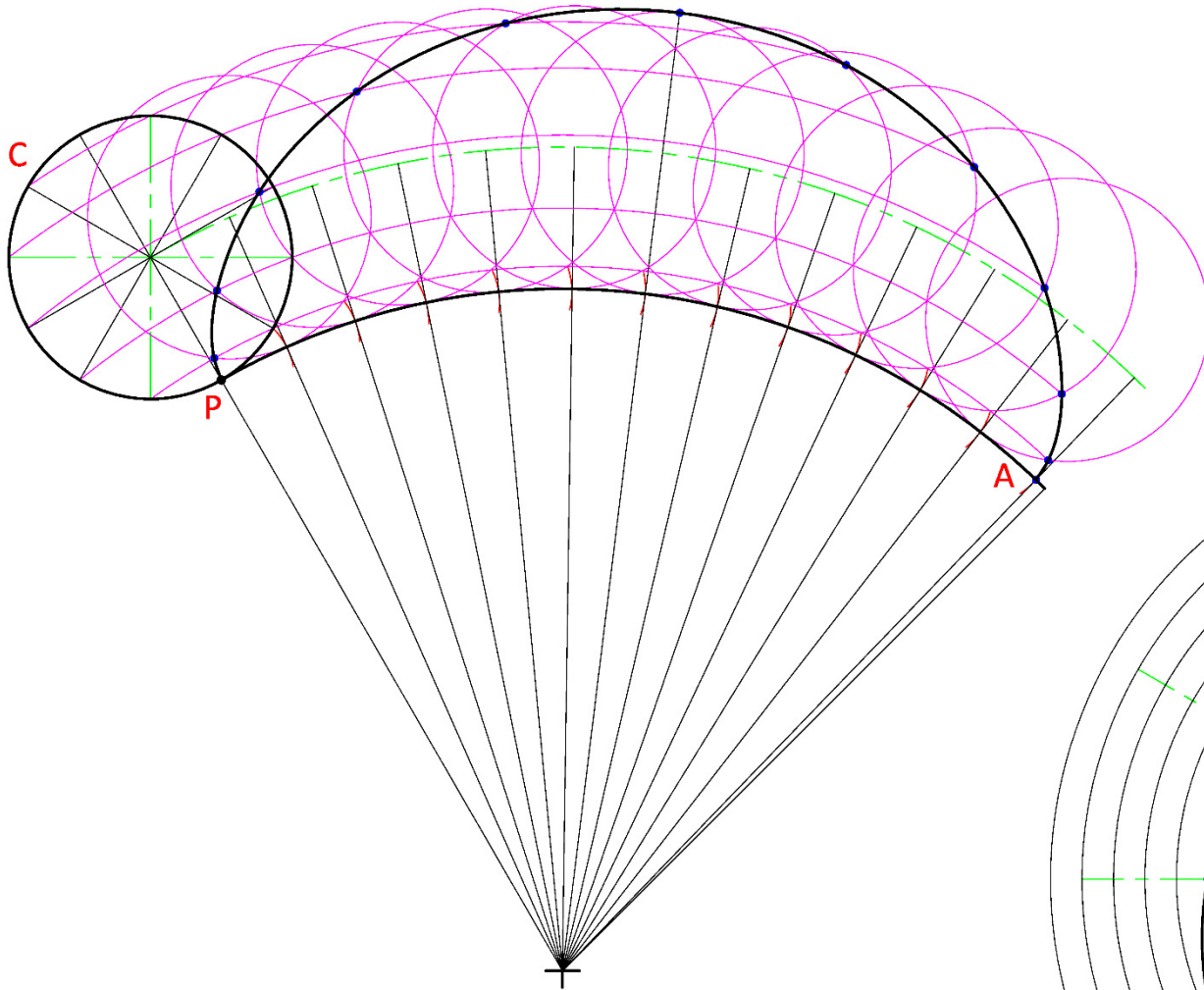
Question C-2

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Design & Communication Graphics – Higher Level			
	Marking Scheme		
	Question C-3		
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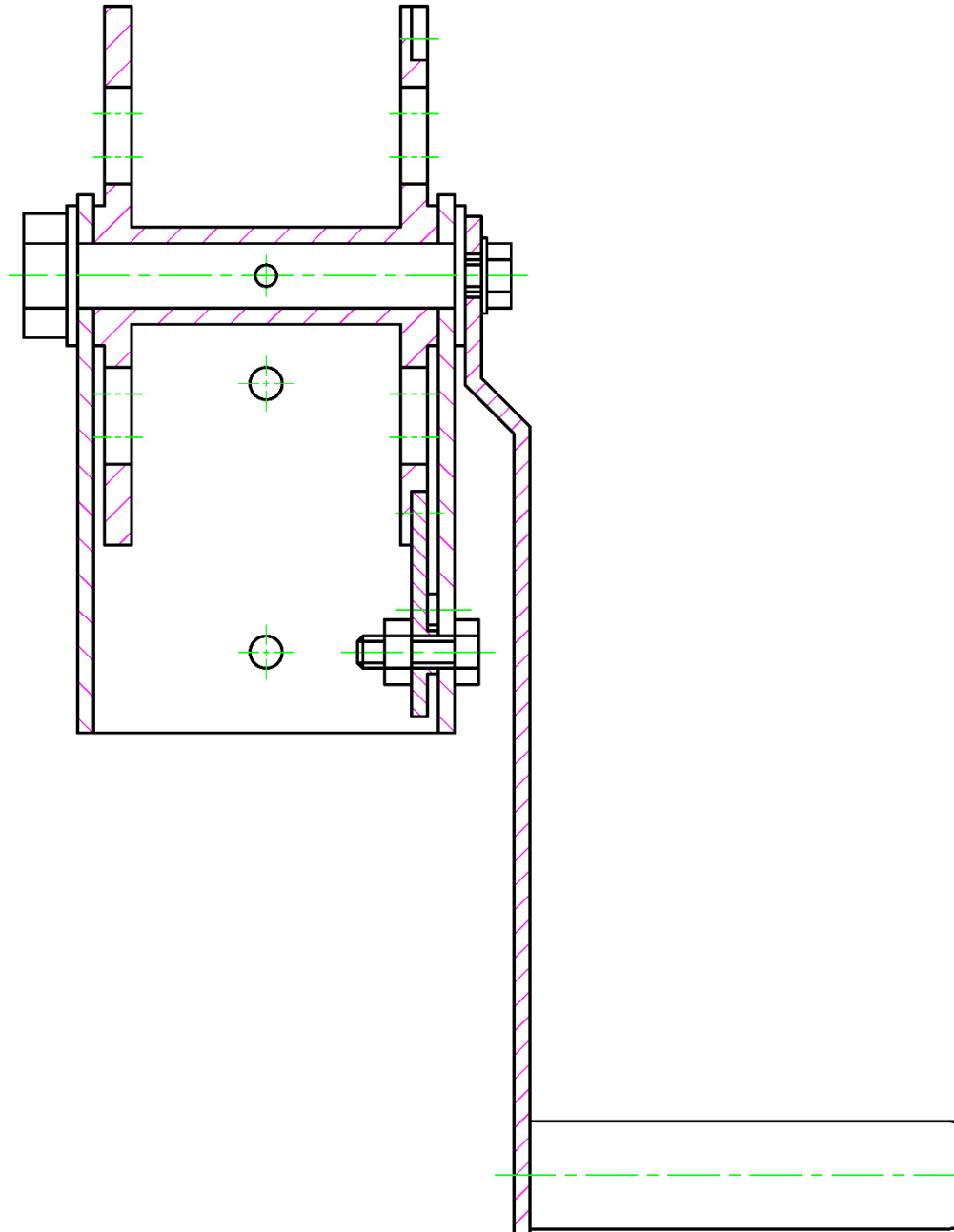


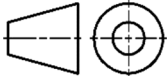
Marking Scheme

Question C-4

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June 2024



Design & Communication Graphics – Higher Level			
	Marking Scheme		
	Question C-5		
	Scale: n/a	June 2024	

Design and Communication Graphics
Student Assignment - Higher Level
Assessment Sheet 2024



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 State Examinations Commission

Candidate Examination No.

Output	Marking criteria				Marks
1	Design Research & Design Feature Comparison				
	Exploration of main design features using primary & secondary research; Selection of appropriate graphics; 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	30			
2	Freehand Graphical Representation				
	Underlying geometry; Proportion; Form/Volume; Use of Tone/Line for effective rendering; Detailed communication of main design features to include 3D presentation quality drawing; Layout & presentation	20			
3	SolidWorks Parts, Assembly, Drawing and eDrawing files				
	Adherence to required filing structure	35	4		
	Creation of a minimum of 5 Part files		2		
	Part models - Proficiency in Parametric CAD, including economy of design and design intent; Selection of most appropriate profiles; Sketches fully defined; Features renamed; Appropriate type of extrusions/end conditions used		15		
	Factor of difficulty/Design intent		5		
	Assembly - Creation of Assembly; Accuracy of parts to facilitate correct assembly; Correct mating of parts; Application of appropriate appearances		7		
	eDrawing of CAD model		2		
4	Hard Copy outputs from SolidWorks				
	Detailed orthographic views of the selected artefact; Section/Detail views where appropriate; pictorial view of the Assembly; Exploded view of the CAD model; Inclusion of main dimensions, notes and symbols; Appropriate scaling, layout and presentation to be considered	15			
5	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	25			
6	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	10			
7	Hard copy outputs from SolidWorks				
	CAD Model, factor of difficulty/design intent	25	13		
	Detailed orthographic views of the proposed solution; Section/Detail views where appropriate; Rendered pictorial view of the CAD model; Photorealistic images; Inclusion of main dimensions, notes and symbols; Appropriate scaling, layout and presentation to be considered		12		
Sub-total					
Marks deducted for pages in excess of maximum					
Assignment Total					

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