



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2022

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.

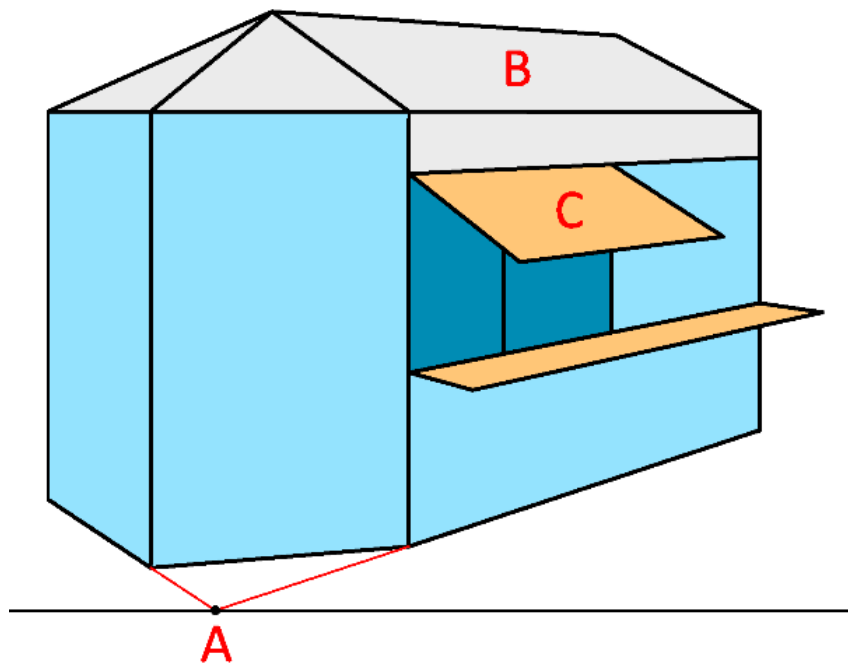
In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when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



Leaving Certificate Examination 2022



Design and Communication Graphics

Higher Level

Marking Scheme

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

Question A-1**MARKS****(a) Shortest horizontal distance between skew lines (18)**

- (i) Draw line from A parallel to CD (or C parallel to AB) in elevation 2
- (ii) Draw line from A parallel to CD (or C parallel to AB) in plan 2
- (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 3

(b) Length of shortest distance (2)

- (ix) Correct length of shortest horizontal distance indicated in millimetres 2

Total = 20**Question A-2****MARKS****(a) Construction of Parabola (16)**

- (i) Locate and draw directrix 2
- (ii) Location of vertex 3
- (iii) Location of points on and above latus rectum 2
- (iv) Location of points below latus rectum 6
- (v) Draw curve (Any = 1) 3

(b) Tangent (4)

- (vi) Required construction and draw tangent ... (2, 2) 4

Total = 20

Question A-3**MARKS****(a) Auxiliary elevation of intersecting solids (7)**

- (i) Projections from plan perpendicular to X_1Y_1 line..... **1**
- (ii) Transfer of heights from elevation to establish vertices in auxiliary view **2**
- (iii) Complete auxiliary elevation of prism and pyramid **4**

(b) Elevation and plan of intersecting solids (13)

- (iv) Location of penetration points on bottom in plan and elevation **4**
- (v) Location of penetration points on top in plan and elevation **4**
- (vi) Joining of points in plan, including hidden detail **2**
- (vii) Joining of points in elevation, including hidden detail **3**

Total = 20**Question A-4****MARKS****(a) Completion of elevation of chair (9)**

- (i) Location of points **m** and **n** in elevation..... **2**
- (ii) Projection of points **p** and **q** from end view to plan **2**
- (iii) Location of points **p** and **q** in elevation **2**
- (iv) Complete elevation (draw curve)..... **3**

(b) Completion of surface development (11)

- (v) Projection of points from end view to development view **1**
- (vi) Horizontal sub-division to establish intermediate points on development **2**
- (vii) Location of remaining points on development view **4**
- (viii) Completion of surface development **4**

Total = 20

Question B-1**MARKS****(a) Elevation and Plan of intersecting planes ABC, ABD and EFG (16)**

- (i) Use given coordinates to draw elevation of ABC, ABD and EFG **8**
- (ii) Draw the plan of planes ABC, ABD and EFG **8**

(b) Dihedral Angle (18)

- (iii) New X_1Y_1 parallel to line of intersection AB..... **4**
- (iv) Projection of planes and line of intersection on new X_1Y_1 **4**
- (v) Additional X_2Y_2 perpendicular to line of intersection AB **5**
- (vi) Projection of ABC and ABD as lines and indicating dihedral angle..... **5**

(c) Edge View of plane EFG and Inclination of EFG to horizontal plane (16)

- (vii) Projections of horizontal line on EFG ... (2, 1, 2)..... **5**
- (viii) X_1Y_1 perpendicular to plan of correct horizontal line **3**
- (ix) Projection of plane EFG to auxiliary view **5**
- (x) Indication of true inclination of EFG to horizontal plane **3**

(d) Projections of point P and true length of line FP (10)

- (xi) Locate plan of point P **3**
- (xii) Locate elevation of point P **3**
- (xiii) Determine true length of line FP **4**

Total = 60

Question B-2**MARKS****(a) Draw given Plan (12)**

- (i) Draw the given plan of structure **12**

(b) Perspective of Structure (48)

- (ii) Position spectator and plan of picture plane (2, 2) **4**
- (iii) Plan of vanishing points **4**
- (iv) Ground line, horizon line, vanishing points in elevation (1, 2, 2) **5**
- (v) Establish corner A in perspective view **2**
- (vi) Perspective of base lines of structure (2×3) **6**
- (vii) Apply height of 70mm and complete the three vertical surfaces **6**
- (viii) Apply height of 25mm and complete perspective of horizontal shelf **5**
- (ix) Apply height of 10mm and complete perspective of opening **4**
- (x) Use of AVP to complete sloping surface **C**..... **5**
- (xi) Use of AVP to complete sloping surface **B**..... **4**
- (xii) Complete perspective drawing of structure **3**

Total = 60

Question B-3

	MARKS
(a) Plan and Elevation of touchscreen ABCD (16)	
(i) Draw given plan of ABCD	8
(ii) Project elevation of ABCD	8
(b) Traces of oblique plane that contains ABCD (10)	
(iii) Identification of H.T.	3
(iv) Construction to determine V.T.	3
(v) Drawing of V.T.	4
(c) Plan and Elevation of bezel (20)	
(vi) Use of appropriate construction to determine true shape of ABCD	4
(vii) Determination of true shape of ABCD	4
(viii) Offset edges 8mm inwards in True Shape view	4
(ix) Locate bezel in plan and elevation using correct construction	8
(d) Plan and Elevation of kickstand and angle between touchscreen and kickstand (14)	
(x) Use of 100° angle to determine plan of edge EH	3
(xi) Draw plan and elevation of kickstand EFGH	7
(xii) Determine and indicate true angle between touchscreen and kickstand	4
	Total = 60

Question C-1

MARKS

(a) Earthworks for Rest Area and Path (37)

Earthworks between A and B (Level, Sloping edge) - Embankment

- (i) Draw parallel lines at 7.5mm intervals 5
- (ii) Identify intersections with contours and draw curves 4

Earthworks between B and C (Level) - Embankment

- (iii) Draw parallel lines at 7.5mm intervals 5
- (iv) Identify intersections with contours and draw curves 4

Earthworks between B and C (Level) - Cutting

- (v) Draw parallel lines at 5mm intervals 5
- (vi) Identify intersections with contours and draw curve 3

Earthworks between C and D - Embankment

- (vii) Draw required 7.5mm arc at **D** and draw tangent 3
- (viii) Draw parallel lines at 7.5mm intervals 5
- (ix) Identify intersections with contours and draw curve 3

(b) Profile on EF (15)

- (x) Measure and draw height lines at 5mm intervals 2
- (xi) Projections from intersections between line **EF** and contours 2
- (xii) Draw main left hand portion of profile 5
- (xiii) Draw level right hand portion of profile 3
- (xiv) Draw middle straight line portion of profile 3

(c) Maximum Height for Phone Mast (8)

- (xv) Locate point **F** and draw tangent to profile 4
- (xvi) Determination and indication of required height 4

Total = 60

Question C-2

MARKS

(a) Outline Plan and Elevation (36)

- (i) Draw base and top circles (R50) in plan and elevation 6
- (ii) Location of 'throat' circle in plan and elevation 6
- (iii) Construction to determine points on one branch of hyperbola in elevation 10
- (iv) Determination of points on second branch in elevation 6
- (v) Draw hyperbolic curves (Any = 1) 3
- (vi) Completion of elevation and plan 5

(b) Vertical Opening (16)

- (vii) Draw vertical opening in plan 4
- (viii) Determine end points on curve in elevation 4
- (ix) Determine additional points in elevation (min 5 including the vertex) 5
- (x) Draw curve (Any = 1) 3

(c) Focal point and Directrix (8)

- (xi) Construction to determine required directrix 4
- (xii) Construction to determine required focal point 4

Total = 60

Question C-3**MARKS****(a) Plan and Elevation of surfaces A, B and C (15)**

- (i) Draw plan as given 9
- (ii) Draw elevation as given 6

(b) Dihedral angle between surfaces A and B (22)

- (iii) X_1Y_1 parallel to line of intersection 5
- (iv) Projection of surfaces A and B and line of intersection on new X_1Y_1 6
- (v) New X_2Y_2 perpendicular to line of intersection 5
- (vi) Projection of surfaces as lines and determine dihedral angle 6

(c) One-piece Surface Development of Surfaces B and C (12)

- (vii) Correct construction to determine true shape of surface **B** 4
- (viii) Correct construction to determine true shape of surface **C** 4
- (ix) Drawing of one-piece surface development 4

(d) Projections of movement path (11)

- (x) Location of required line in surface development view 3
- (xi) Location of line in plan 4
- (xii) Location of line in elevation 4

Total = 60

Question C-4

	MARKS
(a) Displacement Diagram and Cam Profile (35)	
(i) Locate cam displacement at 0° , 180° , 270° and 360°	4
(ii) Construction to determine U.A.R. (min. 7 incl. end points)	7
(iii) Draw U.A.R. Curve ... (any = 1)	2
(iv) Draw 'Fall' 180° to 270° on displacement diagram	2
(v) Draw 'Fall' 270° to 360° on displacement diagram	3
(vi) Establish correct centre of cam profile.....	1
(vii) Draw 30° divisions through cam centre	3
(viii) Transfer of heights from displacement diagram to cam profile	6
(ix) Draw rollers on 30° division lines	3
(x) Complete cam profile	4
 (b) Line Diagram and Combined Movement (25)	
(xi) Draw diagram as given (including AB, BC, CD and Crushing Platform)	8
(xii) Draw Crushing Platform in 40 mm crushing position	3
(xiii) Establish position of D_1 when Crushing Platform is in 40 mm position	2
(xiv) Locate C_1 in correct position	4
(xv) Locate A_1 in correct position	4
(xvi) Draw lines A_1B , BC_1 and C_1D_1	4
Total = 60	

Question C-5**MARKS****Sectional Elevation*****Assembly (6)***

- (i) Relative positioning of components 6

Base (13)

- (ii) Complete outline of Base 4
 (iii) Inner detail of recess portion 3
 (iv) Inner detail of spot face section 2
 (v) Holes 3

Vertical Spindle (7)

- (vi) Draw required outline of Vertical Spindle 5
 (vii) Ø4 Hole 2

Vice Pivot (6)

- (viii) Outline of Vice Pivot 4
 (ix) Inner Detail 2

Lower Jaw Spindle (8)

- (x) Outline of Lower Jaw Spindle 6
 (xi) Inner Detail 2

Clamping Jaw (4)

- (xii) Outline of Clamping Jaw 2
 (xiii) Hole Detail 2

Rotating Boss & Dowel (7)

- (xiv) Outline of Rotating Boss 4
 (xv) Inner Detail 2
 (xvi) Circular hole/Dowel 1

Securing Screws (4)

- (xvii) Outline of Securing Screws 3
 (xviii) Inner Detail 1

Completion of drawing (6)

- (xix) Presentation, hatching and centrelines 6

Total = 60



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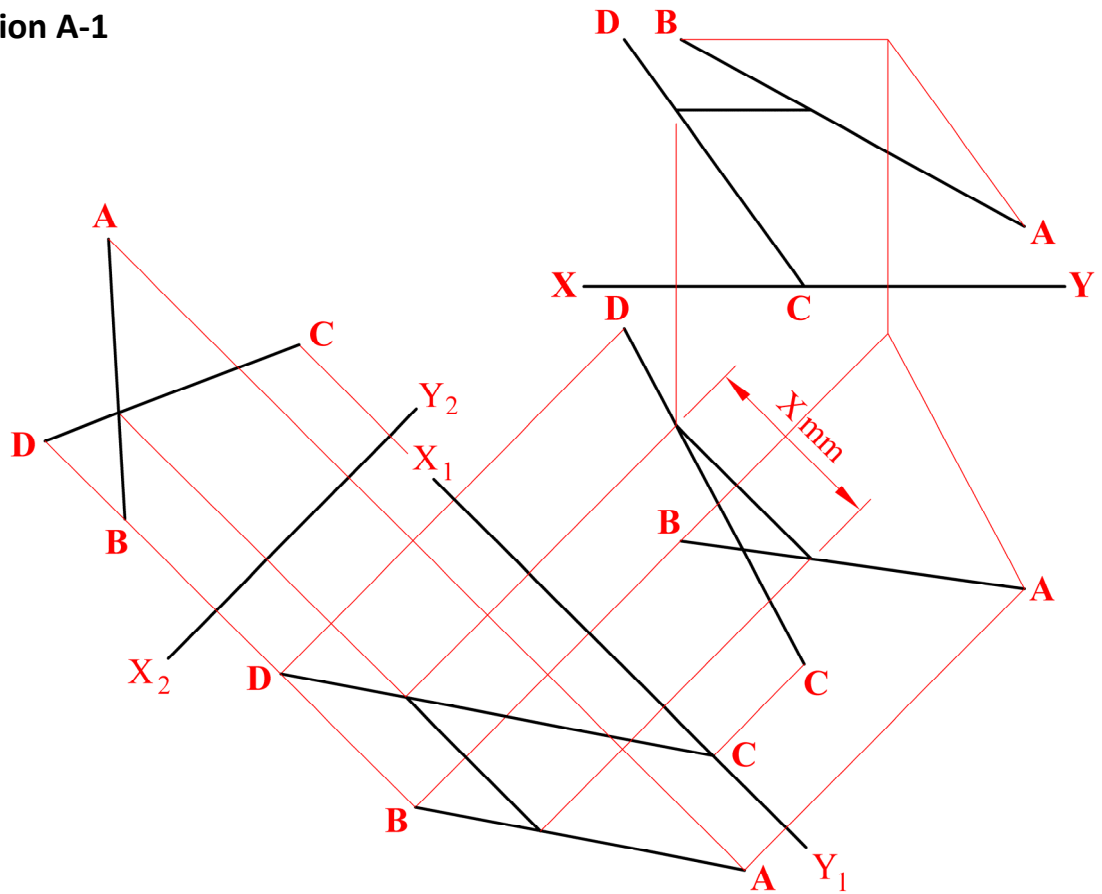
Design and Communication Graphics

Higher Level

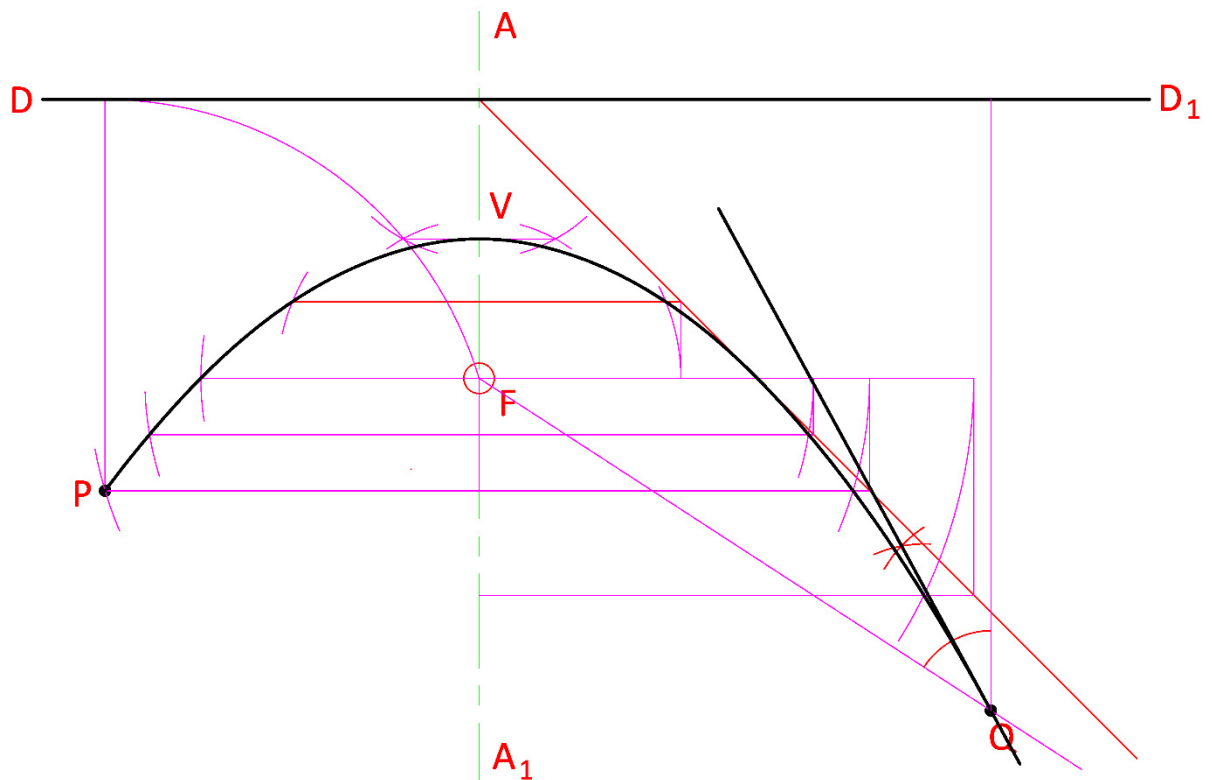
Sample Solutions

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

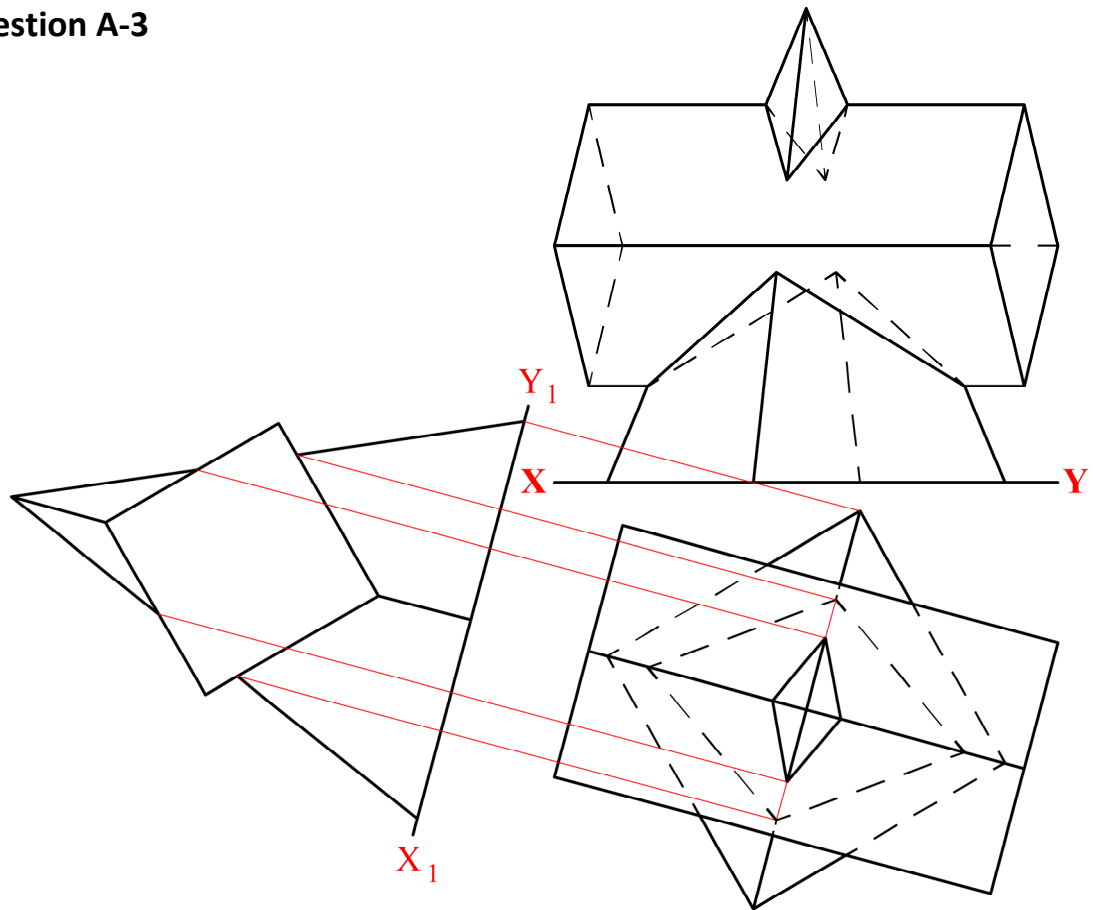
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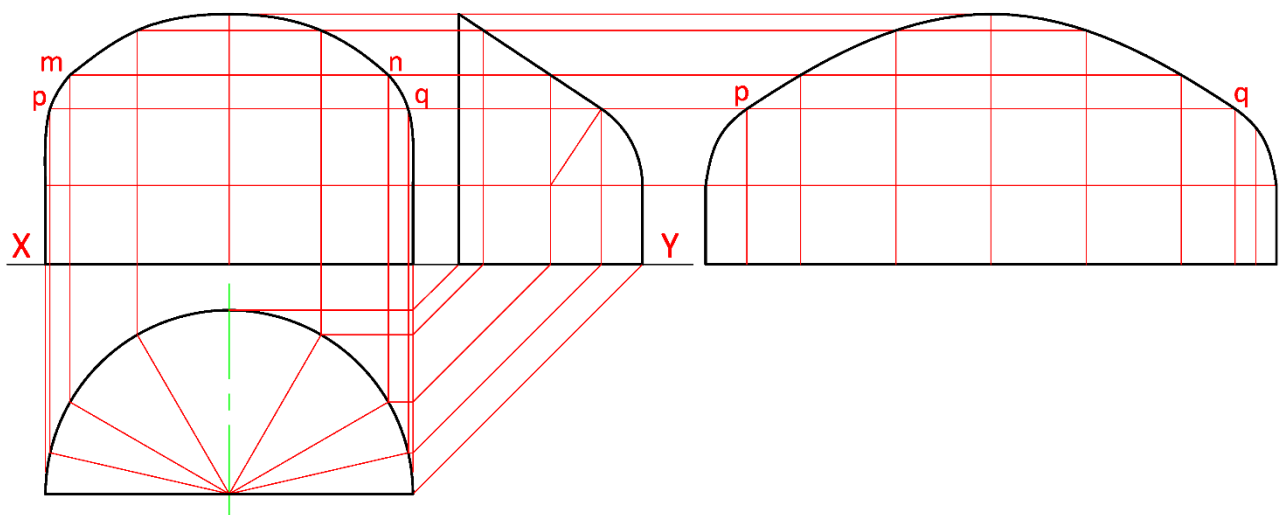
Question A-2

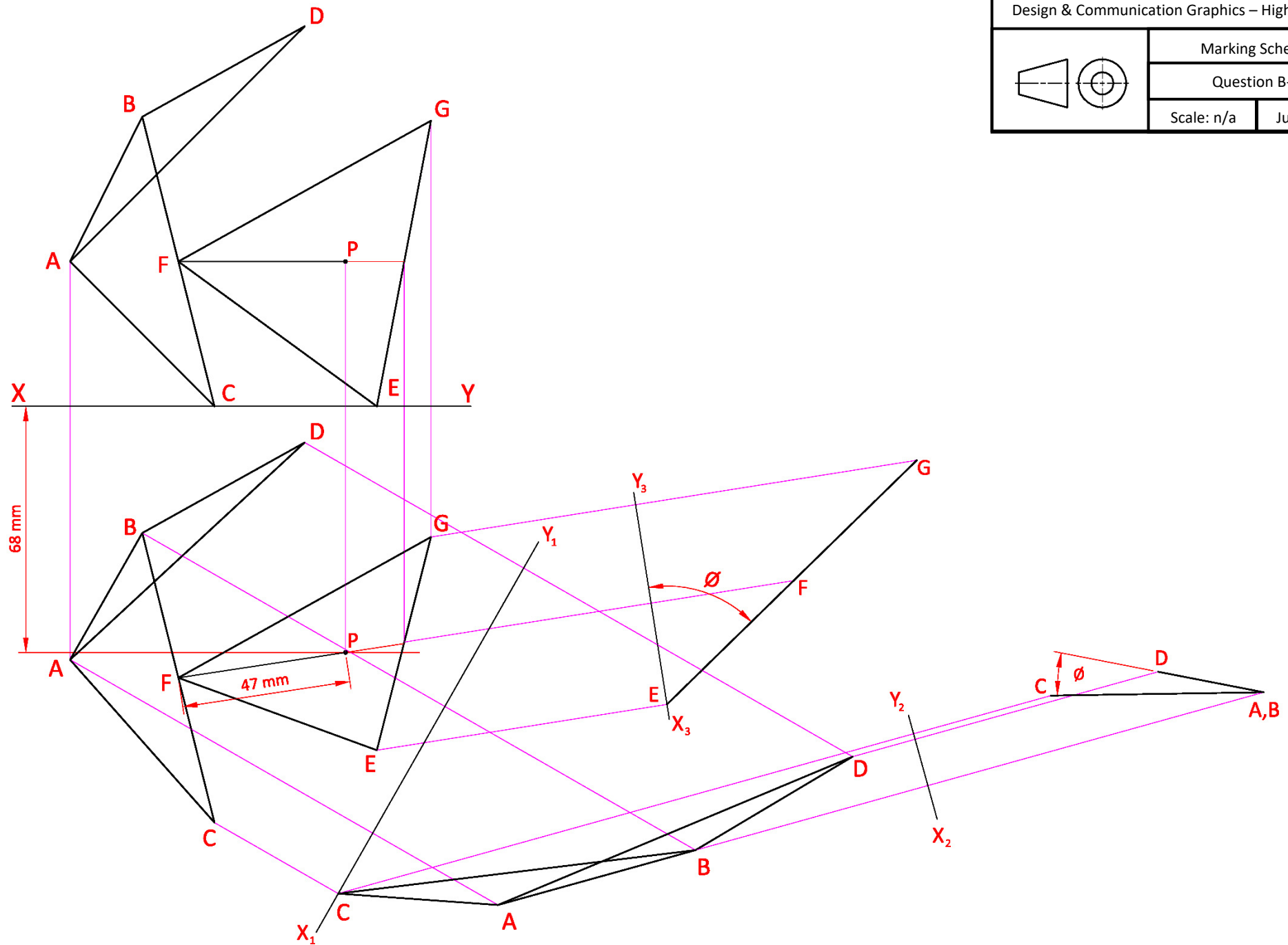
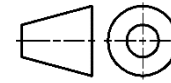


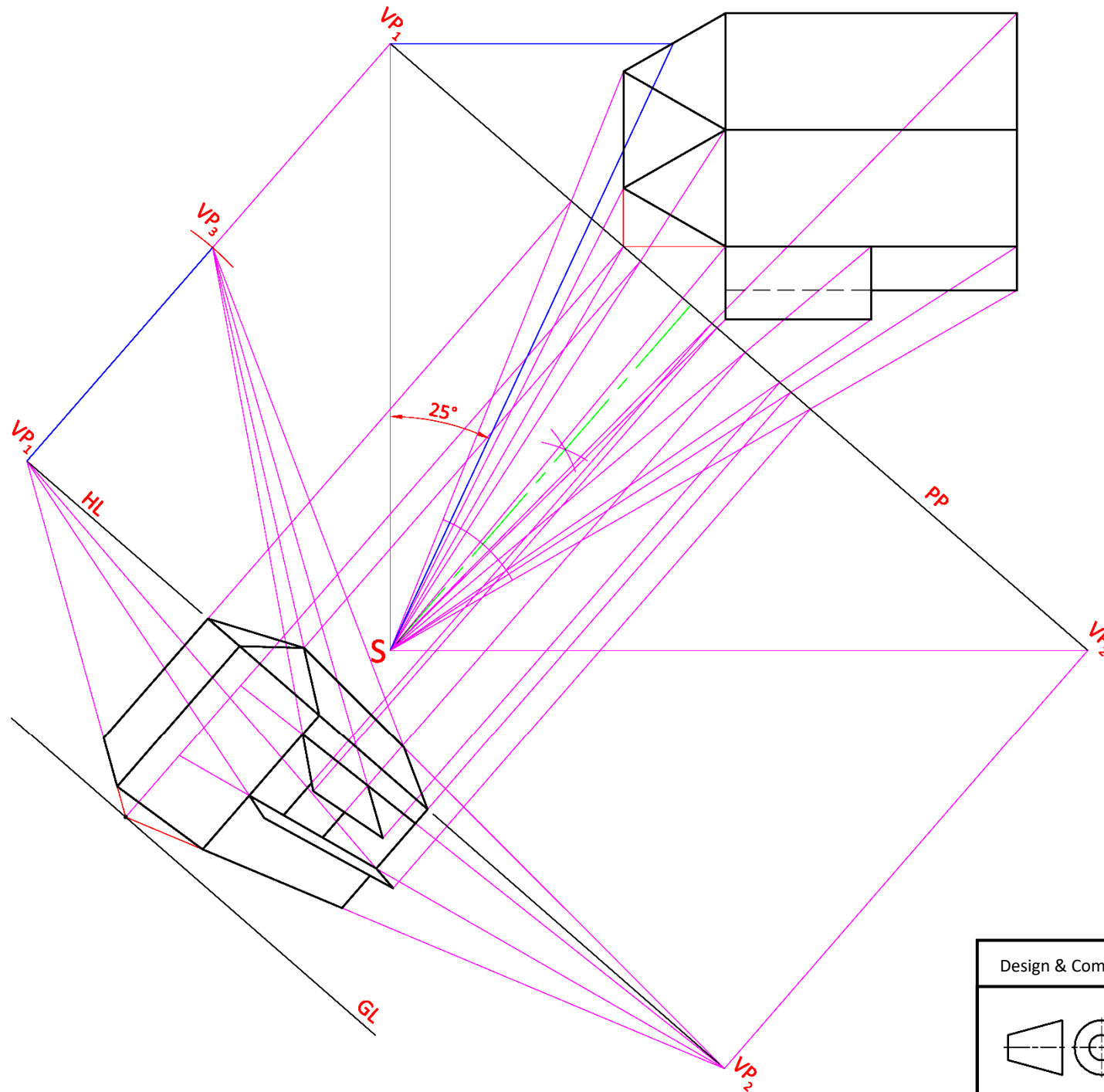
Question A-3



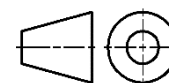
Question A-4







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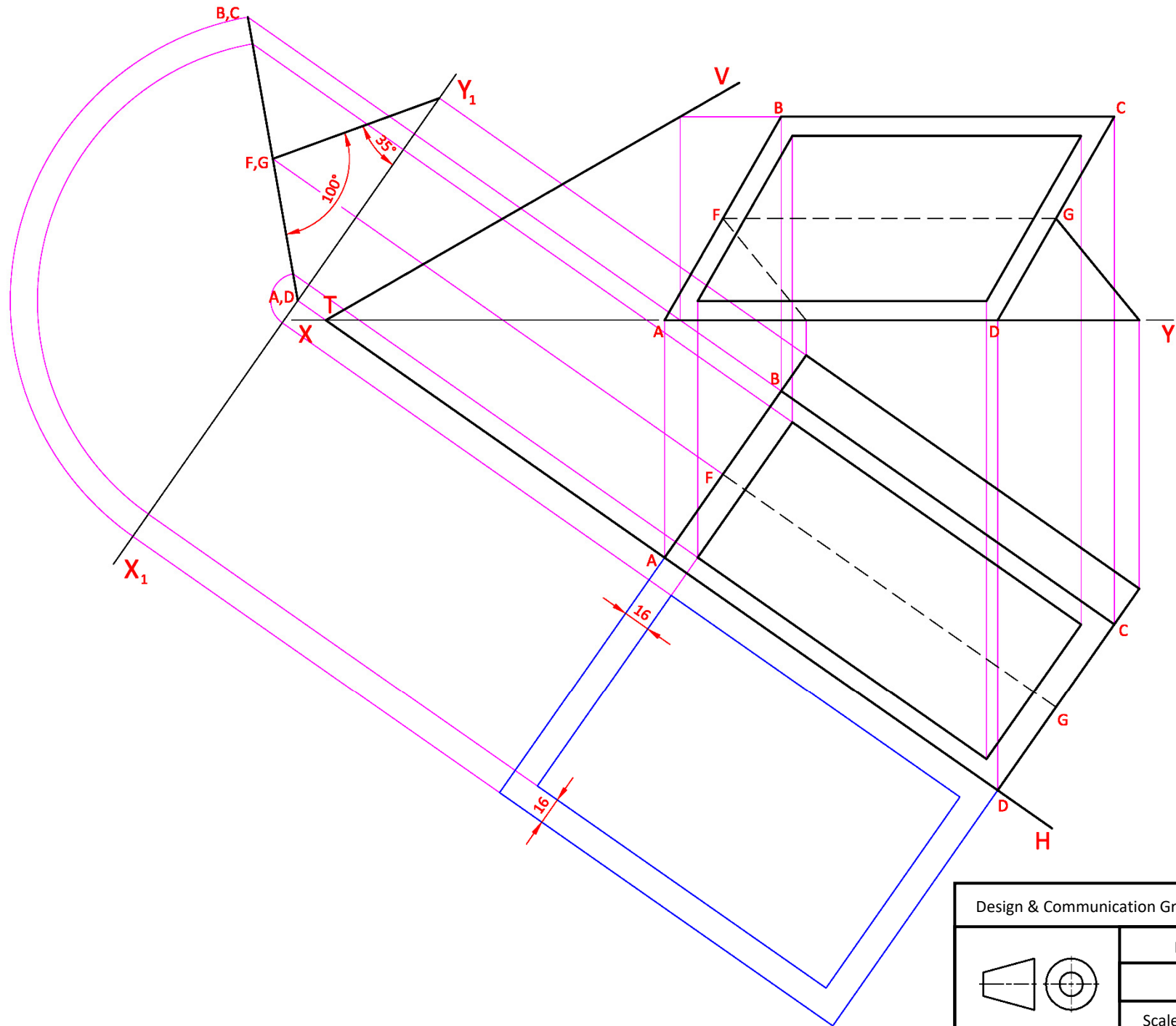


Marking Scheme

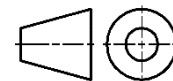
Question B-2

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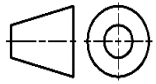


Marking Scheme

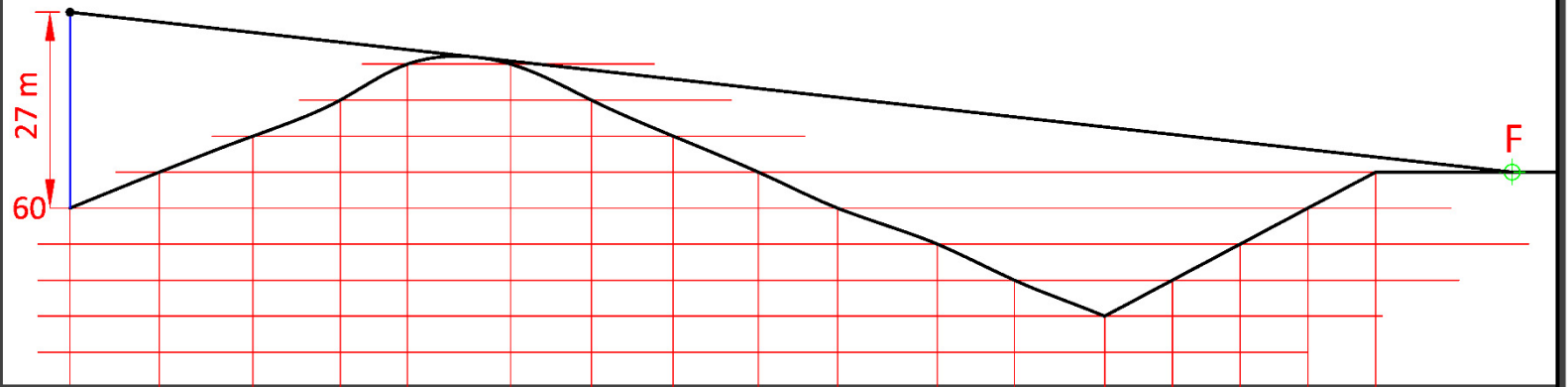
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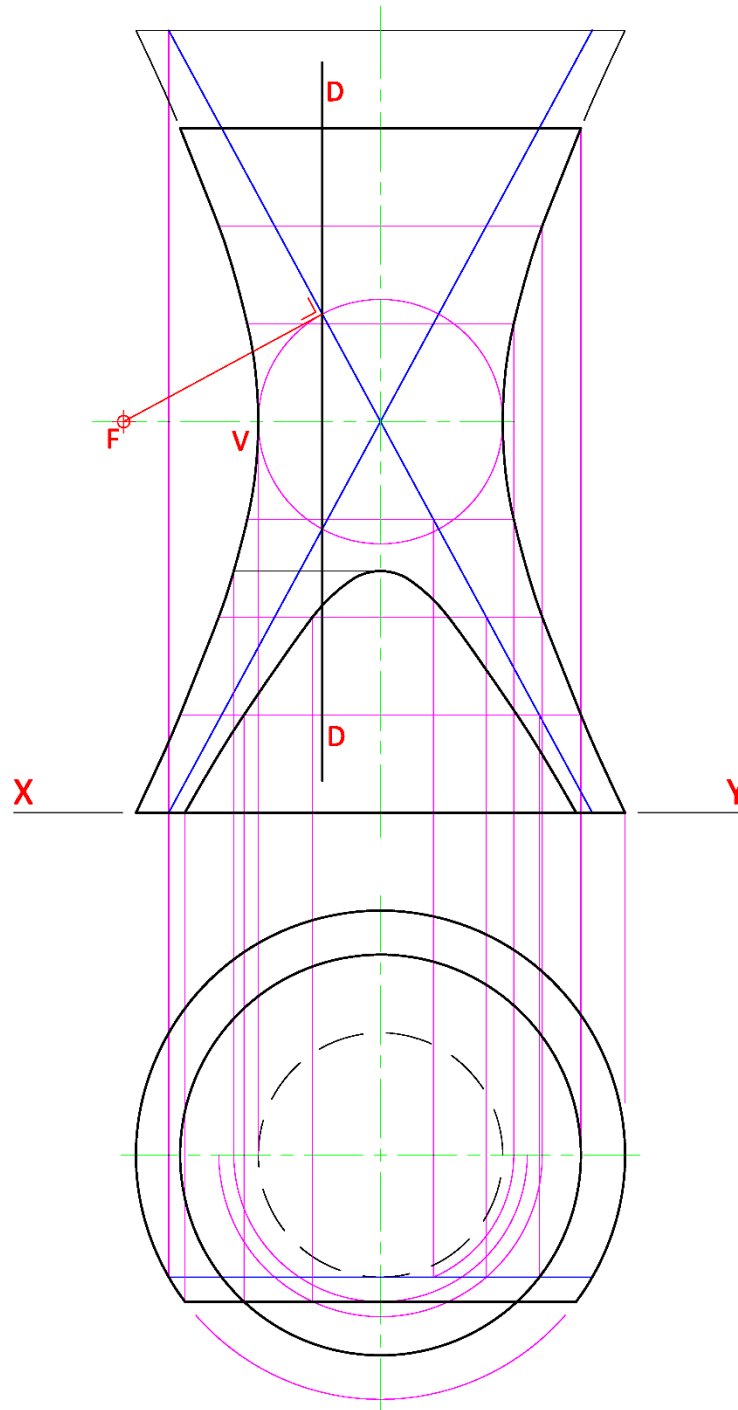


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E F

D C B A

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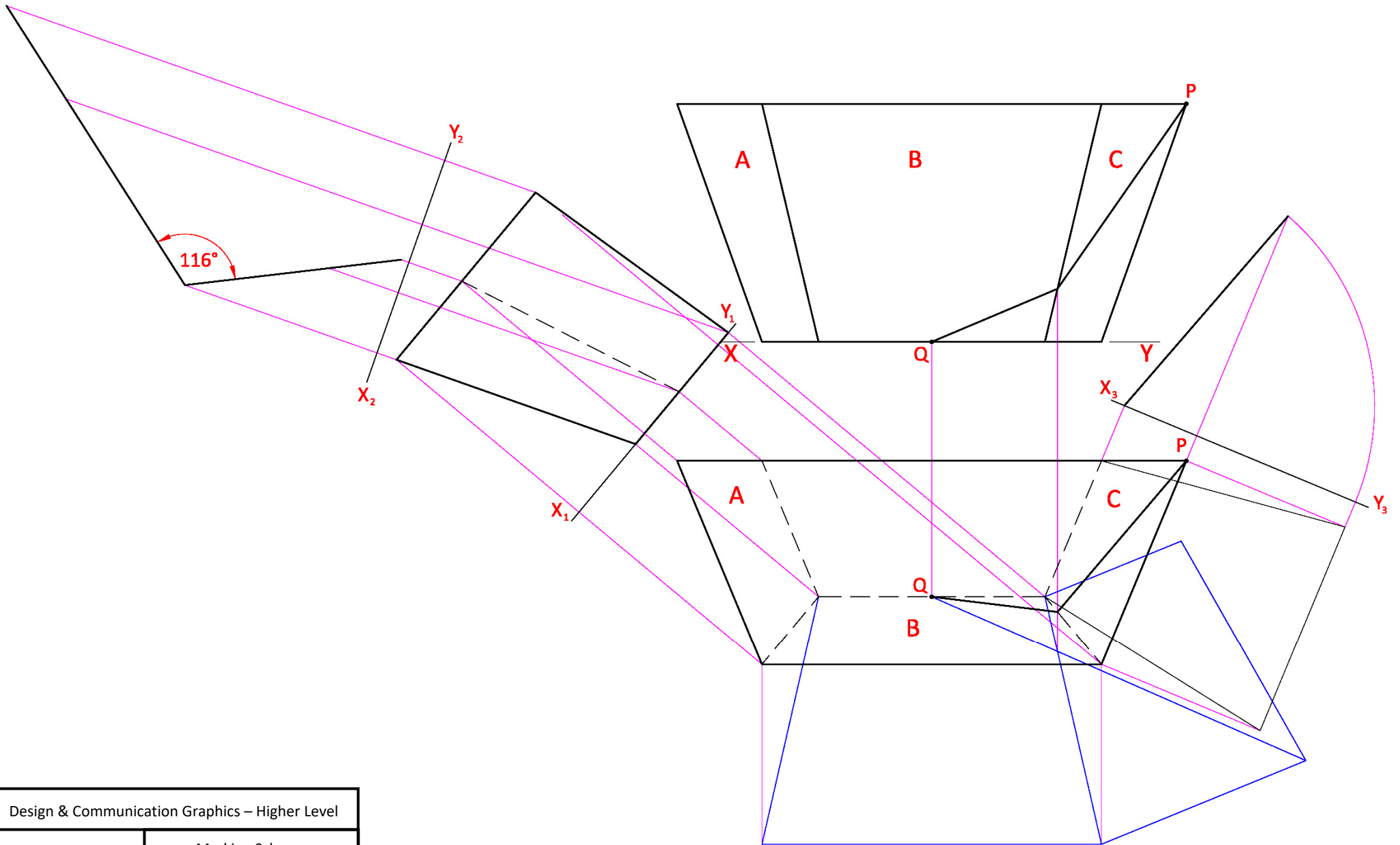


Marking Scheme

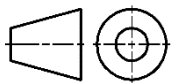
Question C-2

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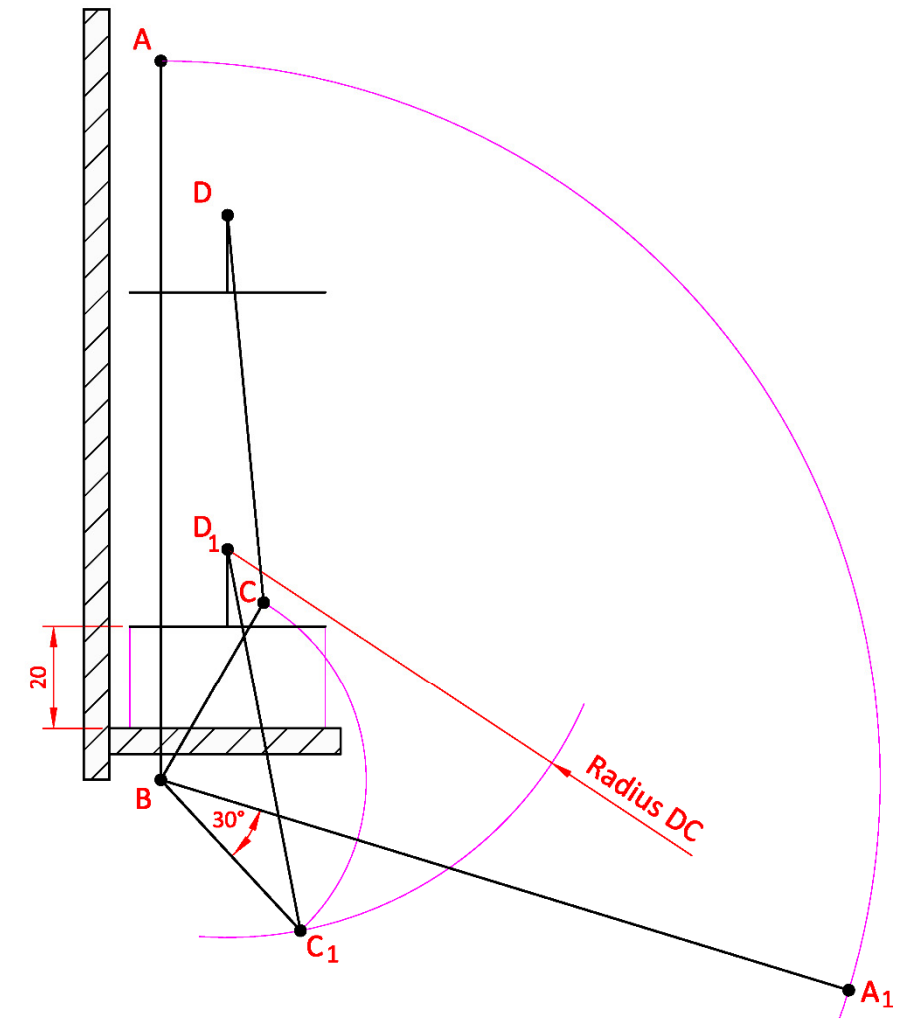
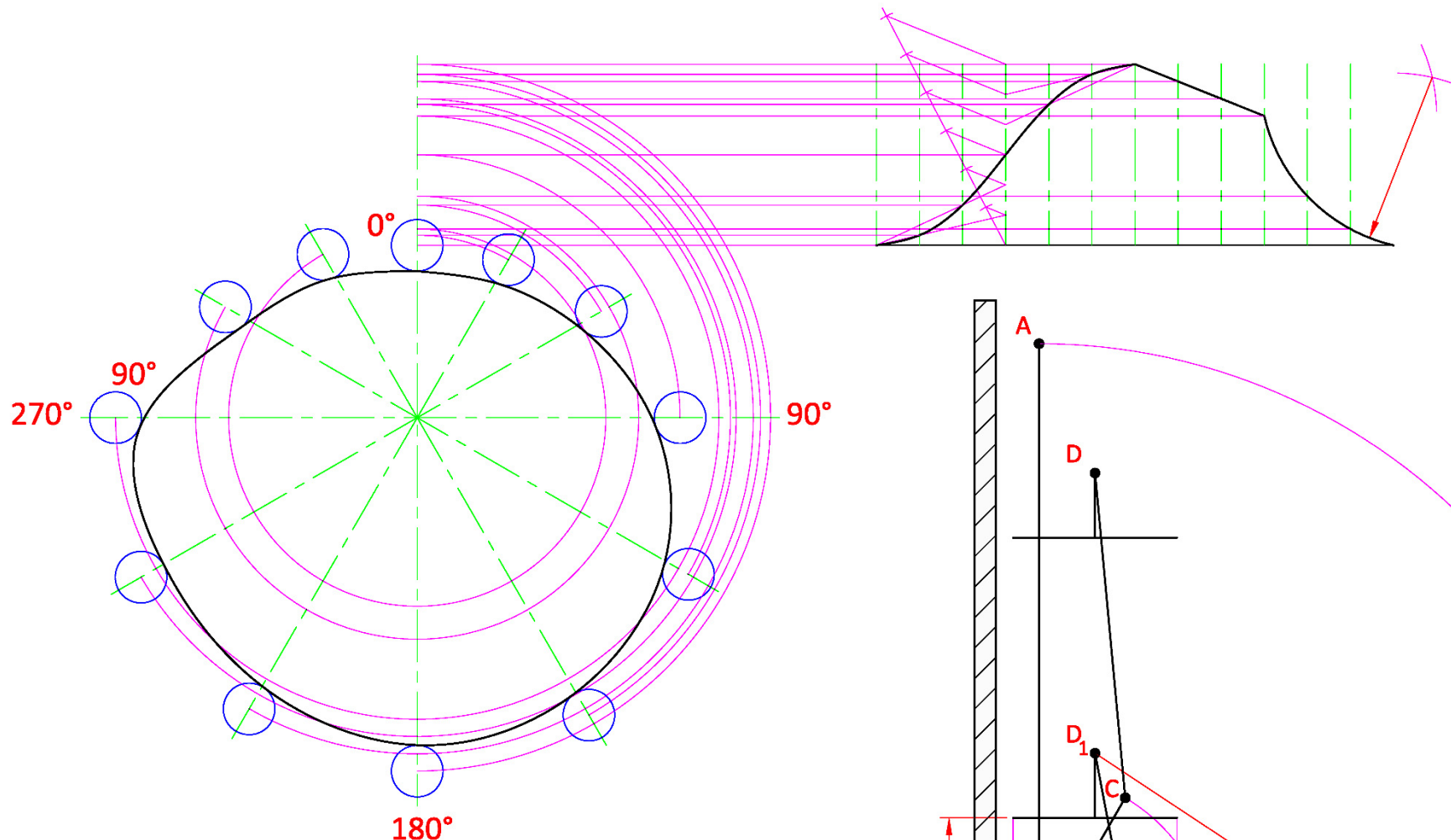


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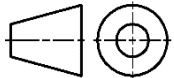
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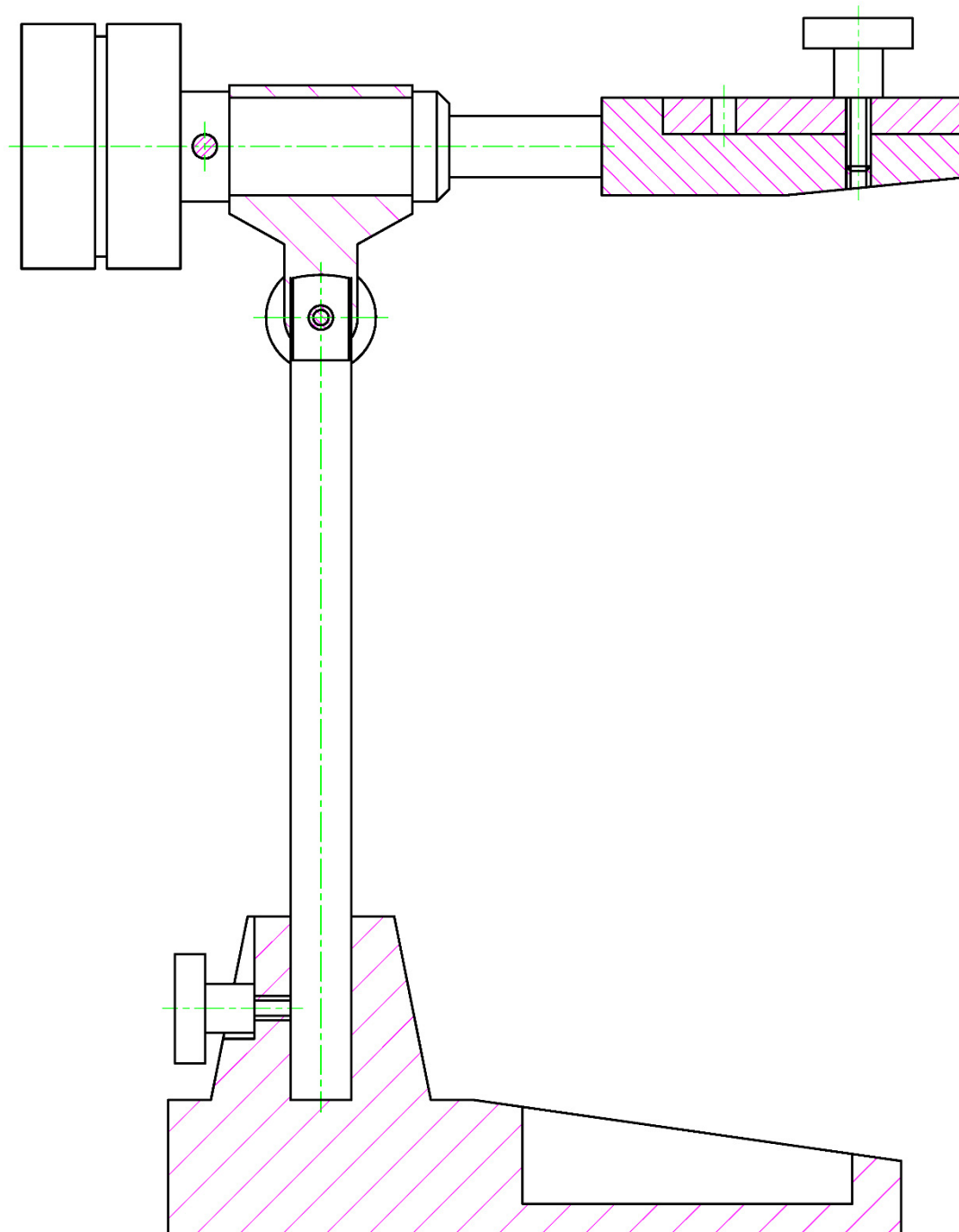


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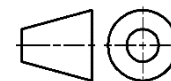
Question C-4

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Design & Communication Graphics – Higher Level



Marking Scheme

Question C-5

Scale: n/a

June 2022

Design and Communication Graphics
Student Assignment - Higher Level
Assessment Sheet 2022



Coimisiún na Scrúduithe Stáit
 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				
	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	10		
	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		15		
Sub-total					
Marks deducted for pages in excess of maximum					
Assignment Total					

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