Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE 2008

MARKING SCHEME

TECHNICAL DRAWING

ORDINARY LEVEL

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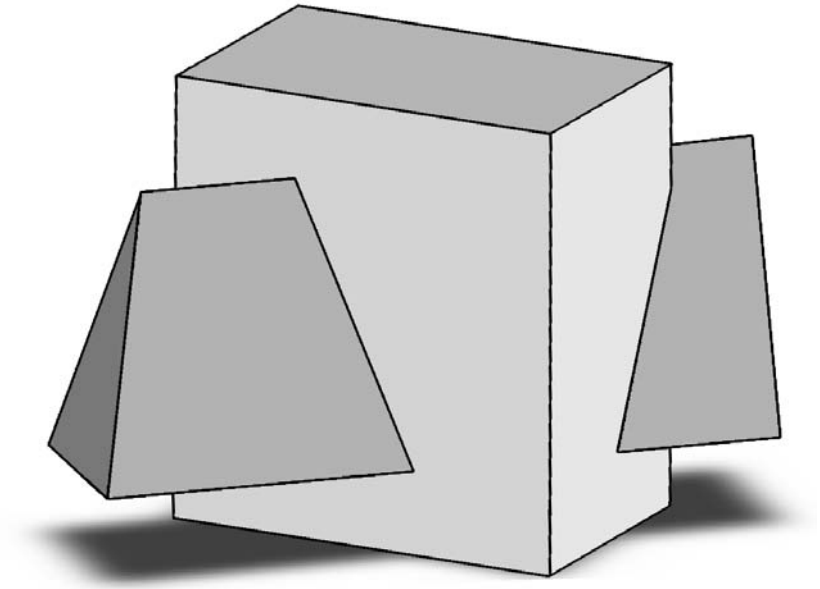
Technical Drawing
Paper 1 - Ordinary Level



(Plane & Solid Geometry)

Marking Scheme and Sample Solutions

(Other valid solutions are acceptable and marked accordingly)

Question 1

Marks

(a) Elevation 15

1. Outline of elevation (6x1) **6**
2. Locate point b **2**
3. Complete the elevation (7x1) **7**

(b) Plan 10

4. Outline of plan (6x1) **6**
5. Draw the semicircle **2**
6. Complete the plan **2**

(c) New Elevation 20

7. X_1Y_1 parallel to the plan of A **2**
8. Projections from the plan **2**
9. Heights from the elevation (Excl. curve) **3**
10. Surface A **5**
11. Freehand curve (points, curve 2,2) **4**
12. Complete the new elevation **4**

13. ***Presentation*** **5** **5**

Total 50

Question 2

Marks

(a) Triangle ABC 16

1. Draw the line AB 55 long **4**
2. Angle BAC at 40º **4**
3. Locate point C **4**
4. Draw lines AC and BC **4**

Point D 14

5. Geometrical division of line AC **6**
6. Locate point D **4**
7. Draw lines AD and CD **4**

(b) Area Conversion 15

8. Convert ABCD to a triangle **3**
9. Triangle to a rectangle **3**
10. Area reduced by half **2**
11. Conversion to a square..... **4**
12. Draw the square **3**

13. ***Presentation*** **5** **5**

Total 50

Question 3

			Marks
(a)	**Elevation**	**9**	
	1. Draw cone A		**4**
	2. Draw sphere B		**5**
	Plan	**14**	
	3. Draw cone A		**4**
	4. Point q in elevation		**3**
	5. Point o_1 in plan		**3**
	6. Draw sphere B		**4**
(b)	**Sphere C**	**15**	
	7. Points r and s in elevation		**4**
	8. Point t_1 in plan		**4**
	9. Point t in elevation		**3**
	10. Draw both spheres		**4**
(c)	**Point P**	**7**	
	11. Point P in plan		**2**
	12. Projections to the elevation		**3**
	13. Point P in elevation		**2**
	14. ***Presentation***	**5**	**5**
		Total	**50**

Question 4

Marks

Setting up 7

1. Given line AB, Circles C and D (1,3,3) **7**

(a) Locus of P on circle C 18

2. Division of the circle **3**
3. Centres marked on line ef **3**
4. Project from divisions of circle **3**
5. Locate points on locus **5**
6. Draw the locus of P **4**

(b) Locus of Q on circle D 20

7. Division of circle D..... **3**
8. Centres marked on line gh **6**
9. Project from divisions of circle..... **3**
10. Locate points on the locus **4**
11. Draw the locus of Q **4**

12. ***Presentation*** **5** **5**

Total 50

Question 5

		Marks
(a)	**Setting up** **12**	
1.	Given plan	**5**
2.	Given elevation	**5**
3.	Traces VTH	**2**
	Auxiliary Elevation **9**	
4.	X_1Y_1 perp. to H.T.	**2**
5.	Projections from plan	**2**
6.	Edge view of the plane	**2**
7.	Auxiliary view the of solid	**3**
	Truncation **18**	
8.	Points a, b, c, d, e and f in plan	**6**
9.	Points a, b, c, d, e and f in elevation	**6**
10.	Complete the plan	**3**
11.	Complete the elevation	**3**
(b)	**True shape** **6**	
12.	Setting up the true lengths and widths	**4**
13.	Draw the true shape	**2**
14.	***Presentation*** **5**	**5**
	Total	**50**

Question 6

		Marks
(a)	**Ellipse 23**	
1.	Set up axis directrix and focus	**6**
2.	Locate the vertices	**4**
3.	Set up the correct eccentricity	**4**
4.	Locate points on curve	**4**
5.	Draw the curve	**5**
(b)	**Parabola 22**	
6.	Set up as given (2,2,2)	**6**
7.	Locate the focus	**4**
8.	Locate the vertex	**2**
9.	Set up the correct eccentricity for the curve	**3**
10.	Points on the curve	**3**
11.	Draw the curve.	**4**
12.	***Presentation*** **5**	**5**
	Total	**50**

Question 7

Marks

Given views **14**

1. Given plan (4,4) **8**
2. Given elevation (3,3) **6**

End Elevation **9**

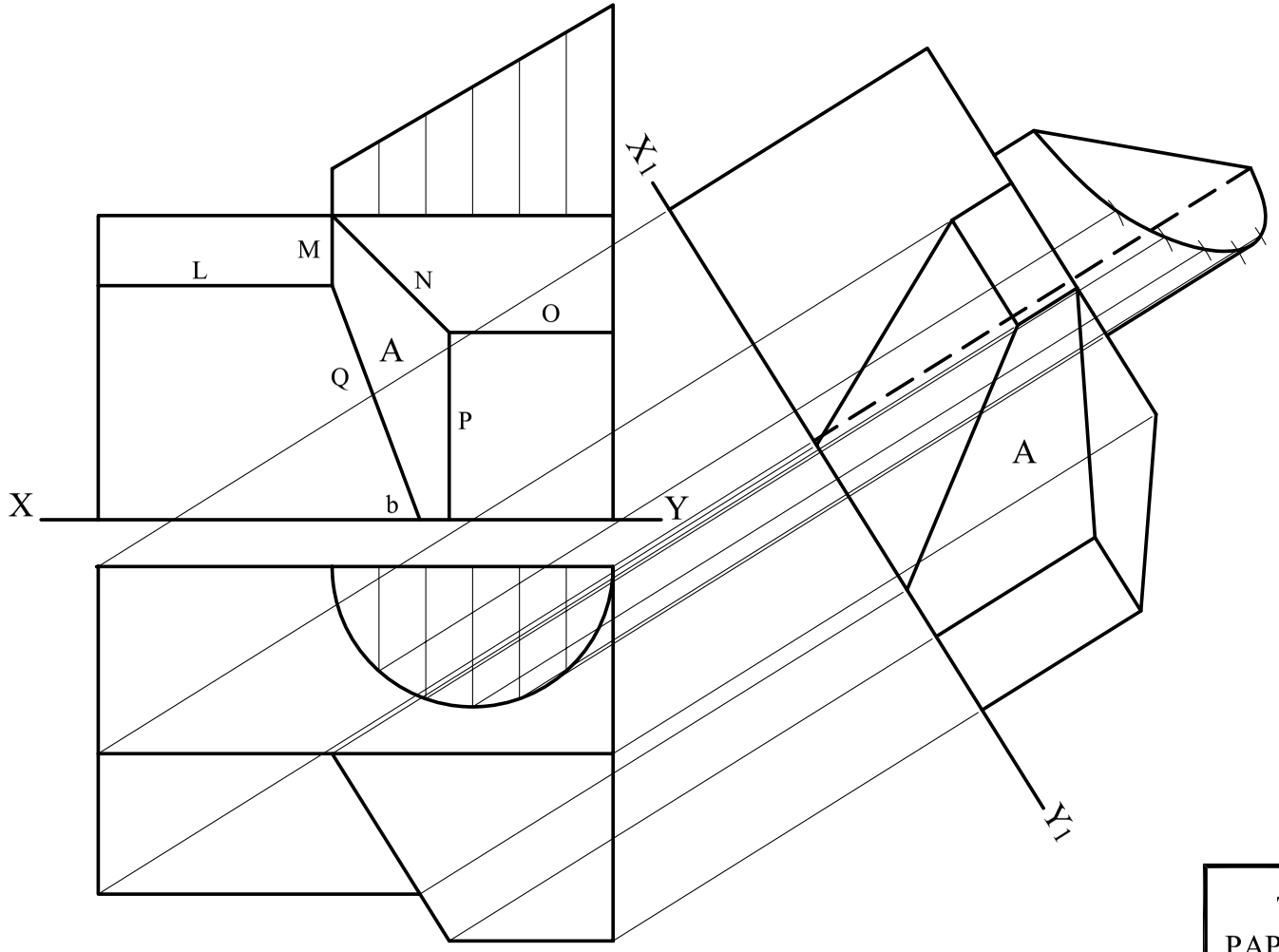
3. Rectangular prism (6x1) **6**
4. Triangular prism (3x1) **3**

Interpenetration **22**

5. Points a, b and c **6**
6. Points d, e and g **6**
7. Point f **3**
8. Complete the elevation **5**
9. Hidden detail correctly represented **2**

10. ***Presentation*** **5** **5**

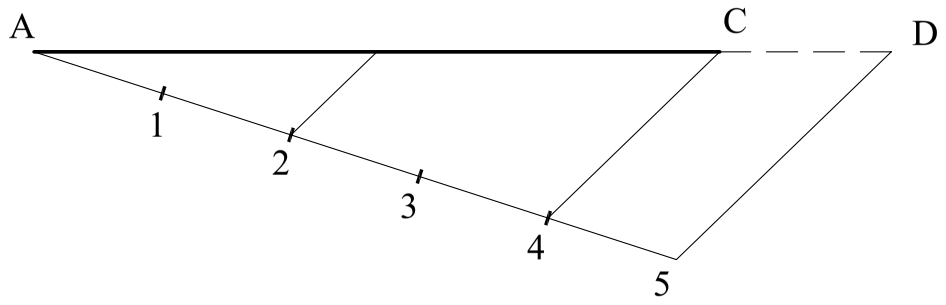
Total **50**

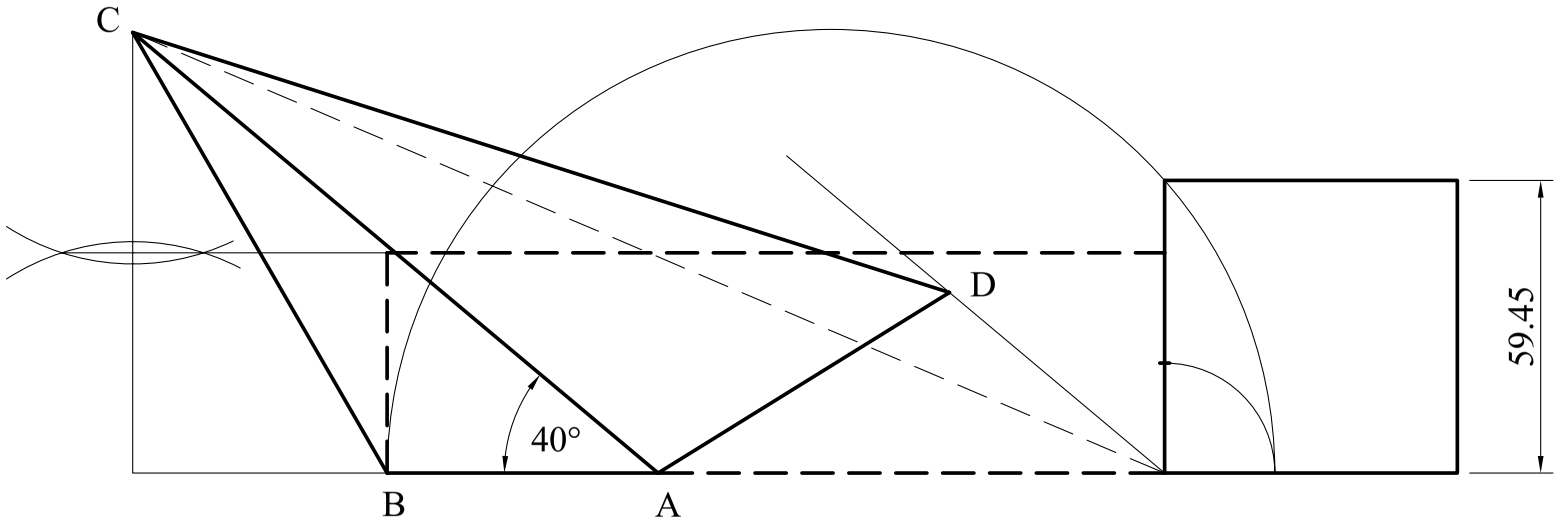


TECHNICAL DRAWING
PAPER 1 ORDINARY LEVEL

QUESTION 1	2008

SCALE: N/A





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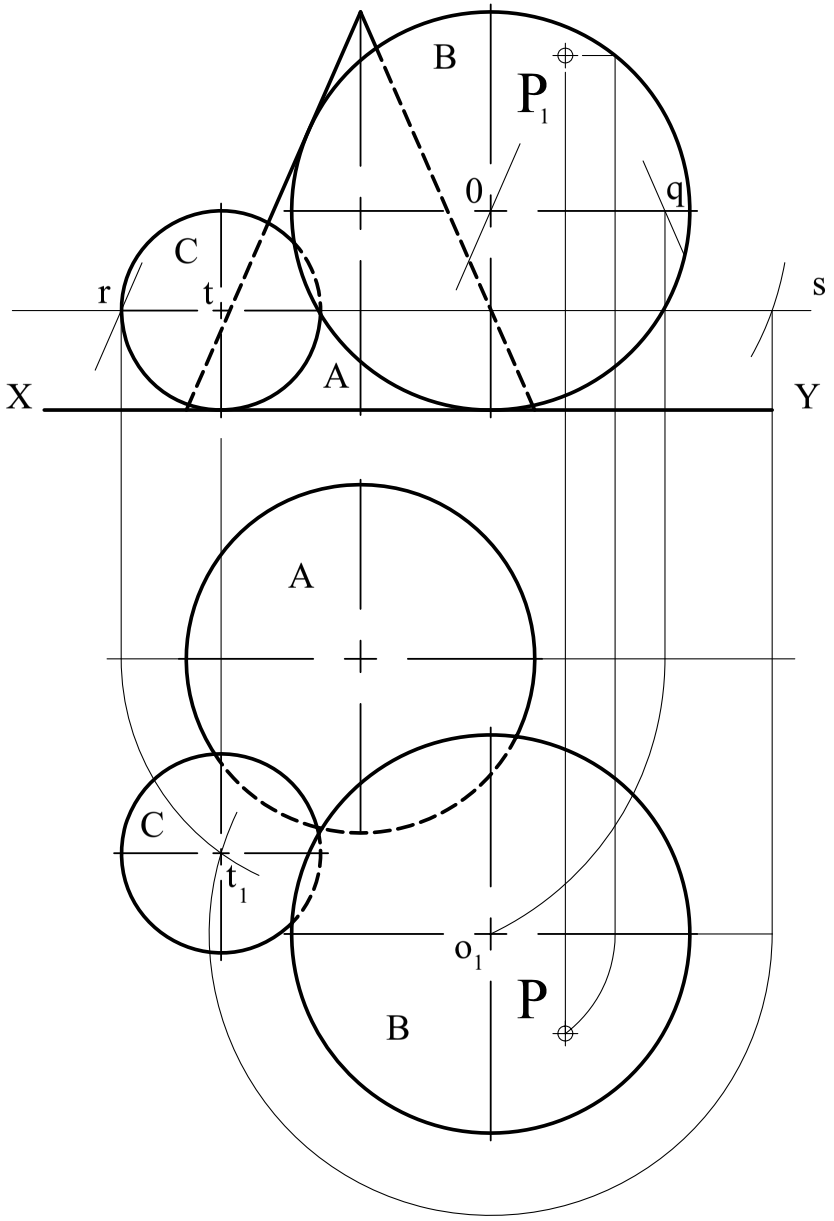
QUESTION 2	2008
SCALE: N/A	



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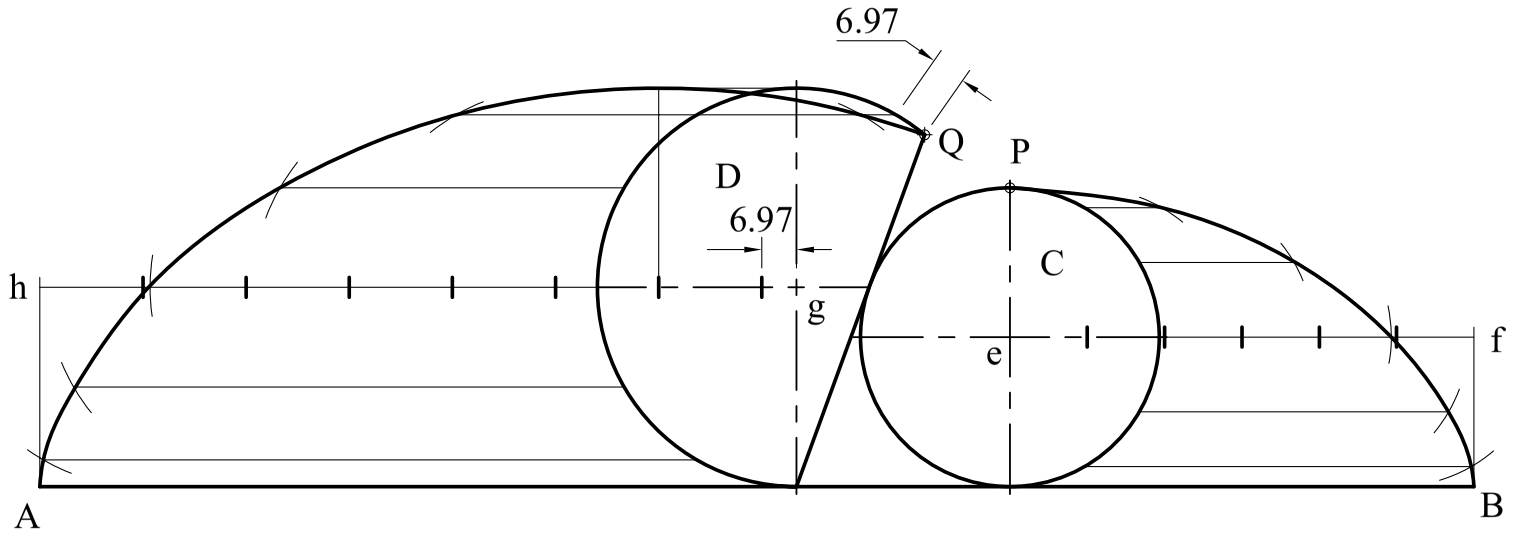
QUESTION 3	2008
SCALE: N/A	



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QUESTION 4	2008
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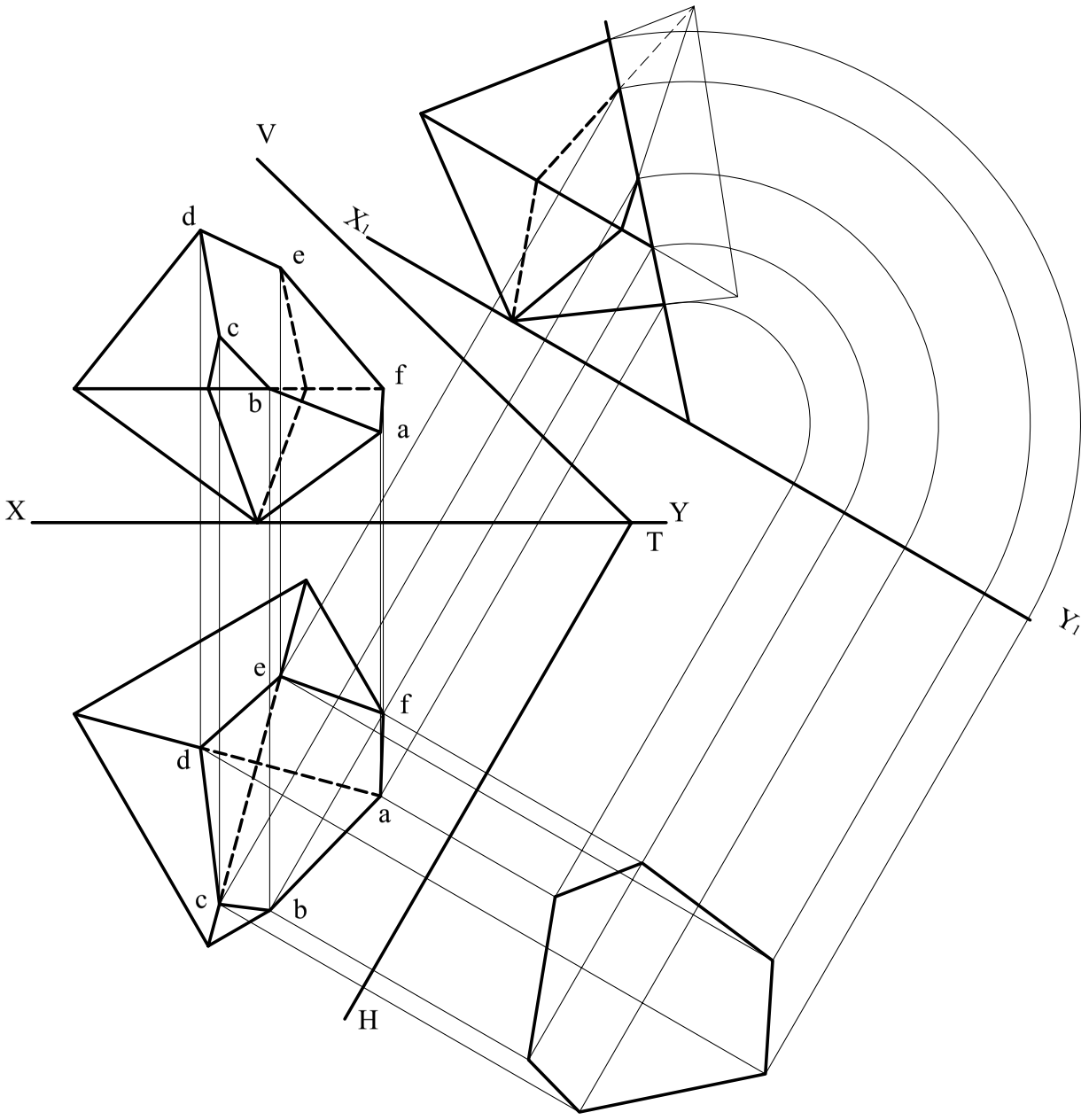

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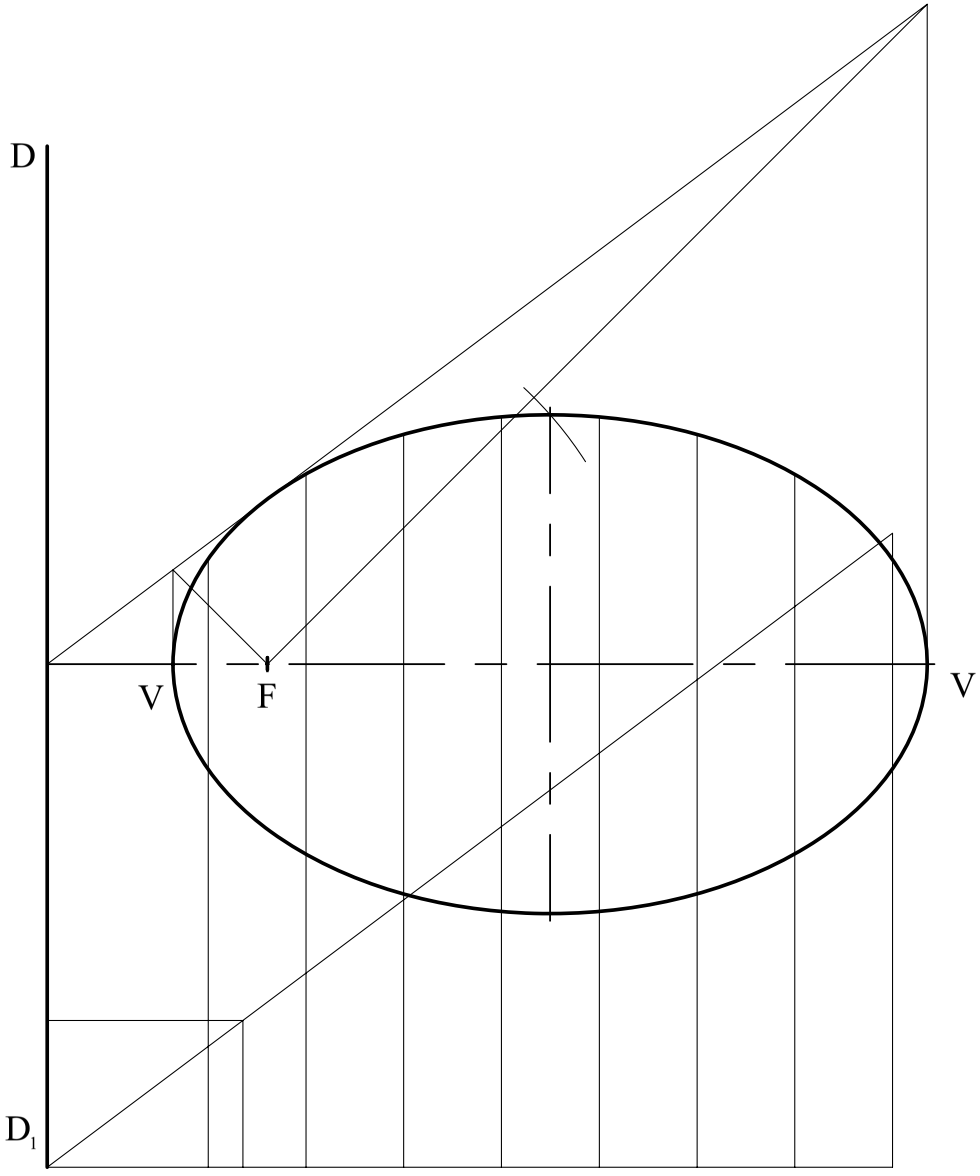
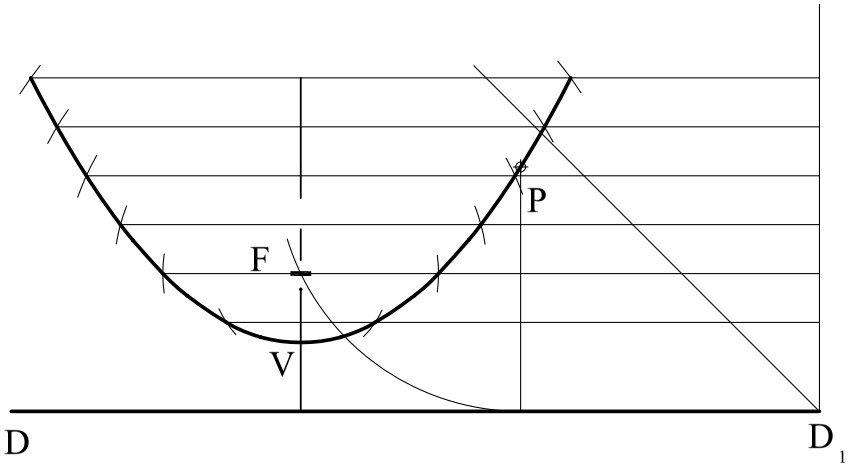
QUESTION 5	2008
SCALE: N/A	

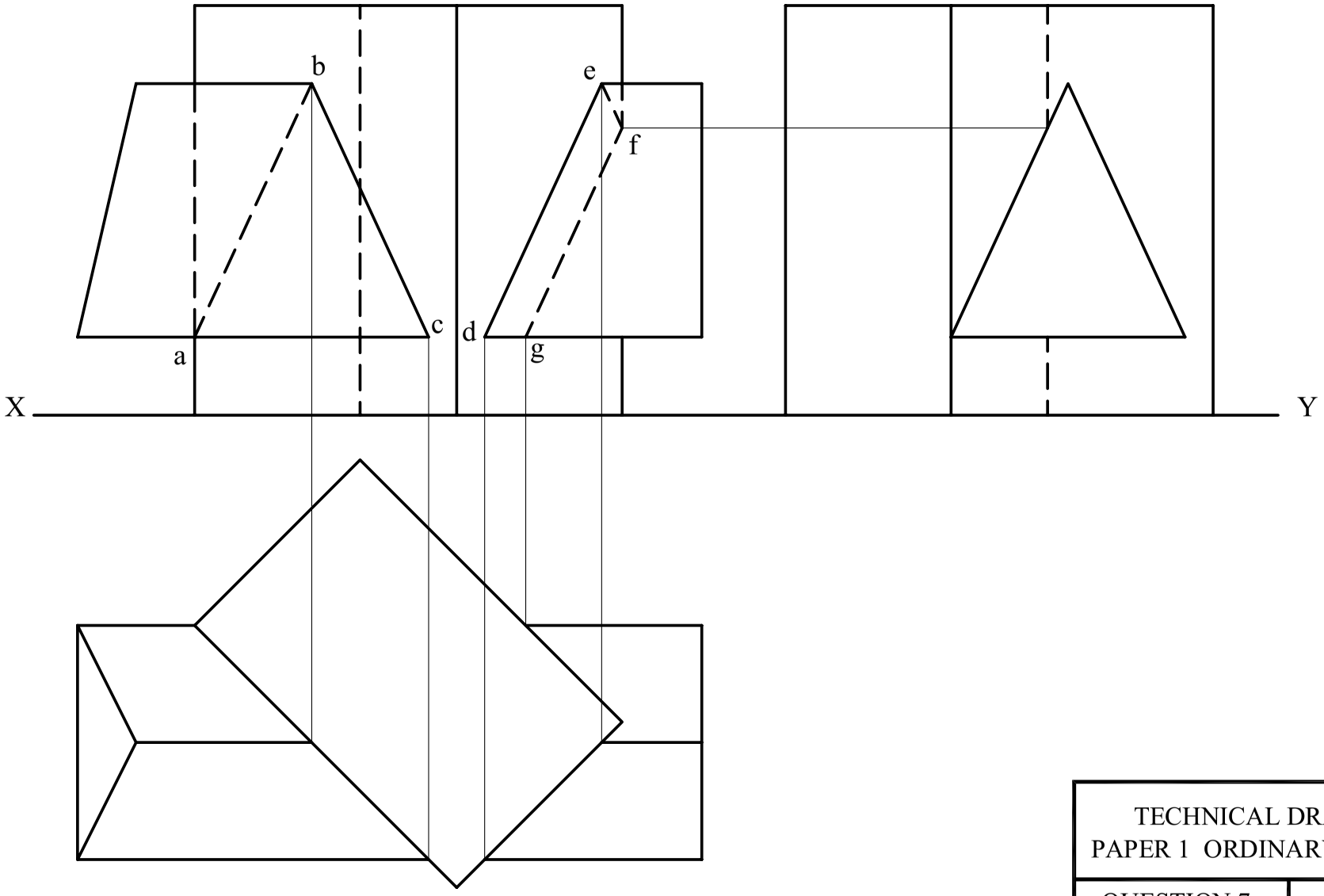


6a

6b



TECHNICAL DRAWING PAPER 1 ORDINARY LEVEL	
QUESTION 6	2008
SCALE: N/A	

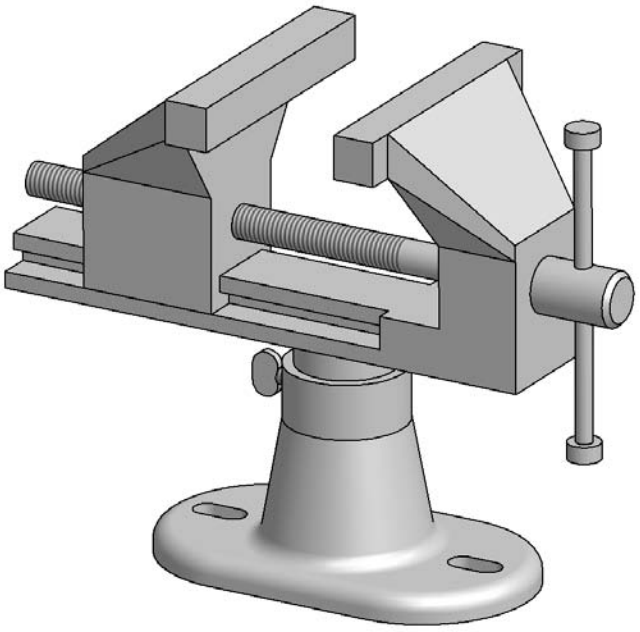


TECHNICAL DRAWING PAPER 1 ORDINARY LEVEL	
QUESTION 7	2008
SCALE: N/A	

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2008

Technical Drawing
Paper 2A - Ordinary Level



(Engineering Applications)

Marking Scheme and Sample Solutions

(Other valid solutions are acceptable and marked accordingly)

QUESTION 1 (*100 MARKS)*

CONCEPTS

A	**Assembly**	**5 marks**
B	**Sectional Elevation**	**46 marks**
C	**Plan**	**23 marks**
D	**Additional Requirements**	**26 marks**

A ASSEMBLY 5 Marks

(i)	Moving Jaw to Fixed Jaw	1
(ii)	Adjusting Screw to Fixed Jaw	1
(iii)	Set Screw to Fixed Jaw	1
(iv)	Vice Assembly to Support Base	1
(v)	Clamping Screw to Support Base	1

B SECTIONAL ELEVATION 46 Marks

1. Support Base (11 Marks)

(i)	Base Outline	5
(ii)	Base Relief	2
(iii)	Slotted Holes	2
(iv)	Centre and Threaded Hole	2

2. Fixed Jaw (12 Marks)

(i)	Horizontal Base Outline	2
(ii)	Vertical Body	2
(iii)	Sloping Body	2
(iv)	Jaw	2
(v)	Adjusting Screw Hole	1
(vi)	Threaded Hole	1
(vii)	Base Mounting Collar	1
(vi)	Base Mounting Spindle	1

3. Moving Jaw (8 Marks)

(i)	Base Outline/Position	3
(ii)	Sloping Body	2
(iii)	Jaw	2
(iv)	Threaded Hole	1

4. Adjusting Screw (11 Marks)

(i)	Screw Shank	2
(ii)	Head	2
(iii)	Tommy Bar	6
(iv)	U'Cut	1

5. Set Screw (2 Marks)

	Head/Shank/Spud	2

6. Clamping Screw (2 Marks)

	Head/Shank	2

C PLAN 23 Marks

1. Support Base (4 Marks)

(i)	Base Outline	2
(ii)	Vertical Sides	2

2. Fixed Jaw (9 Marks)

(i)	Front Body	3
(ii)	Jaw	2
(iii)	Horizontal Base	4

3. Moving Jaw (5 Marks)

(i)	Body	3
(ii)	Jaw	2

4. Adjusting Screw (5 Marks)

(i)	Screw Shank	2
(ii)	Head	2
(iii)	Tommy Bar	1

D ADDITIONAL REQUIREMENTS 26 Marks

(i)	**First or Third Angle Projection**	4
(ii)	**Title**	4
(iii)	**ISO Symbol** (Incorrect 2 Marks)	4
(iv)	**Dimensioning**	4
(v)	**Presentation** (Excellent 10, Good 8, Fair 6)	10

QUESTION 2 (50 MARKS)

A	**Given Views**	**26 marks**
B	**Surface Development of Pipe**	**16 marks**
C	**Presentation**	**8 marks**

A GIVEN VIEWS — 26 Marks

(i)	Triangular Base Plate Plan	5
(ii)	Baseplate Elevation	1
(iii)	Vertical Pipe Outline Plan	3
(iv)	Vertical Pipe Elevation	2
(v)	Sloping Pipe Elevation	6
(vi)	Pipe Divisions	4
(vii)	Sloping Pipe Plan	5

B SURFACE DEVELOPMENT OF PIPE — 16 Marks

(i)	Seam on CC (Any seam 2 marks)	4
(ii)	Stepping off of Circumference	4
(iii)	Length of Generators	4
(iv)	Outline of Top Curve	2
(v)	Outline of Lower Curve	2

C PRESENTATION — 8 Marks

(Excellent 8, Good 6, Fair 4)

Note: *Indexing to be considered under this heading*

QUESTION 3 (50 MARKS)

A Cam Profile 30 Marks
B Mechanism 20 Marks

A CAM PROFILE 30 Marks

(a) Displacement Diagram (10 Marks)

(i)	360° Divisions	1
(ii)	Lift/Travel	2
(iii)	0° to 60° Uniform Velocity	1
(iv)	60° to 240° Uniform Acc & Ret	2
(v)	240° to 270° Dwell	1
(vi)	270° to 360° Simple Har. Motion	2
(vii)	Drawing of Curve	1

(b) Cam Profile (15 Marks)

(i)	Minimum Radius	2
(ii)	Camshaft Diameter	1
(iii)	Maximum Radius	1
(iv)	0° to 60° Uniform Velocity	2
(v)	60° to 240° Uniform Acc & Ret	2
(vi)	240° to 270° Dwell	2
(vii)	270° to 360° Simple Har. Motion	2
(viii)	Direction of Rotation	2
(ix)	Drawing Profile	1

(c) Presentation 5

(Excellent 5, Good 4, Fair 3)

Note: *Indexing to be considered under this heading*

B MECHANISM 20 Marks

(a) Line Diagram (5 Marks)

(i)	Crank OA	1
(ii)	Rail EF	1
(iii)	Link ACB	1
(iv)	Fixed Pivot D	1
(v)	Link CP	1

(b) Locus of P (9 Marks)

(i)	Locus of A	2
(ii)	Points for B	2
(iii)	Points for C	2
(iv)	Points for P	2
(v)	Drawing Locus of P	1

(c) Machine Guard

Drawing of Guard Outline/ Clearance 3

(d) Presentation 3

(Excellent 3, Good 2, Fair 1)

Note: *Indexing to be considered under this heading*

QUESTION 4 *(50 MARKS)*

A	**Dimensional Drawing**	**32 Marks**
B	**Machine Part**	**12 Marks**
C	**Engineering Terms**	**6 Marks**

A DIMENSIONAL DRAWING 32 Marks

(a) Shape Description (18 Marks)

(i)	Diameter / Length	2
(ii)	Thread Conventions	1
(iii)	Undercut	2
(iv)	Diameter / Length	1
(v)	Flat	1
(vi)	Diameter / Length	1
(vii)	Fillet	1
(viii)	Diameter / Length	1
(ix)	Chamfers	1
(x)	Diameter / Length	1
(xi)	Taper Minimum Diameter	1
(xii)	Length	1
(xiii)	Woodruff Keyway	2
(xiv)	Diameter / Length	1
(xv)	Taper Angle	1

(b) Size Description (12 Marks)

(i)	Diameters	2
(ii)	Lengths	2
(iii)	Keyway	2
(iv)	Under Cut	1
(v)	Chamfers	1
(vi)	Fillet Radius	1
(vii)	Screw Thread Designation	1
(viii)	Taper	1
(ix)	Flat	1

(c) Presentation (2 Marks)

(i)	Centre Line	1
(ii)	Dimensions	1

B MACHINE PART 12 Marks

(a) Parts List (6 Marks)

(i)	Table	1
(ii)	Item Number / Name	5

(b) Pump Operation (6 Marks)

(i)	Description	3
(ii)	Sketch	3

C ENGINEERING TERMS 6 Marks

(i)	Ball-bearing	2
(ii)	Roller-bearing	2
(iii)	Bush	2

QUESTION 5 SECTION A *(50 Marks)*

A Isometric View **41 Marks**
B Engineering Terms **9 Marks**

A ISOMETRIC VIEW — 41 Marks

(a) Correct View (4 Marks)

(i)	Correct View Point P	4
	Oblique (2 Marks)	

(b) Sectioned View (12 Marks)

(i)	Base Block	3
(ii)	Lower Vertical Portion	2
(iii)	Sloping Surface	2
(iv)	Upper Vertical Portion	2
(v)	Cylinder Top/Lower	3

(c) Un-Sectioned View (Marks)

(i)	Construction Large Diameter	2
(ii)	Construction Small Diameter	2
(iii)	Construction Web	2
(iv)	Left Vertical Body	2
(v)	Top Surface Base	2
(vi)	Left Vertical Body x 2	4
(vii)	Inner Curve	2
(viii)	Outer Curve	2
(ix)	Curved Surface Top	1
(x)	Web	2

(d) Presentation 4
(Excellent 4, Good 3, Fair 2)

B ENGINEERING TERMS — 9 Marks

(i) **Counterbore**
Sketch 3

(ii) **Slotted Hole**
Sketch 3

(iii) **Blind Hole**
Sketch 3

QUESTION 5 SECTION B *(50 Marks)*

A	**Commands**	**6 Marks**
B	**Explanation**	**9 Marks**
C	**Freehand Isometric Sketch**	**10 Marks**
D	**Cad Profile**	**25 Marks**

A Commands (6) — 6 Marks

6 x 1 = 6

B Three Commands Explanation — 9 Marks

Sketch	2	3 x 3
Note	1	

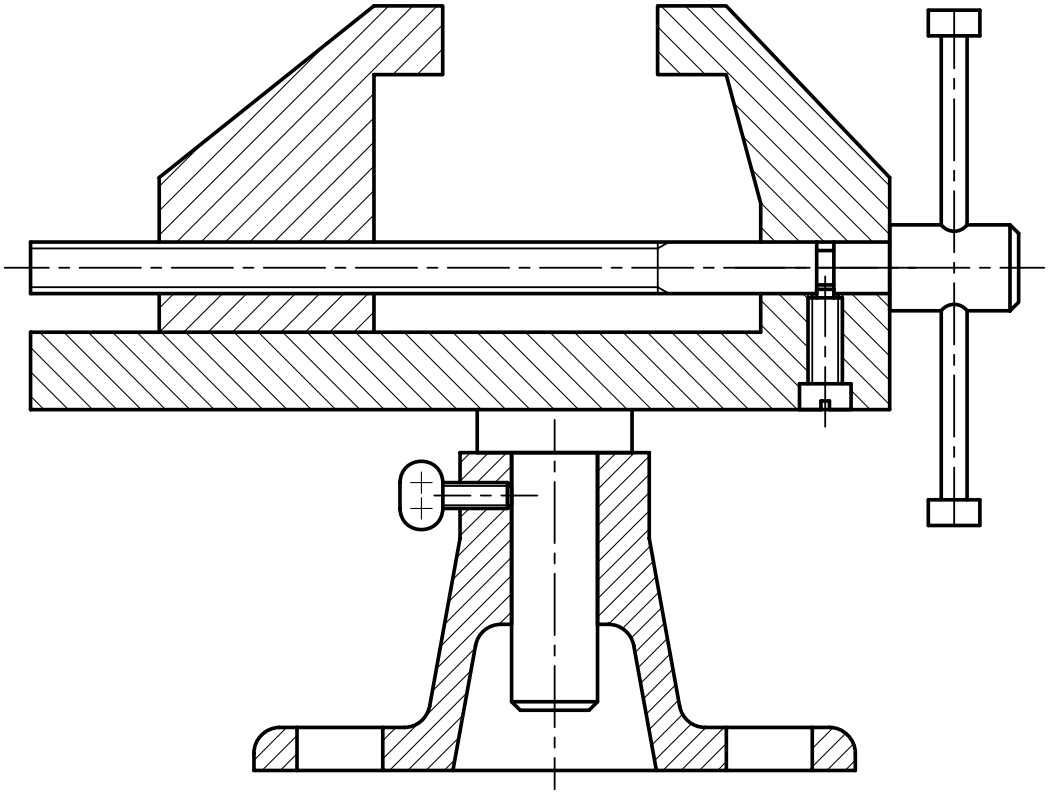
C Freehand Isometric Sketch — 10 Marks

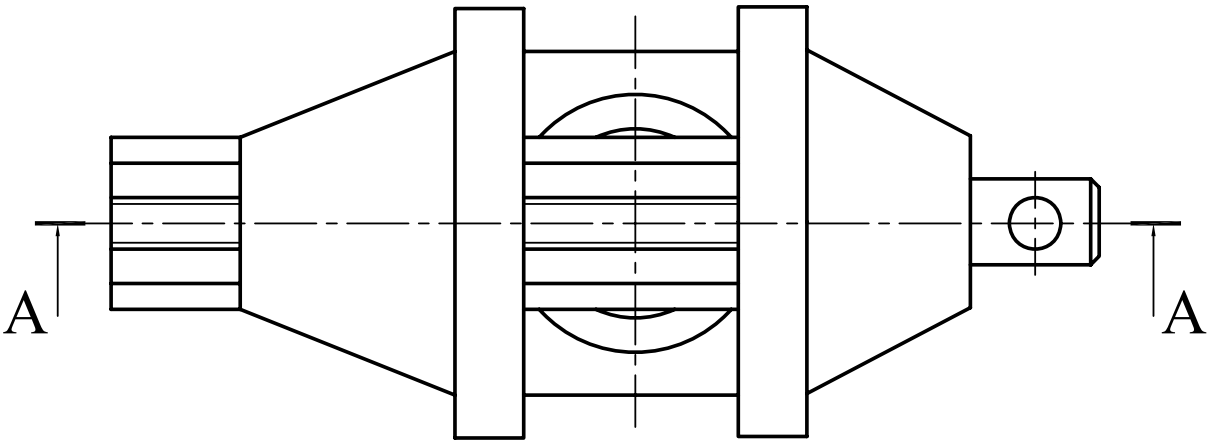
(i)	Correct View	2
(ii)	Base Block	2
(iii)	Rectangular Block Front	2
(iv)	Vertical Block & Curve	2
(v)	Triangular Wedge	2

D Cad Profile — 25 Marks

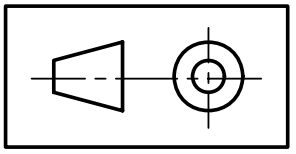
(i)	Rectangle	2
(ii)	Fillet	2
(iii)	Offset	2
(iv)	Circle	2
(v)	Circle Offset	2
(vi)	Circular Arc ABC	2
(vii)	Lines from A & C to Centre	2
(viii)	Trim Lines	1
(ix)	Rectangle	1
(x)	Three Lines DE, EF and FG	2
(xi)	Mirror	1
(xii)	Circle	1
(xiii)	Polyline	1
(xiv)	Rectangular Array	2
(xv)	Presentation	2

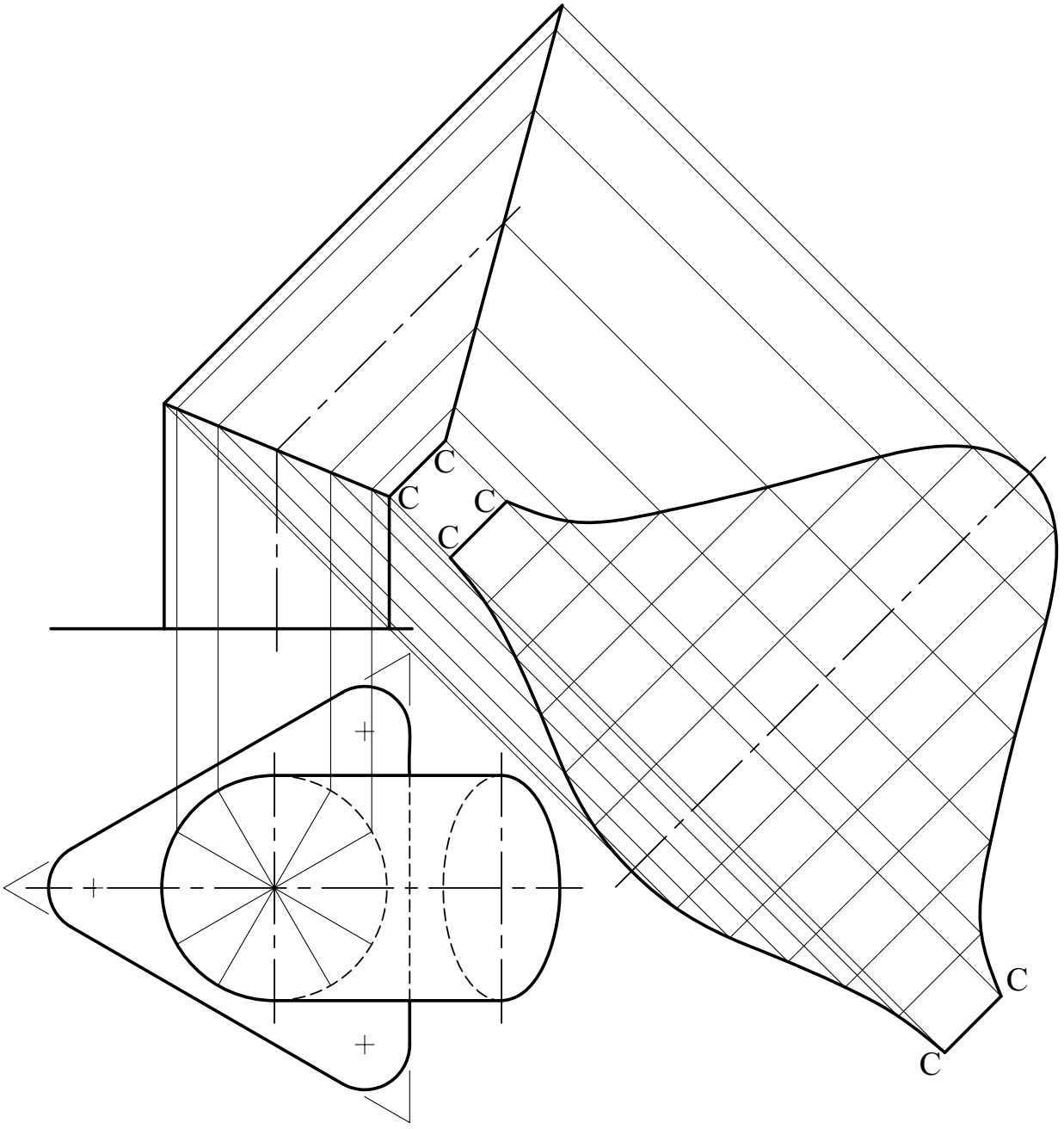
ADJUSTABLE TABLE VICE





Q1. (a) & (b)

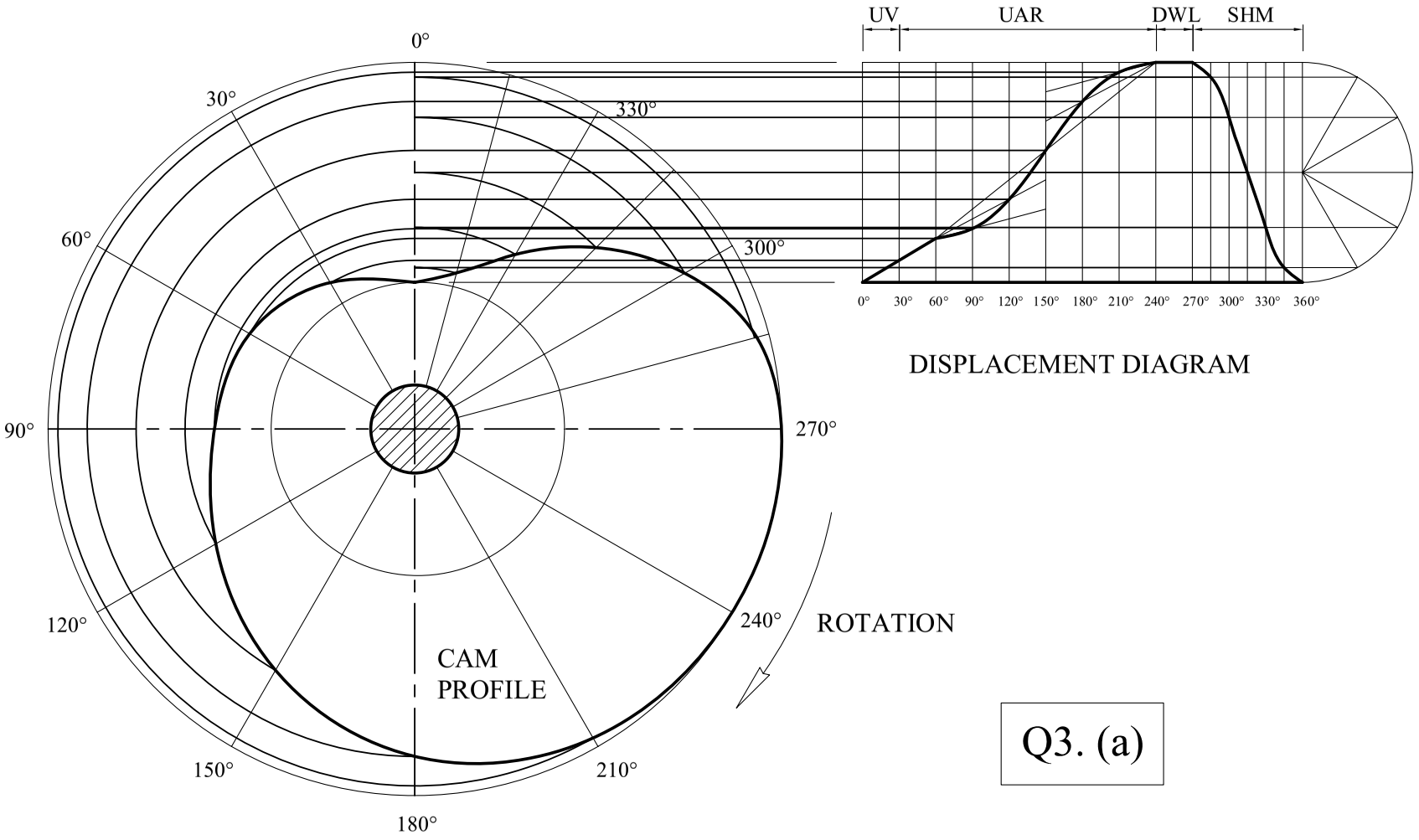




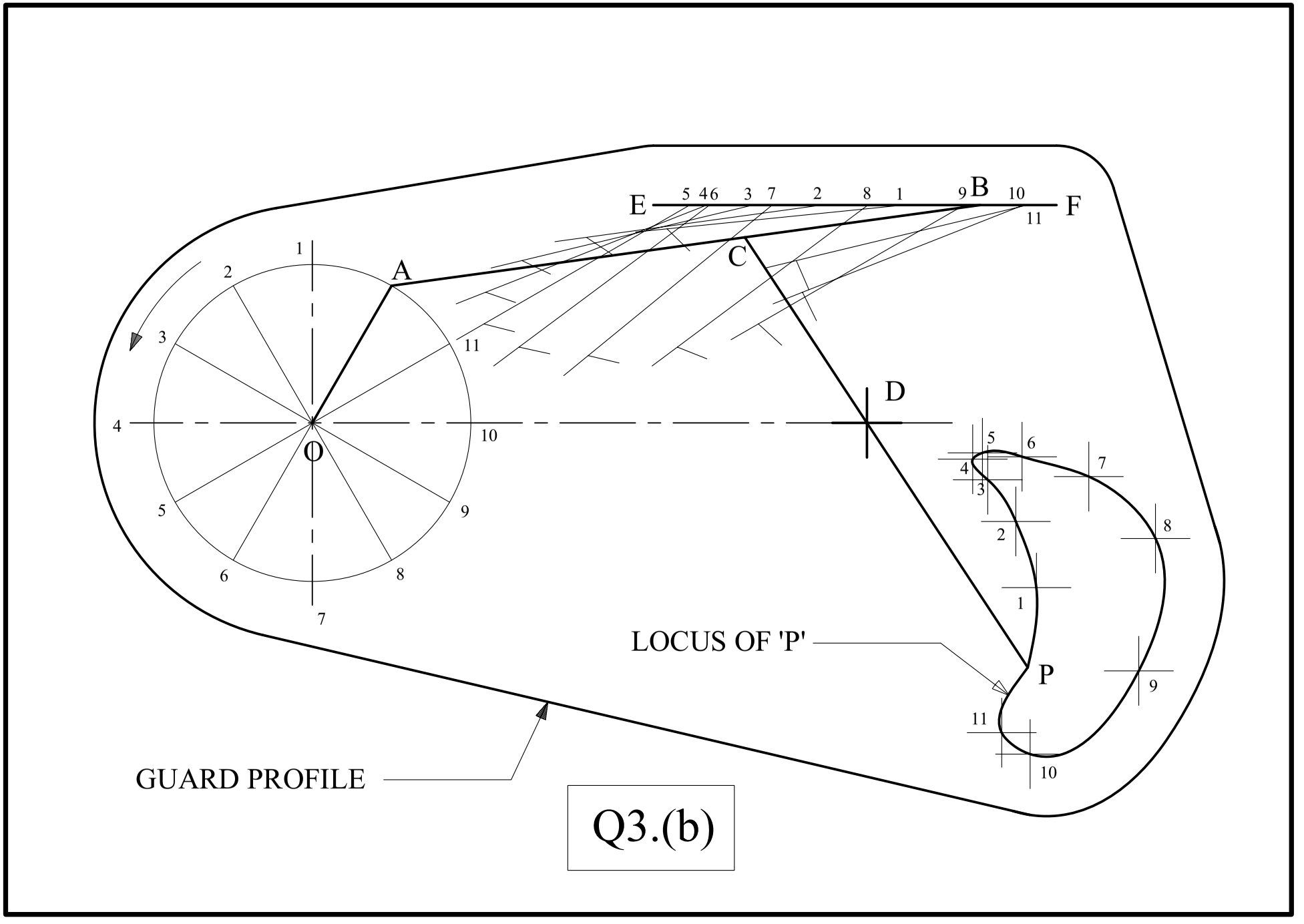
(a) ELEVATION & PLAN

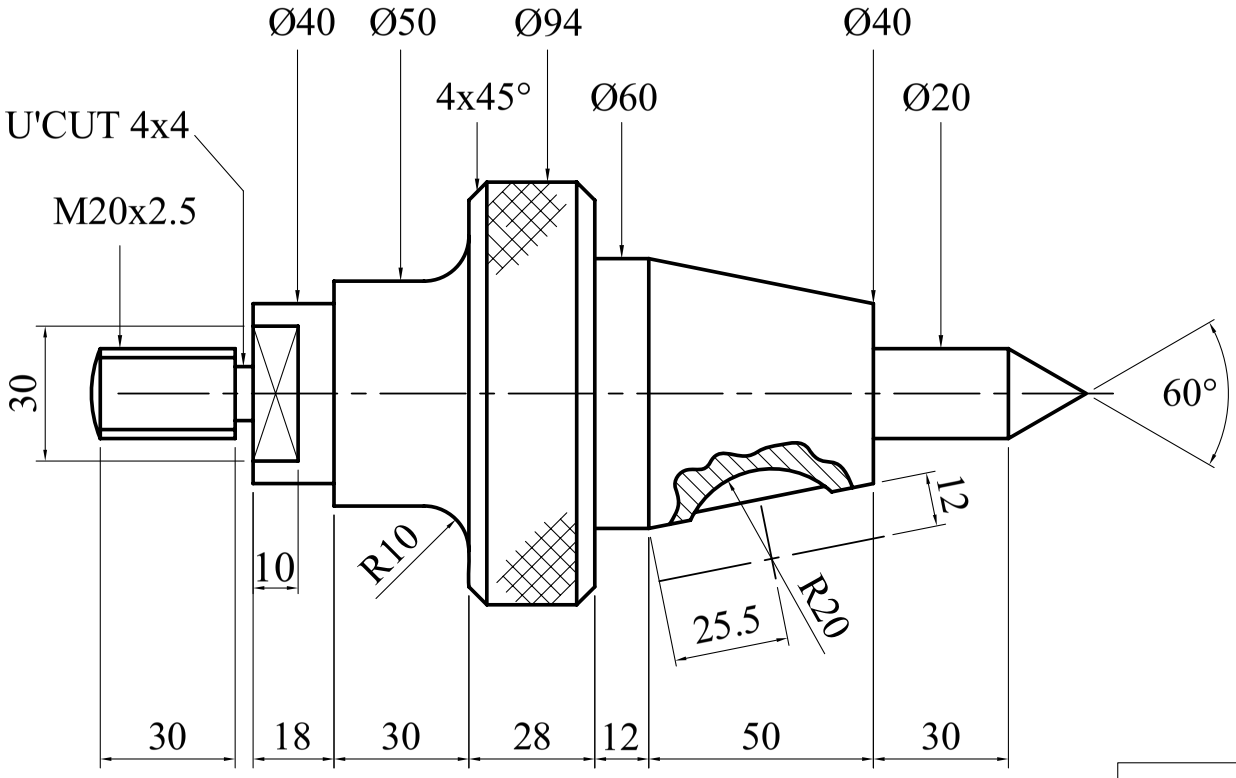
(b) SURFACE DEVELOPMENT OF PIPE

Q2. (a) & (b)


UV
UAR
DWL
SHM
0°
30°
330°
60°
300°
90°
270°
120°
240°
150°
210°
180°
0° 30° 60° 90° 120° 150° 180° 210° 240° 270° 300° 330° 360°
DISPLACEMENT DIAGRAM
CAM
PROFILE
ROTATION

Q3. (a)


E
5 4 6 3 7 2 8 1 9
B
10
11
F
A
C
D
O
1
2
3
4
5
6
7
8
9
10
11
LOCUS OF 'P'
P
GUARD PROFILE
Q3.(b)

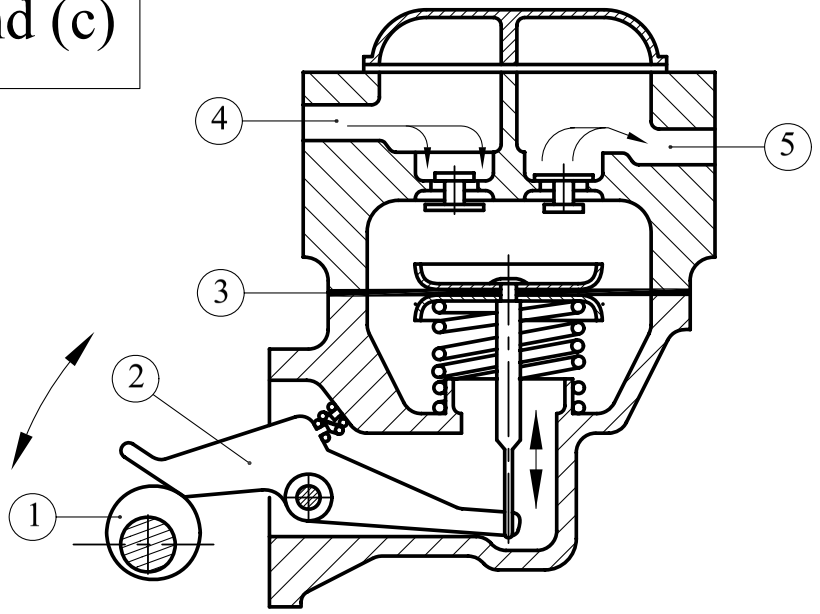

Ø40
Ø50
Ø94
Ø40
4x45°
Ø60
Ø20
U'CUT 4x4
M20x2.5
30
60°
12
10
R10
25.5
R20
30
18
30
28
12
50
30

Q4. (a)

(i)

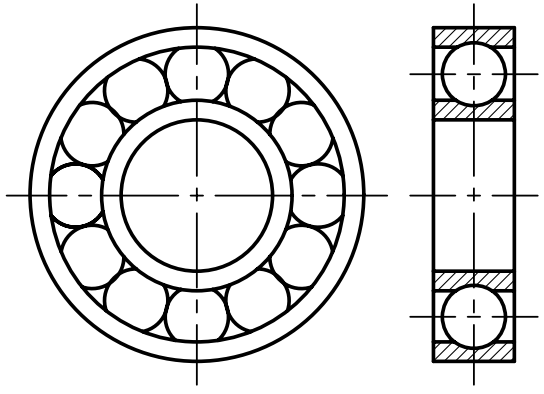
NO.	NAME
1	CAM
2	FOLLOWER
3	DIAPHRAM
4	INLET
5	OUTLET

Q4. (b) and (c)

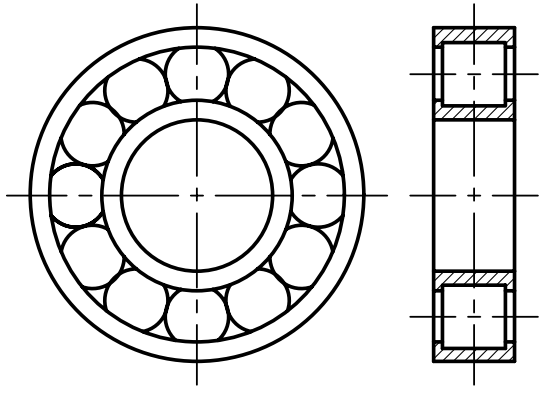


(ii) PUMP OPERATION

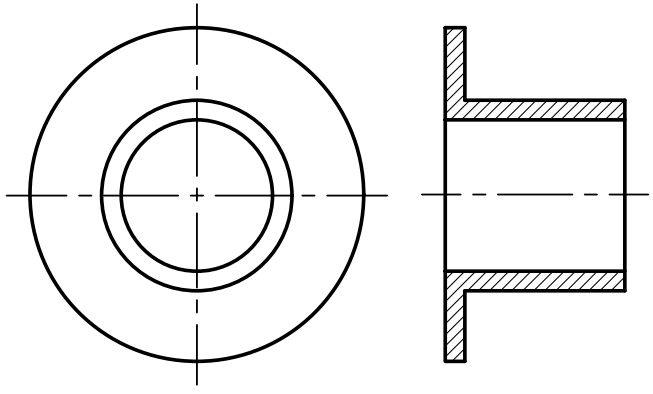
As the cam rotates the follower rocks causing the diaphram to be moved up and down.
On the downward stroke the liquid is sucked in through port 4
On the upward stroke the liquid is pumped out through port 5



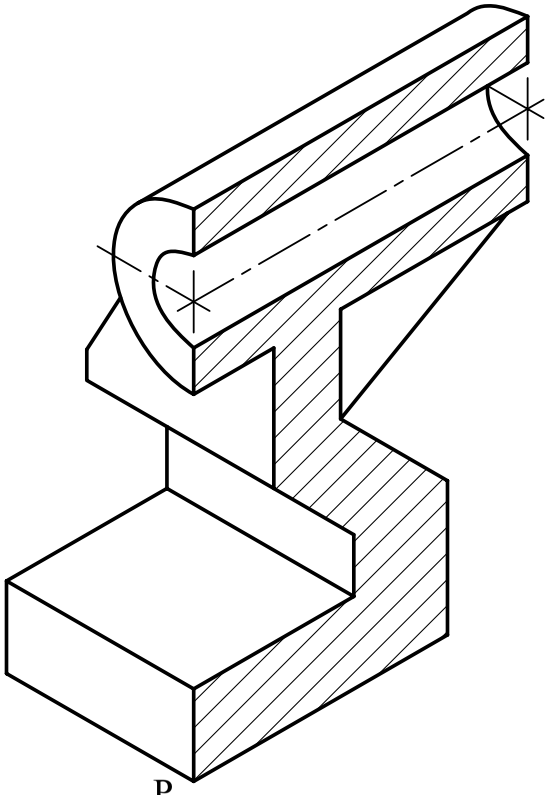
(i) BALL-BEARING

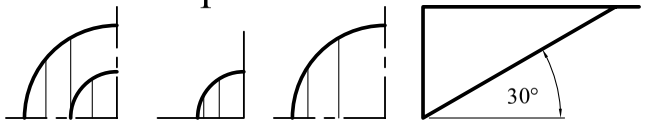


(ii) ROLLER-BEARING

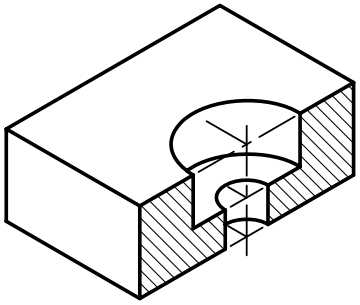


(iii) BUSH

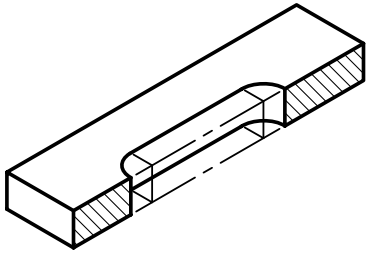




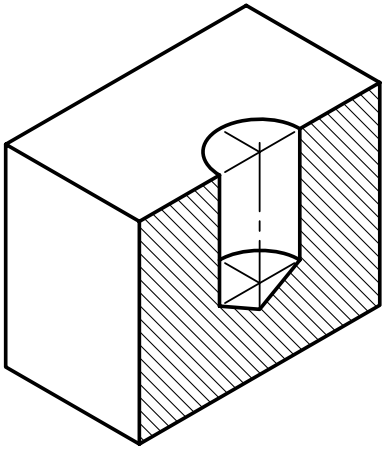
Q5. (a) SECTION A



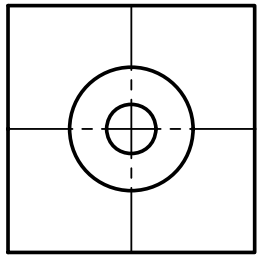
(i) Counterbore

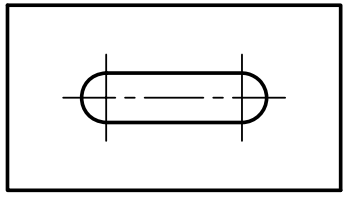


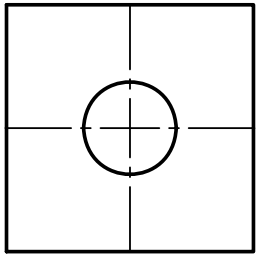
(ii) Slotted hole



(iii) Blind hole







Q5. (b) SECTION A

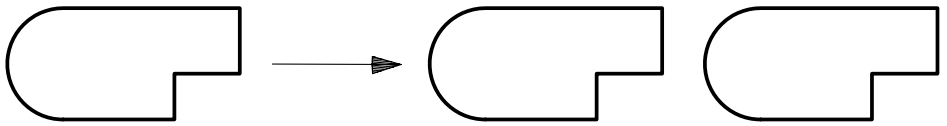
(a) Any 6 suitable CAD commands

LINE, CIRCLE, FILLET, OFFSET, COPY, TRIM, EXTEND, POLYGON, etc.

(b) CAD commands

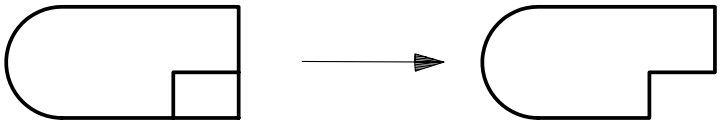
(i) COPY

DUPLICATES OBJECTS.



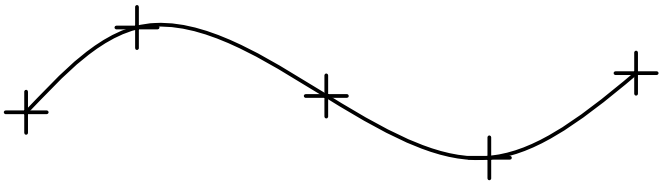
(ii) TRIM

TRIMS OBJECTS AT A CUTTING EDGE DEFINED BY OTHER OBJECTS.

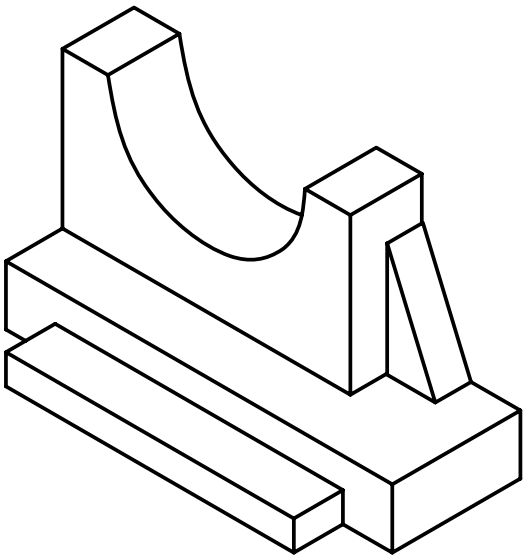


(iii) SPLINE

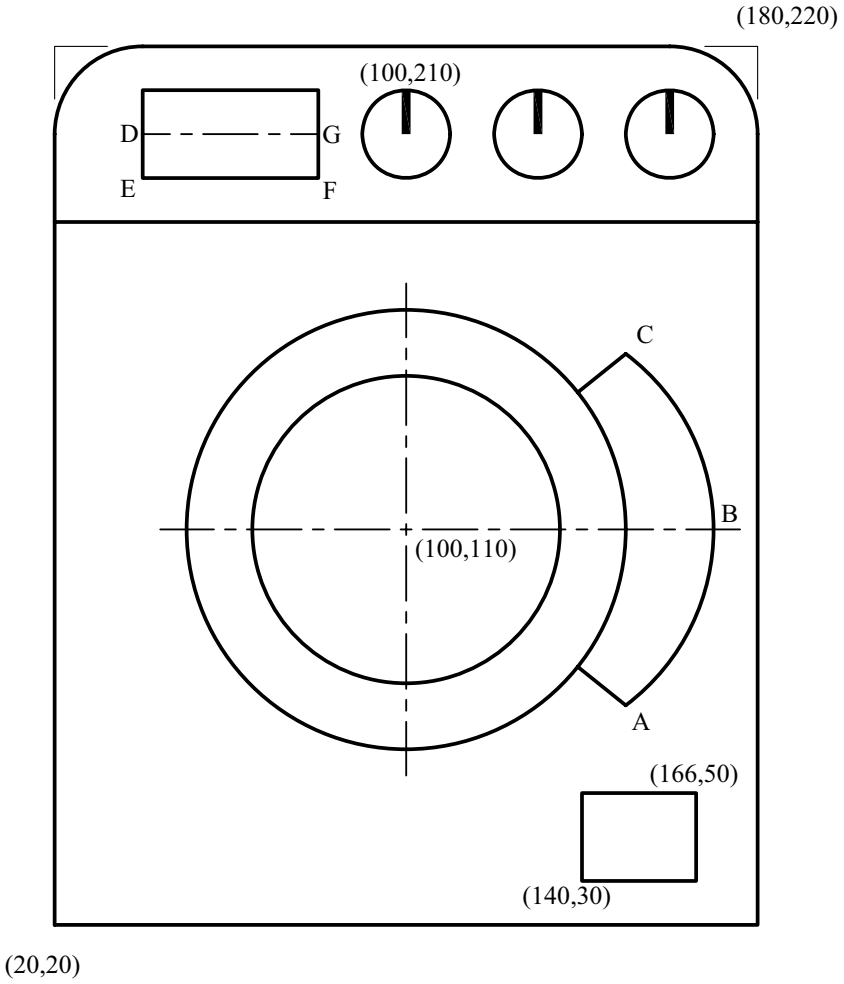
A SPLINE IS A SMOOTH CURVE PASSING THROUGH A GIVEN SET OF POINTS.



(c) Isometric sketch



Q5. (a), (b) & (c)
SECTION B



Q5. (d) SECTION B

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2008

Technical Drawing
Paper 2B - Ordinary Level

(Building Applications)

Marking Scheme and Sample Solutions

(Other valid solutions are acceptable and marked accordingly)

Question 1		Marks
(1)	Draw the given plan. *(Any four lines.)* *(1x4)*	**4**
(2)	Position spectator, PP, VP_1 & VP_2 in plan. *(Any spectator, any PP, -1 if VPs incorrect.)* *(1,2,1,1)*	**5**
(3)	Ground line, horizon line, and VPs in elevation. *(-1 if VPs projected incorrectly.)* *(1,1,1,1)*	**4**
(4)	Projection lines from S to plan. *(Any one line.)*	**2**
(5)	Perspective of base lines. *(Point on GL, right & left vanishing lines, right & left points.)* *(1,2,2)*	**5**
(6)	**Steps** Heights 1, 2 & 3 and apply, vertical step ends. *(3,4)*	**7**
(7)	Complete steps. *(One vertical and one horizontal surface for each step.)* *(2,2,2)*	**6**
(8)	**Canopy** Perspective of front of canopy. *(Heights 6 & 7 & apply, vertical front surface)* *(1,1,1)*	**3**
(9)	Heights to rear of canopy and complete canopy. *(Heights 4 & 5 and apply, three lines.)* *(2,2)*	**4**
(10)	**Press Box** Locate the front surface and complete the press box. *(Height of edge, apply, base line, two surfaces.)* *(1,1,1,2)*	**5**
(11)	Presentation	**5**
	Total Marks	**50**

Question 2		Marks
(1)	Draw roof perimeter in plan. *(Any four lines.)* *(1x4)*	**4**
(2)	Draw elevation of surfaces A & B. *(Projections from plan, wall & angles.)* *(2,2)*	**4**
(3)	Edge view of surfaces E & F in end view (or auxiliary). Determine ridge height and establish ridge in elevation. *(Projections, angles, ridge height & ridge in elevation.)* *(2,2,1)*	**5**
(4)	Edge view of surface D and ridge of roof AB in end view. *(Starting ht. & angle of D, ridge ht. of AB.)* *(1,1)*	**2**
(5)	Intersections of roofs A, B, D, E and F in plan. *(Three projections from elevation, four projections from end view, any three new lines of intersection in plan.)* *(2,2,3)*	**7**
(6)	Auxiliary edge view of surface C, and complete plan. *(Viewing angle & XY line, pitch of C, ridge height & project to plan, any one new line in plan.)* *(1x4)*	**4**
(7)	Complete roof surface C in elevation. *(Project ridge point to elevation, two lines.)* *(1,2)*	**3**
(8)	Development of surface F. *(Four widths from plan, three lengths from end view, correct outline.)* *(2,2,2)*	**6**
(9)	**Dihedral angle between surfaces C & E.** True length of line of intersection. *(Viewing angle & XY line, height, true length.)* *(1x3)*	**3**
(10)	Dihedral angle. *(Plane at 90° to tl., rebatted to XY, projections to plan, angle lines,.)* *(2,1,3,1)* **or** *(Viewing direction & XY line, projections to aux. plan, three widths, angle lines.)* *(1,2,3,1)*	**7**
(11)	Presentation	**5**
	Total Marks	**50**

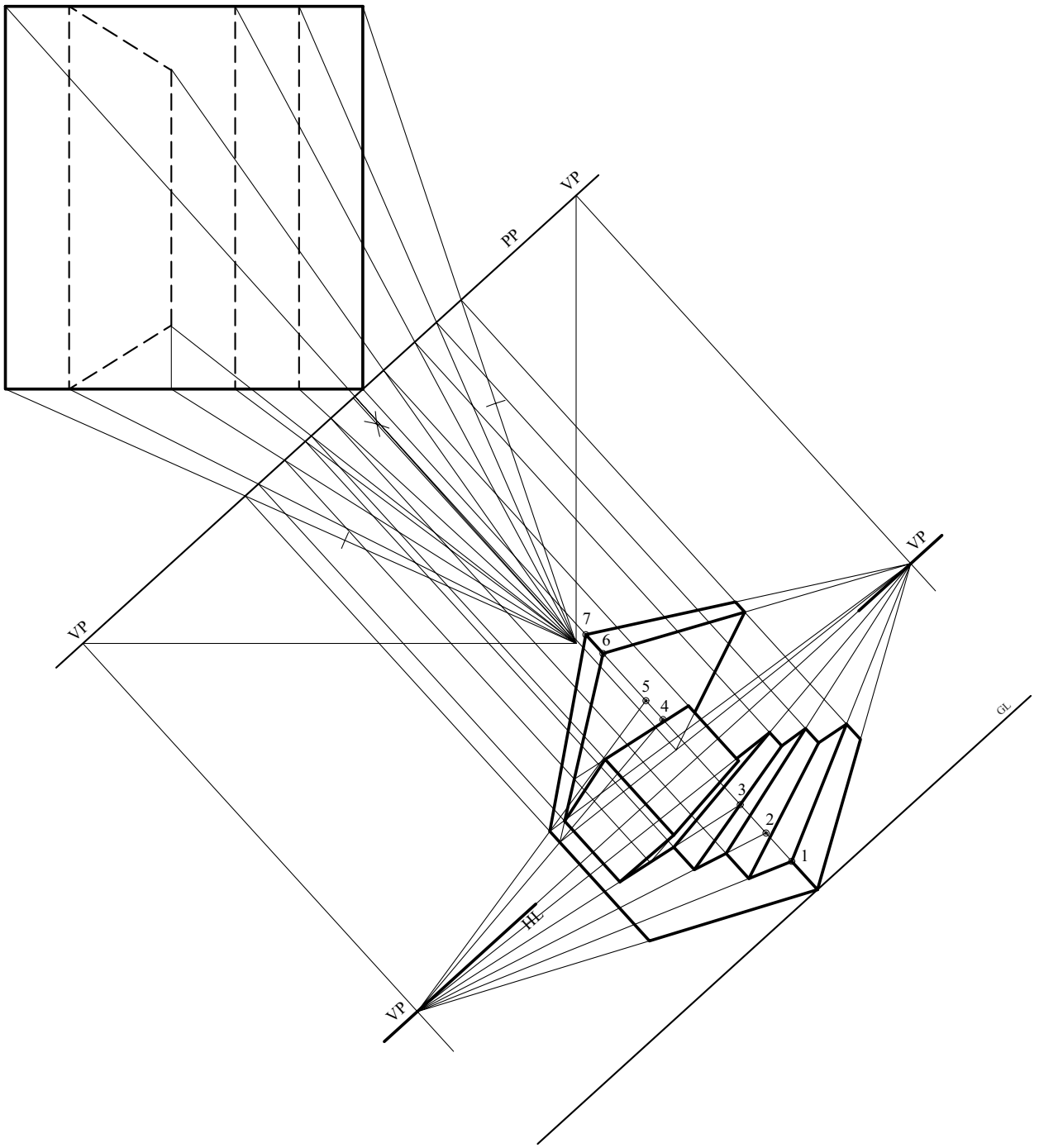
Question 3		Marks
(1)	Draw the given plan and elevation. *(5,5)*	**10**
(2)	*Lines at appropriate angles in plan and elevation.* *(Any line at correct **angle** in each view.)* *(2,2)*	**4**
(3)	Shadow of cantilever section. *(Seven projection lines, three points, two lines.)* *(1x7 ,3, 1x2)*	**12**
(4)	Shadow of straight portion of sail section. *(Four projection lines, two points, two lines.)* *(1x4, 2, 1x2)*	**8**
(5)	Shadow of curved portion of sail section. *(Four projection lines, one point, any curved line.)* *(4,1,2)* *(-1 if straight)*	**7**
(6)	Identify shadow cast.	**4**
(7)	Presentation	**5**
	Total Marks	**50**

Question 4		Marks
(1)	**Plan and Elevation** Draw the given plan, including the elements. *(6,1,1)*	**8**
(2)	Project outline to elevation, measure the heights and draw outline elevation. *(Two widths, three heights, four lines.)* *(2,3,4)*	**9**
(3)	Proportional division and draw elements in elevation. *(Division, division, two elements, two elements.)* *(1,1,2,2)*	**6**
(4)	**End Elevation** Determine heights and widths in end elevation. *(Three heights, four widths.)* *(2,2)*	**4**
(5)	Elements in end elevation. *(Two correctly located end points, two elements each way.)* *(2,1x4)*	**6**
(6)	**True Shape of Section** Draw line AF. *(1)*	**1**
(7)	Project intersections from plan to section and elevation. Establish heights in elevation. *(Three **internal** projections to elevation, any three to section, three **internal** heights in elevation.)* *(2,2,2)*	**6**
(8)	Transfer heights to section and draw curves. *(Three main hts., two internal hts. left & right, curve.)* *(2,2,1)*	**5**
(9)	Presentation	**5**
	Total Marks	**50**

Question 5		Marks
(1)	Draw the given views. *(Elevation, plan, end elevation.)* *(4,9,2)*	**15**
(2)	Isometric axis. *(Corner & vertical line, two 30° lines.)* *(1,1,1)* *(-1 if wrong angle used)*	**3**
(3)	Cage for truncated base pyramid in isometric. *(Widths in isometric, height in isometric.)* *(2,1)*	**3**
(4)	Determine top of truncated base pyramid and draw outline. *(Two widths top left, two widths top right, two sloped faces.)* *(1,1,2)*	**4**
(5)	Constructing centre prism in isometric. *(Height, two vertical faces)* *(1, 1x2)*	**3**
(6)	Determining truncated top pyramid in isometric. *(Height, two widths* top *left, two widths* top *right, two sloped faces.)* *(1,1,1,2)*	**5**
(7)	Constructing top prism in isometric. *(Height, two vertical faces, top surface)* *(1,1,1)*	**3**
(8)	**Semicircular arches in base** Cage for arches in orthographic views. *(Two widths, two heights, two depths.)* *(1,1,1)*	**3**
(9)	Transfer of cage to isometric view and draw curves. *(One width, one height, one depth, curve, second curve.* *(1x5)*	**5**
(10)	Internal edges of arches. *(One base line at 30° **&** one curved line.)* *(1)*	**1**
(11)	Presentation	**5**
	Total Marks	**50**

Question 6		Marks
(1)	Draw the given plan and project the widths to the elevation. *(Three circles, two octagons, any three widths to elevation.)* *(3,2,3)*	**8**
(2)	Establish heights in elevation. *(1x5)*	**5**
(3)	Draw tangent to throat circle in plan and establish asymptotes in elevation. **or** (Tangents to throat circle in plan.) *(Throat tangent, project to elevation, <u>one</u> asymptote in elevation.)* *(1,1,2)* **or** *(Any four tangents to throat circle in plan.)* *(1x4)*	**4**
(4)	Cross sections in plan. **or** (Project tangents to elevation.) *(Two points on asymptote **&** projected to elevation, points rotated and projected to elevation.)* *(2x2)*	**4**
(5)	Plot internal points in elevation. **or** (Draw tangents in elevation.) *(Horizontal projection, point, horizontal projection, point.)* *(1x4)*	**4**
(6)	Draw curves in elevation. *(1,1)*	**2**
(7)	Complete glazed level in elevation. *(<u>Four</u> surfaces to sides, <u>four</u> surfaces to top.)* *(2,2)*	**4**
(8)	**<u>True Shape of Section S-S</u>** Draw the section line and project lengths to section. *(Line S-S, Projections at 90°, XY line **or** centre line.)* *(1,1,1)*	**3**
(9)	<u>Glazed portion</u>, widths obtained from plan, transferred to section and the outline drawn. *(Any two widths from plan, transferred to section, <u>four</u> lines.)* *(2,2,2)*	**6**
(10)	<u>Curved portion</u>, widths obtained from plan, transferred to section and curve drawn. *(Widths of <u>three</u> points (Two end & one internal), <u>three</u> widths transferred to section, any curve.)* *(2,2,1)*	**5**
(11)	Presentation.	**5**
	Total Marks	**50**

Question 7		Marks
(1)	**Profile** Measure heights and draw horizontal sections. *(3,2)*	**5**
(2)	Projections from intersections of line DE with contours to profile. *(Any 5, -1 if projected from wrong line.)* *(1x5)*	**5**
(3)	Draw outline of profile. *(Any 8 segments)* *(1x8)*	**8**
(4)	**Dip and Strike** Join points A, B and C in plan. *(1x3)*	**3**
(5)	Draw triangle in elevation. *(Locating correct points, draw lines.)* *(3,3)*	**6**
(6)	Horizontal line in elevation.	**2**
(7)	Strike in plan. *(Projection to plan, locate point, draw strike.)* *(1,1,1)*	**3**
(8)	Viewing direction for dip and new XY line. *(Viewing direction, XY line.)* *(1,1)*	**2**
(9)	Determine Dip. *(Two heights, edge view)* *(2,1)*	**3**
(10)	**Transmitter** Draw outline of profile of line FG. *(Join FG, Projections at 90°, heights, draw profile.)* *(1,2,2,1)*	**6**
(11)	Determine height of receiver. *(Line if sight, draw receiver.)* *(1,1)*	**2**
(12)	Presentation	**5**
	Total Marks	**50**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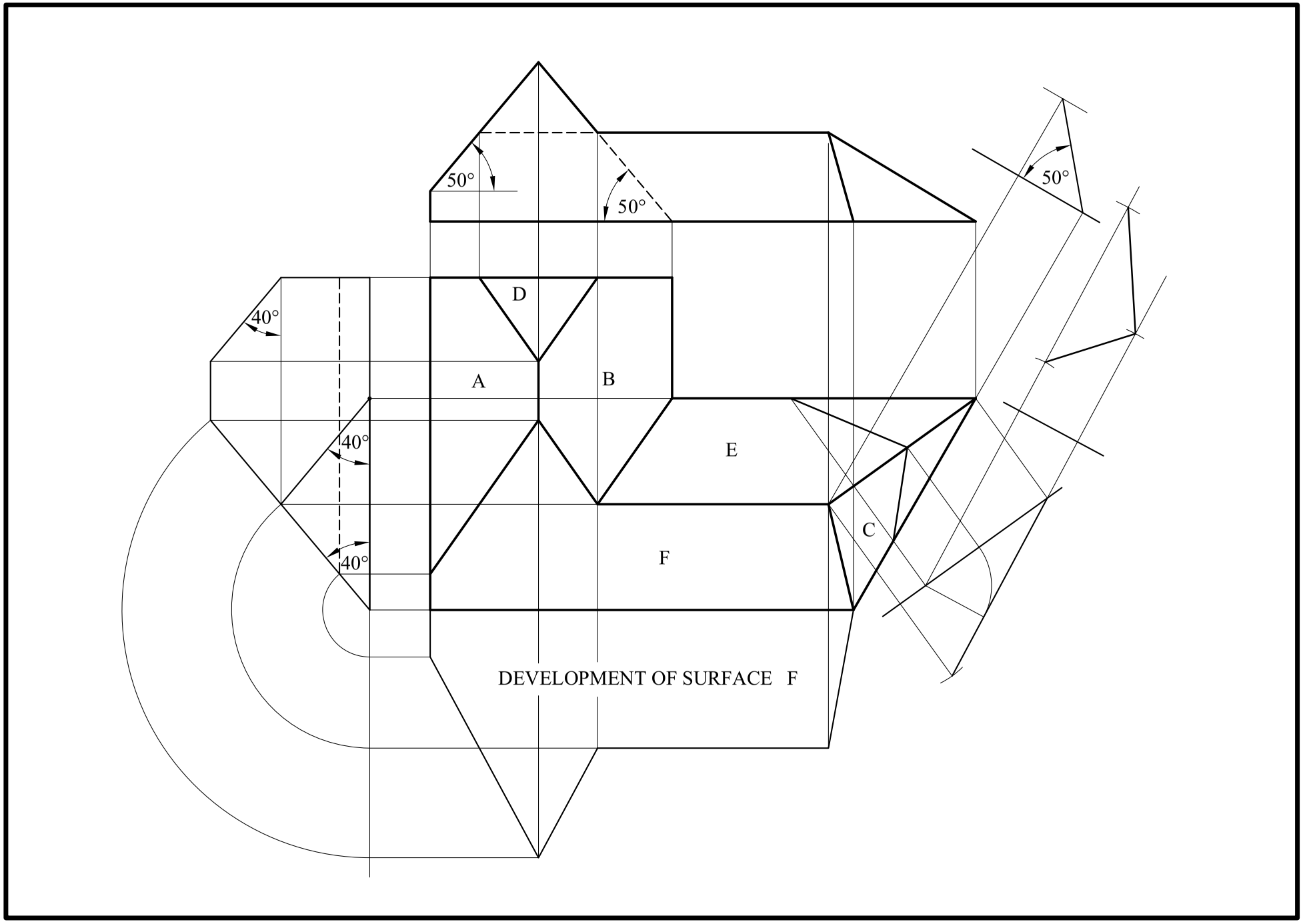
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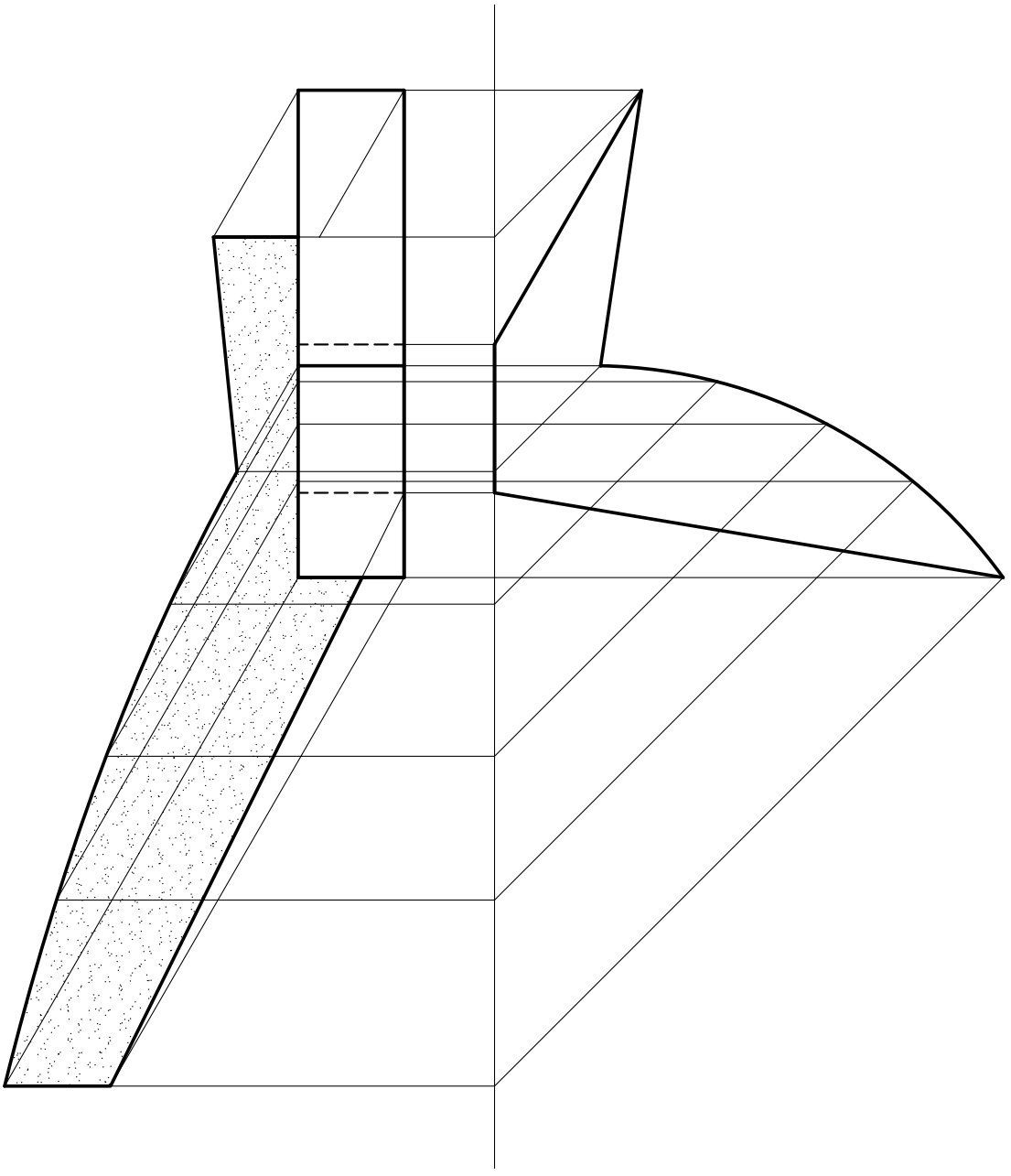
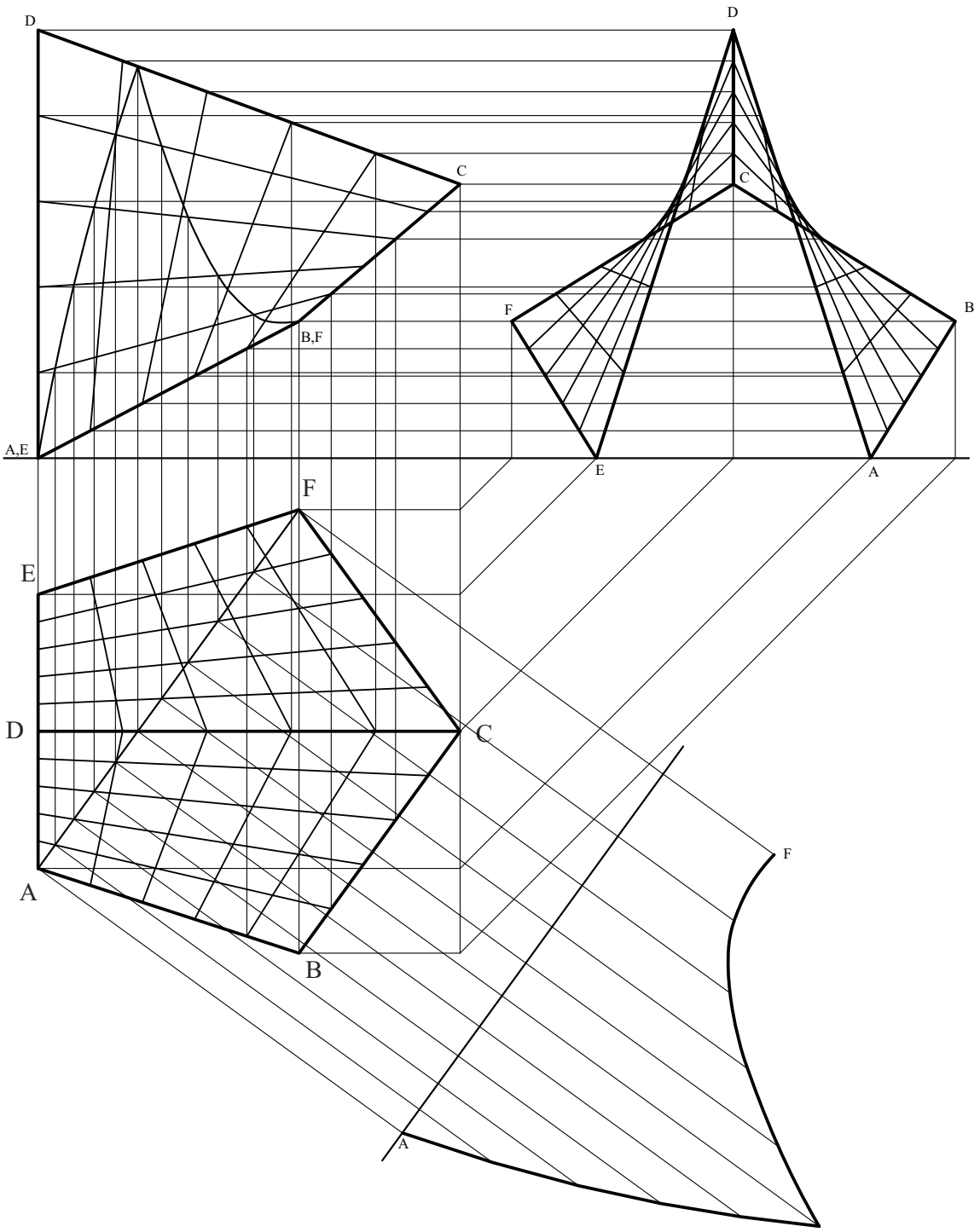
DEVELOPMENT OF SURFACE F

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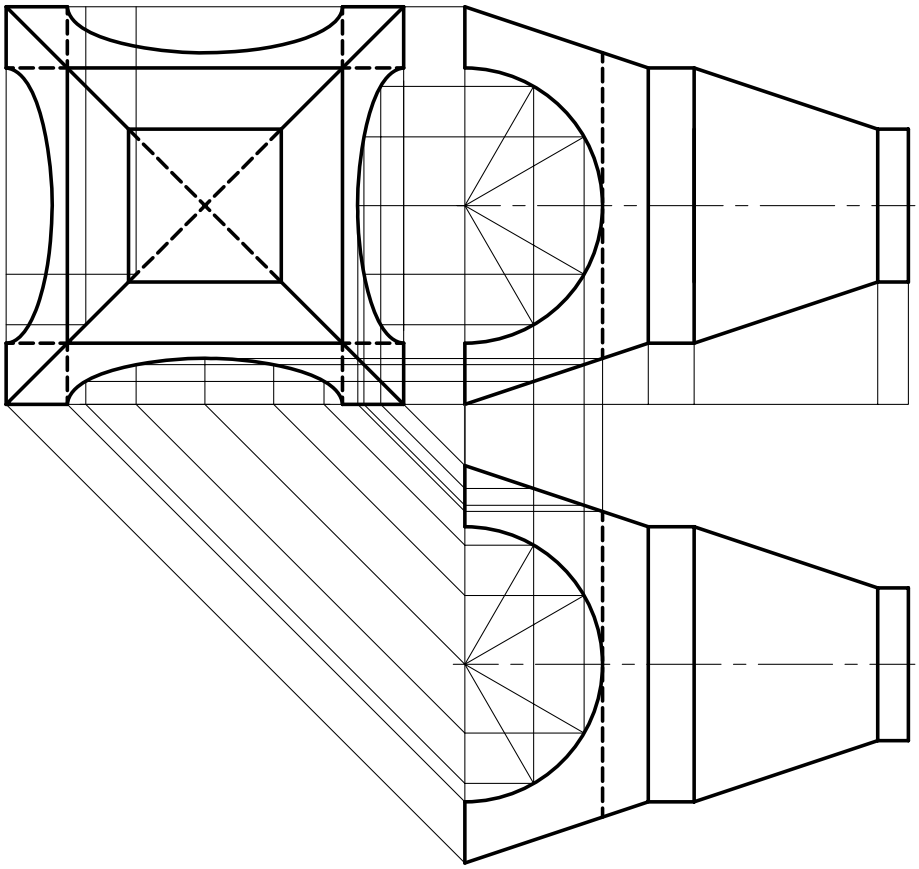

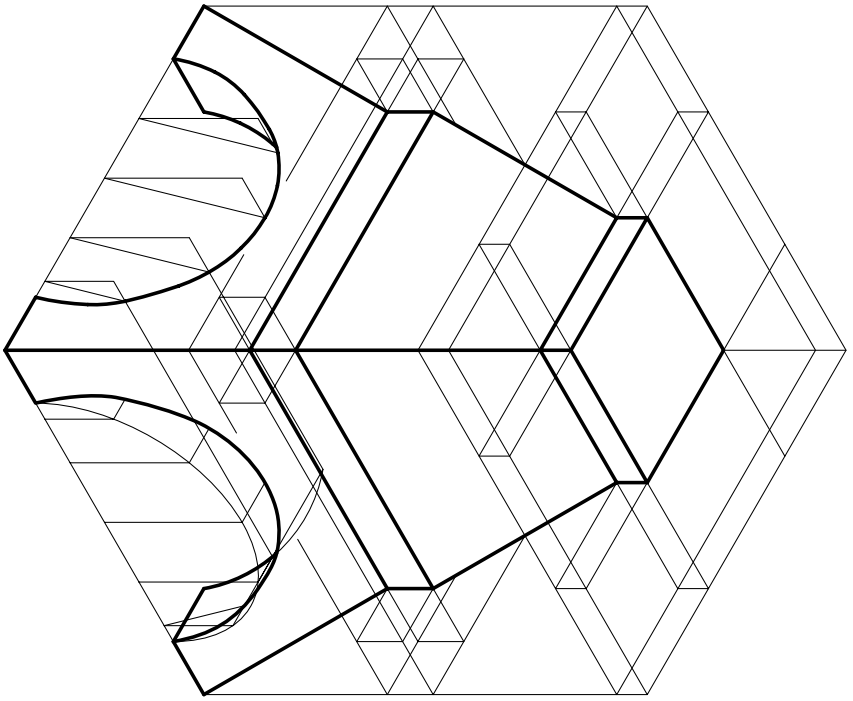

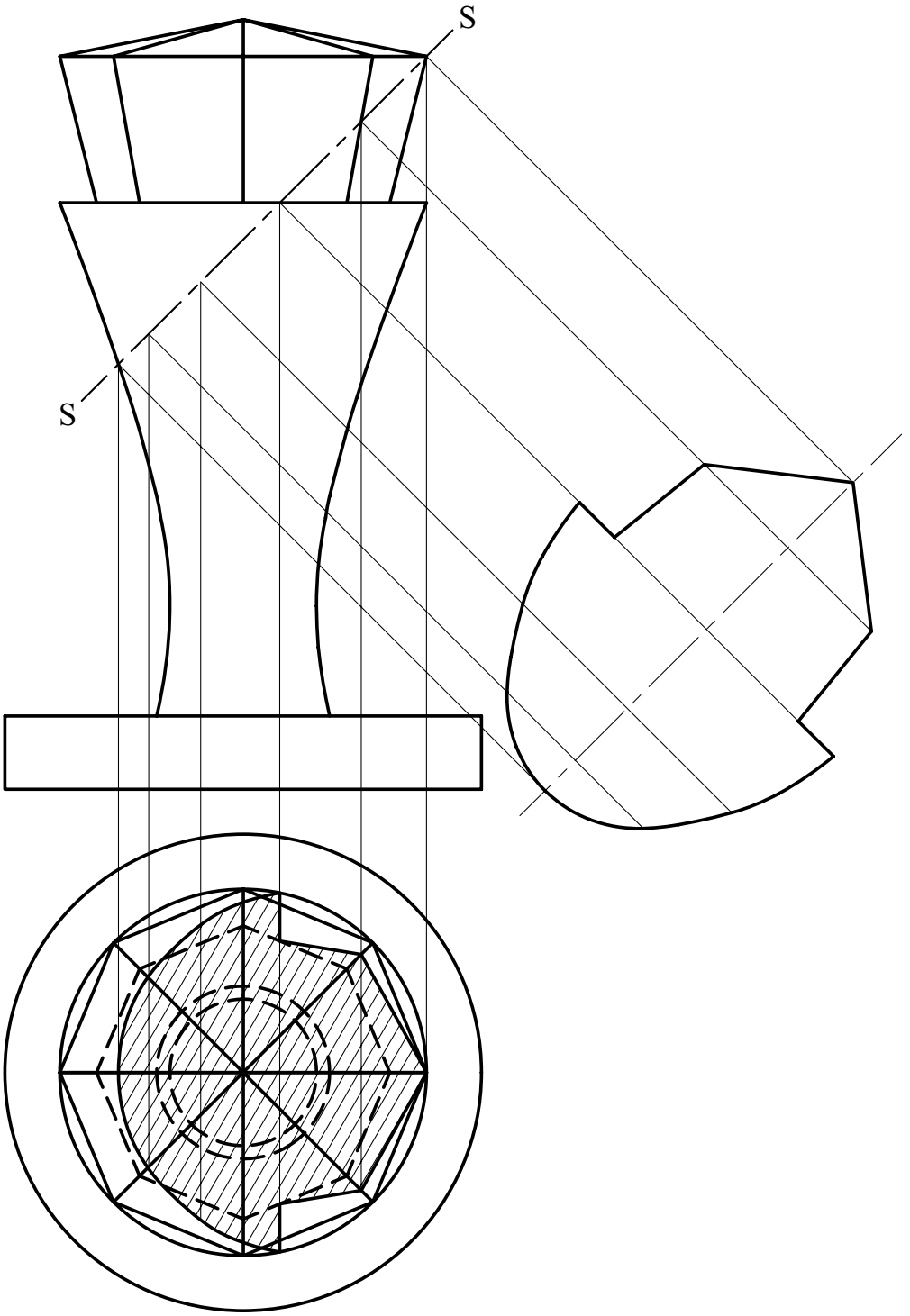
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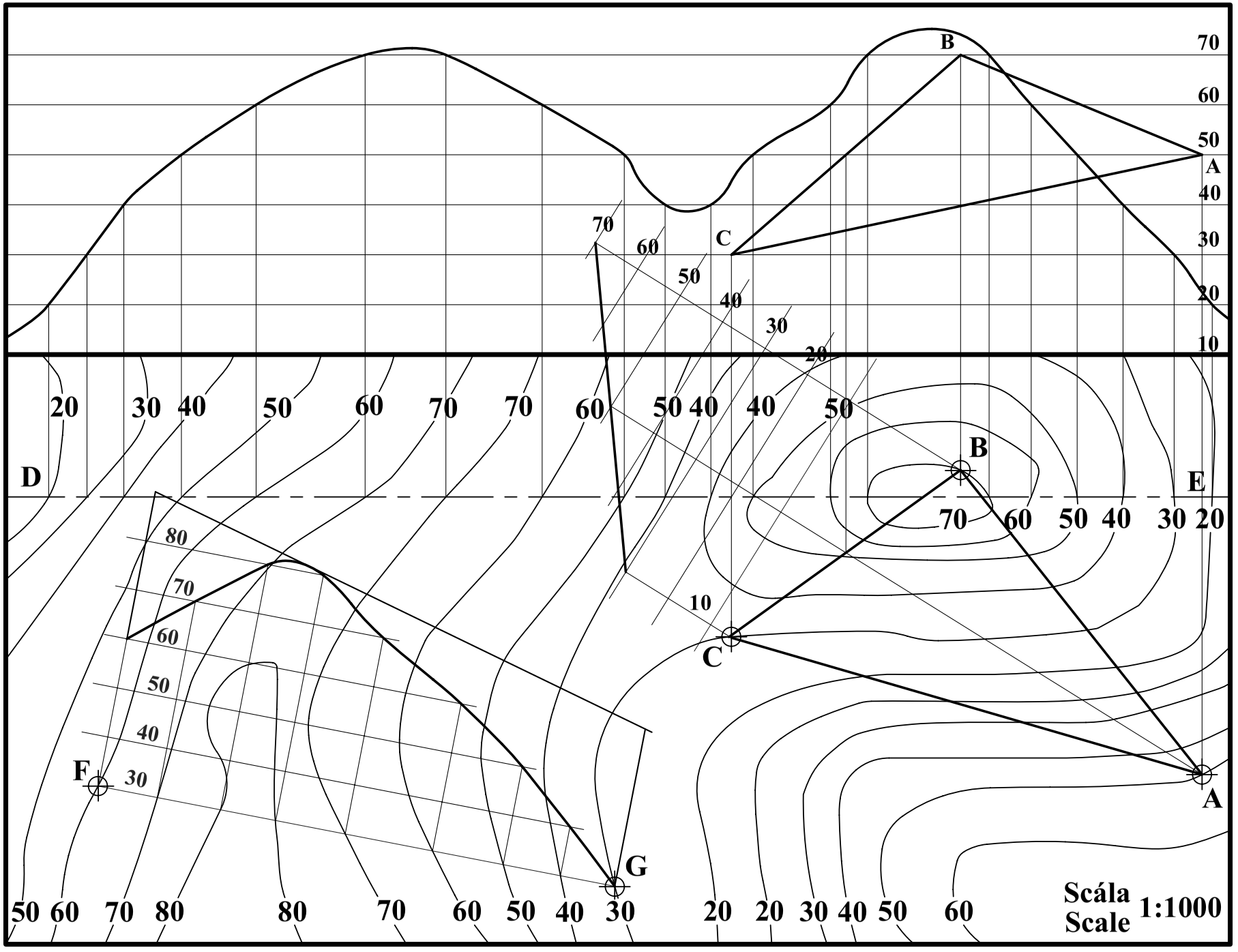
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