



Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE 2008

MARKING SCHEME

TECHNICAL DRAWING

HIGHER LEVEL



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State Examinations Commission

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MARKING SCHEME

TECHNICAL DRAWING

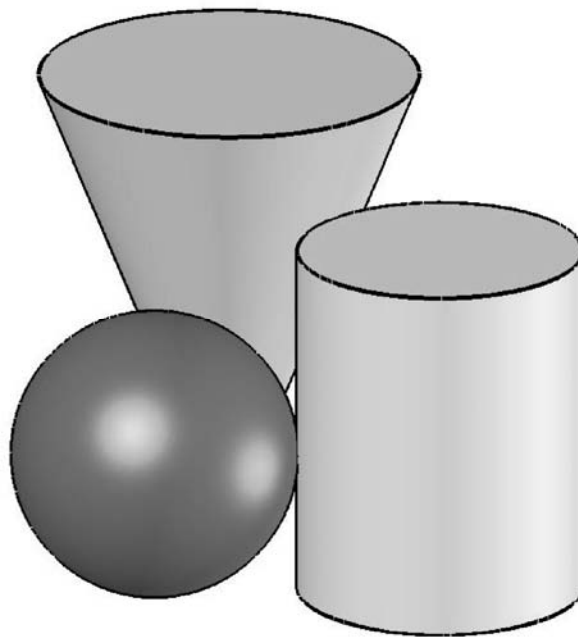
HIGHER LEVEL



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2008

Technical Drawing
Paper 1 - Higher Level



(Plane & Solid Geometry)

Marking Scheme
and Sample Solutions

(Other valid solutions are acceptable and marked accordingly)

QUESTION 1

MARKS

Plan and Elevation of planes ABC and DEF

- (i) Interpretation of co-ordinates2
- (ii) Drawing outline of planes2

(a) Line of Intersection

- (iii) Horizontal lines in elevation (or lines parallel to V.P.)2
- (iv) Projections in plan (or elevation)2
- (v) Drawing line of intersection in plan and elevation2

or

- (iii) Edge view of one plane in auxiliary view...(1,1)2
- (iv) Projection of other plane2
- (v) Determining projections of line of intersection2

(b) Dihedral angle

- (i) New X_1Y_1 taken parallel to line of intersection4
- (ii) Projection of planes and line of intersection on new X_1Y_1 3
- (iii) New X_2Y_2 taken perpendicular to line of intersection4
- (iv) Projection of ABC and DEF on X_2Y_2 and indicating dihedral angle ...4

(c) Determining line from B

- (i) Drawing line from B parallel to DF in elevation and plan.....3
- (ii) Drawing 65mm arc about B in elevation3
- (iii) Drawing correct required line in elevation and plan... (2,1)3
- (iv) Location of point P in a view showing plane ABC as an edge.....1
- (v) Determining correct required angle1

(d) Skew lines

- (i) Creating a plane containing AC (or EF) and parallel to EF (or AC)2
- (ii) Finding edge view of plane... (1,1)2
- (iii) X_2Y_2 perpendicular to X_1Y_1 line2
- (iv) Location of shortest horizontal distance and projection to 1st aux.....2
- (v) Projecting or measuring to plan and elevation.....2
- (vi) Determination and indication of distance from shortest line to HP4

or

- (i) Creating a plane containing AC (or EF) and parallel to EF (or AC)2
- (ii) New X_1Y_1 taken parallel to plan of level line2
- (iii) Projection of AC and EF on new X_1Y_1 4
- (iv) Projecting or measuring to plan and elevation.....2
- (v) Determination and indication of distance from shortest line to HP4

Total **50**

QUESTION 2

MARKS

(a) Drawing given figure

- (i) Drawing line FAC3
- (ii) Finding mean proportional FE (or FB) between FA and FC7
- (iii) Location of point E4
- (iv) Location of point D1
- (v) Drawing of circle and location of point B.....4
- (vi) Completion of pentagon ABCDE4

(b) Division of Area

- (i) Conversion of ABCDE into quadrilateral leaving point D and line AB intact... (Any = 1)3
- (ii) Conversion of quadrilateral into triangle leaving point D and line AB intact... (Any = 1)3
- (iii) Bisection of base3
- (iv) Joining P to division point and drawing parallel from D2
- (v) Completion of correct division.....2

(c) Similar Triangle

- (i) Redrawing of quadrilateral ACDE.....3
- (ii) Positioning of 1st vertex at E2
- (iii) Locating 2nd vertex on AC (or CD).....1
- (iv) Locating 3rd vertex and drawing locus... (2,3)5
- (v) Locating other vertices of required triangle and drawing same.....3

Total **50**

QUESTION 3

MARKS

- (a) Cone A and Sphere B**
- (i) Elevation and plan of cone A and elevation of sphere B2
 - (ii) Bisection of angle between cone edge and XY line
or draw line 30mm from edge of cone3
 - (iii) Locate centre2
 - (iv) Project centre point to plan and rotate about cone A4
 - (v) Locate centre in plan and draw plan of sphere (incl. hidden detail)4
- (b) Projections of Cylinder C**
- (i) Drawing 60mm arc about centre of sphere B in plan3
 - (ii) Drawing 60mm arc about plan of cone A5
 - (iii) Draw plan of correct cylinder (incl. hidden detail)2
 - (iv) Draw elevation of correct cylinder (incl. hidden detail)3
 - (v) Draw plan and elevation of required point of contact.....4
- (c) Tangent Plane**
- (i) Elevation and plan of circumscribing cone about sphere B.....7
 - (ii) Elevation and plan of 75° cone touching edge of circular base4
 - (iii) Horizontal trace tangential to both circles4
 - (iv) Construct and draw vertical trace.....3

Total **50**

QUESTION 4

MARKS

Outline Plan and Elevation

- (i) Drawing outline elevation of triangular pyramid.....3
- (ii) Drawing outline plan of triangular pyramid.....5
- (iii) Drawing outline elevation of inclined prism... (3,1).....4
- (iv) Transfer of widths to plan4

Interpenetration

- (v) Determining points **A & B** in elevation and plan4
- (vi) Determining points **C, D & E** in elevation and plan... (3x3).....9
- (vii) Determining points **F, G, H & I** in elevation and plan... (4x1).....4
- (viii) Determining points **J & K** in plan2
- (ix) Determining points **L, M & N** in plan3
- (x) Determining points **O & P** in plan.....4
- (xi) Joining intersection points in correct order3
- (xii) Completion of drawing (incl. hidden detail)5

Total **50**

QUESTION 5

MARKS

- (a)
- (i) Drawing figure as given3
 - (ii) Dividing arc ACP into a number of equal parts (9 min).....2
 - (iii) Dividing lines PO and OA into a number of equal parts
corresponding with (ii) above2
 - (iv) Stepping distances to locate B₁, B₂, B₃ etc.....2
 - (v) Location of E₁, E₂, E₃ etc.....2
 - (vi) Drawing arcs EP₁, EP₂, EP₃ from E₁, E₂ and E₃, respectively8
 - (vii) Drawing arcs C₁-P₁, C₂-P₂, C₃-P₃ from B₁, B₂, B₃, respectively9
 - (viii) Location of correct turning point T1
 - (ix) Plotting of correct curve without T...(Any = 3)6
- (b) **Logarithmic Spiral**
- (i) Redrawing of lines OA and OP.....1
 - (ii) Setting up 30° intervals at O3
 - (iii) Determining correct radius for P₁.....4
 - (iv) Determining correct radii for P₂, P₃, P₄ and P₅4
 - (v) Drawing of correct curve (Any = 2).....3

Total

50

QUESTION 6

MARKS

- (a) (i) Drawing lines AF and FP3
(ii) Locating point on directrix and drawing directrix4
(iii) Locating points on the curve (min 5 + vertex).....7
(iv) Drawing curve... (Any = 2)4

Centre of Curvature

- (v) Drawing of normal at point P2
(vi) Determining centre of curvature4

- (b) (i) Drawing triangle ABC3
(ii) Location of point F2
(iii) Location of second focal point.....5
(iv) Locating points on the curve...(minimum 6 points).....6
(v) Drawing curve... (Any = 2)4

Directrix

- (vi) Locating point on directrix3
(vii) Drawing directrix... (Any = 2).....3

Total **50**

QUESTION 7**MARKS****(a) Outline Plan and Elevation**

- (i) Drawing plan and elevation of pyramid.....6
- (ii) Drawing of VTH and $V_1T_1H_1$ 5

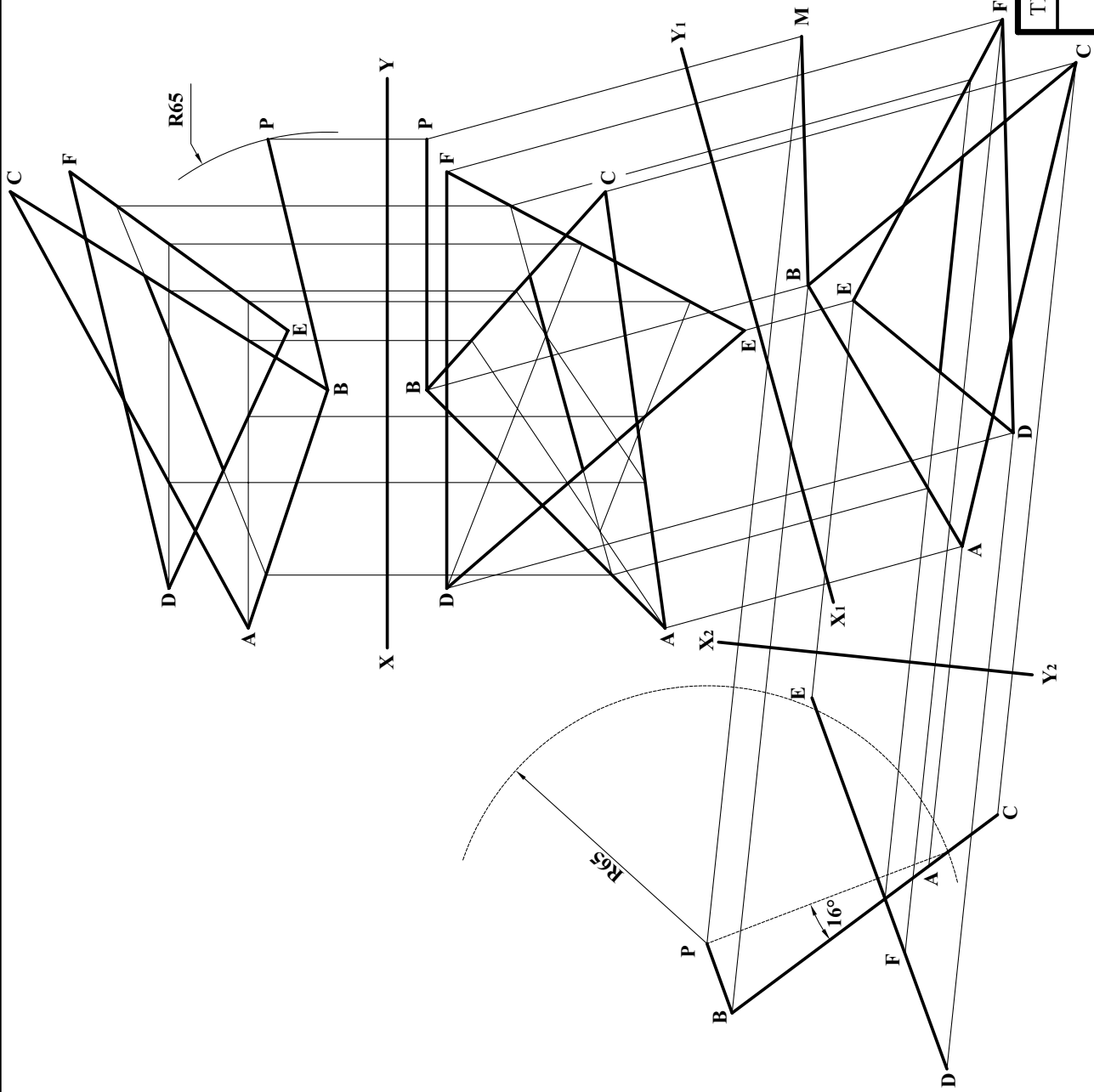
(b) Cut Pyramid

- (i) Auxiliary direction and X_1Y_1 2
- (ii) Edge view of plane.....3
- (iii) Identification of cut surface in auxiliary view4
- (iv) Cut surface in plan and elevation4
- (v) Completion of plan and elevation4
- (vi) Determine and indicate inclination of cut surface to V.P.4

(c) Square Pyramid

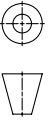
- (i) Auxiliary direction and X_1Y_1 2
- (ii) Edge view of plane.....3
- (iii) Determine correct length of base3
- (iv) Pyramid in auxiliary view2
- (v) Required plan of pyramid.....3
- (vi) Drawing elevation of correct pyramid3
- (vii) Completion of hidden detail.....2

Total**50**



TECHNICAL DRAWING - HIGHER LEVEL - PAPER I.

PROJECTION

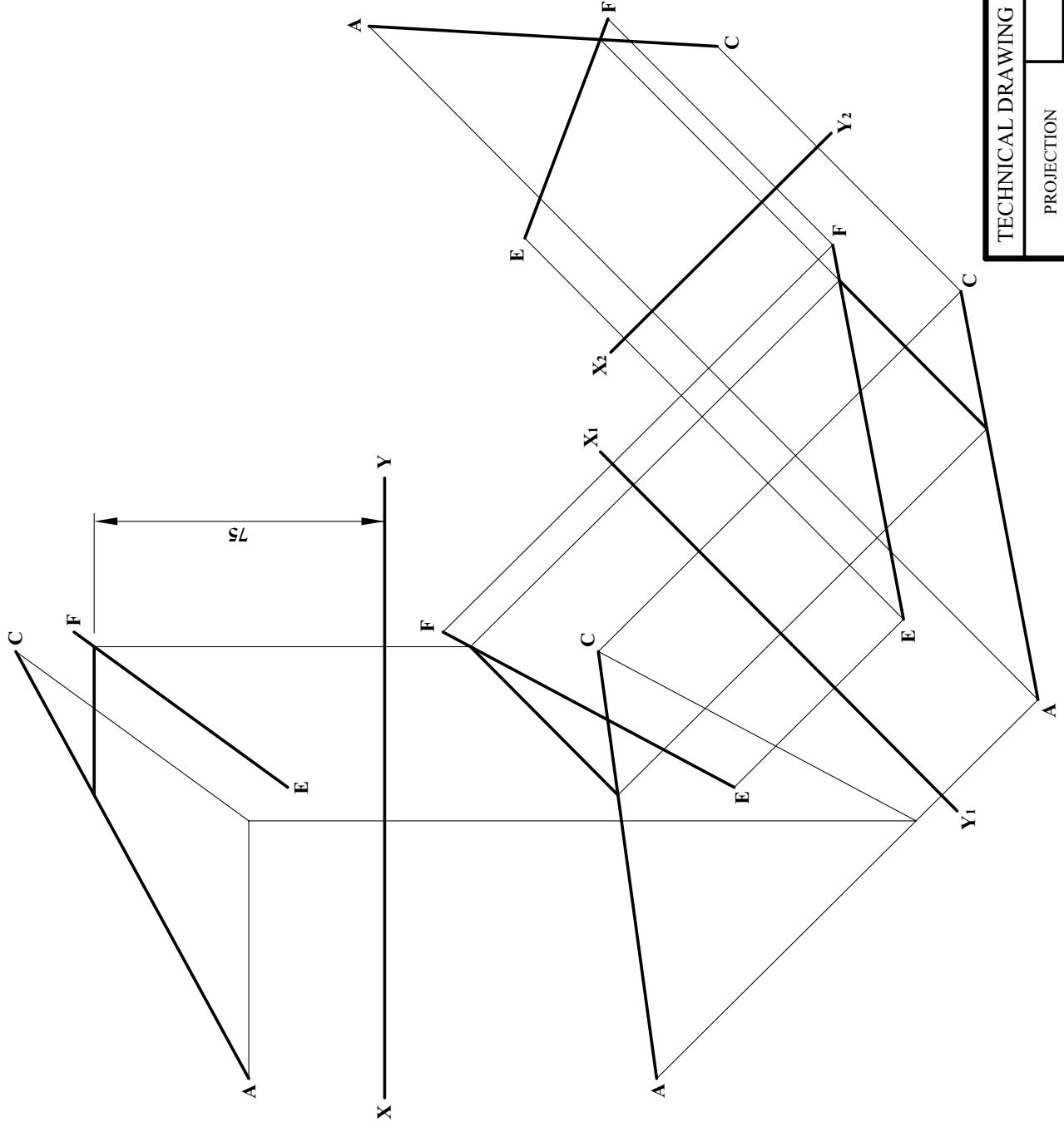


MARKING SCHEME.

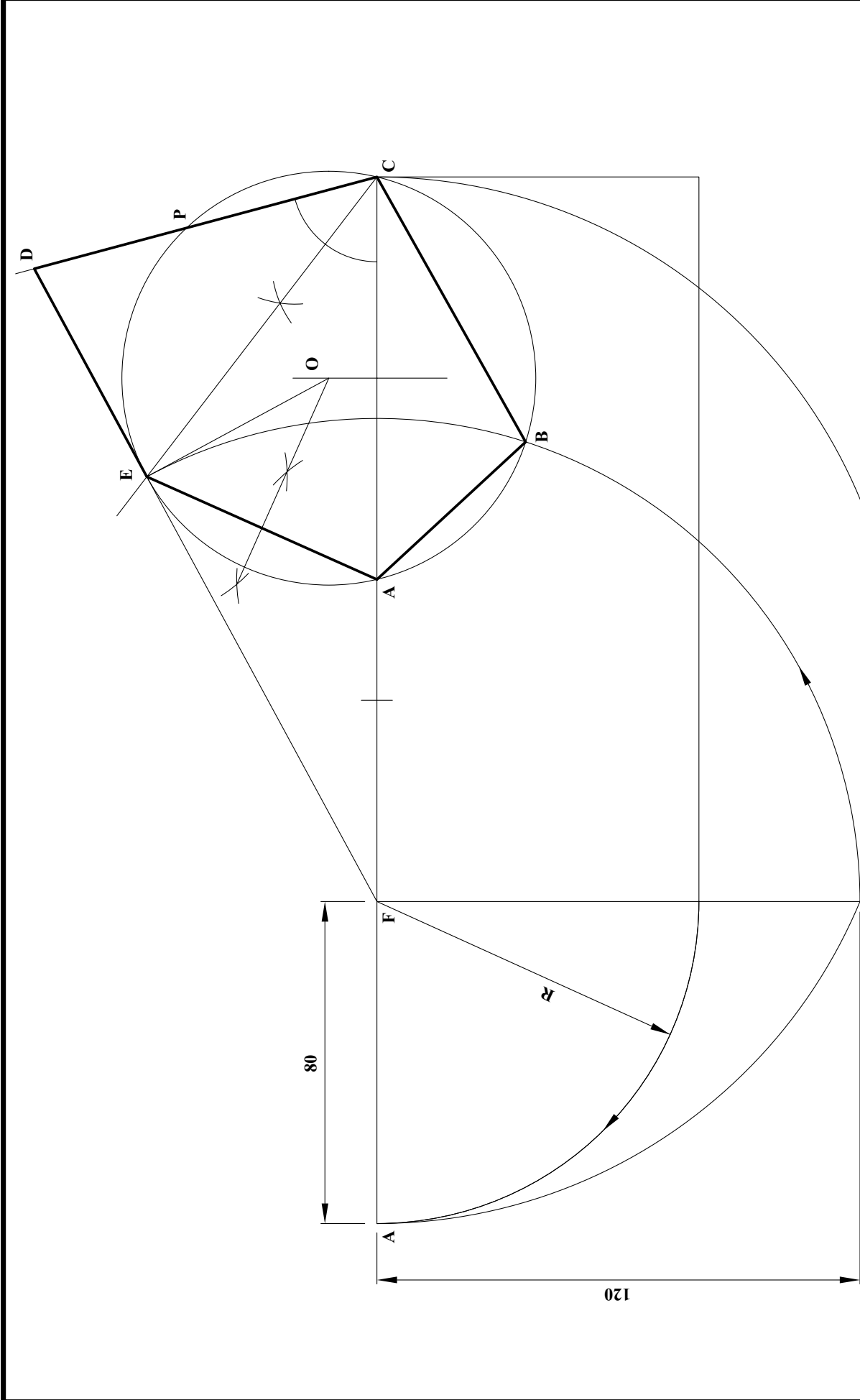
QUESTION I (a), (b) & (c).

SCALE: N/A.

DATE: JUNE 2008.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER I.	
PROJECTION	MARKING SCHEME.
QUESTION 1(d)	SCALE: N/A.
DATE: JUNE 2008.	

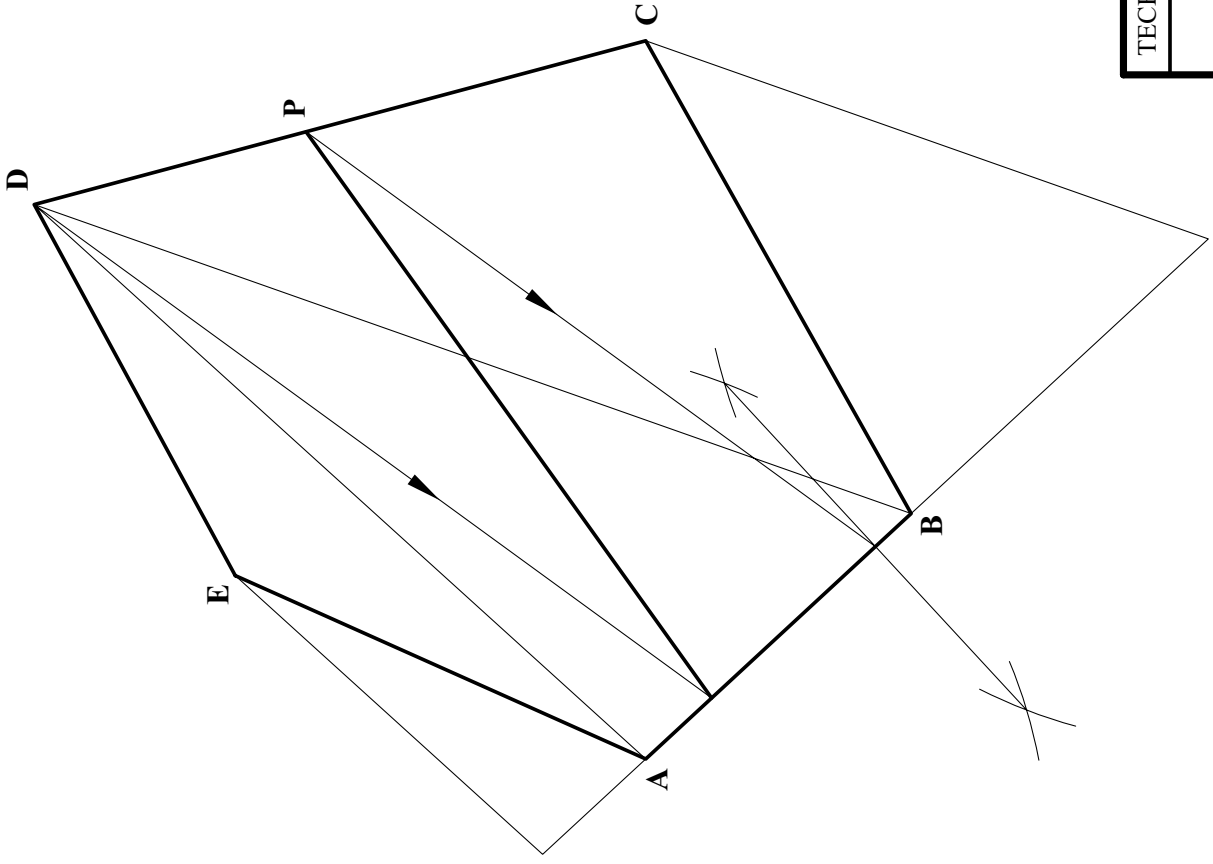


TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.

MARKING SCHEME.

QUESTION 2 (a).

SCALE: N/A. DATE: JUNE 2008.



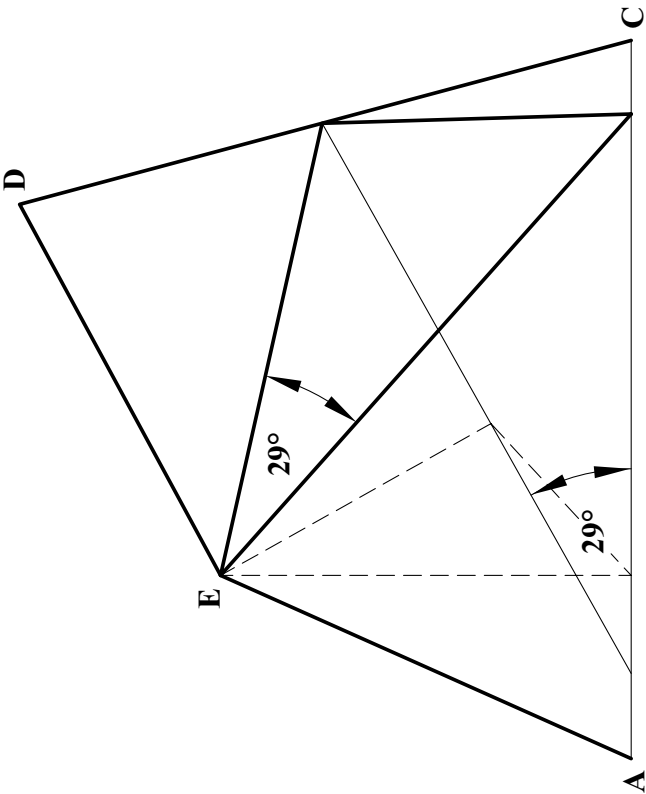
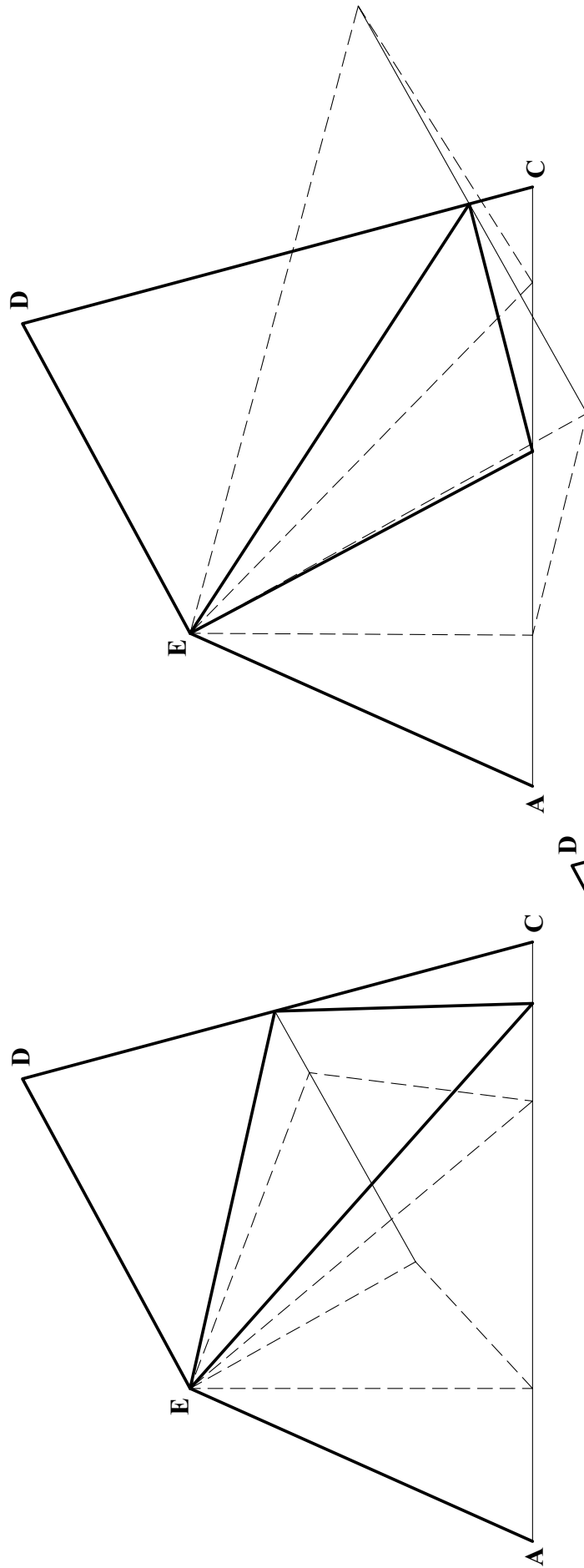
TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.

MARKING SCHEME.

QUESTION 2 (b).

SCALE: 1:1.

DATE: JUNE 2008.



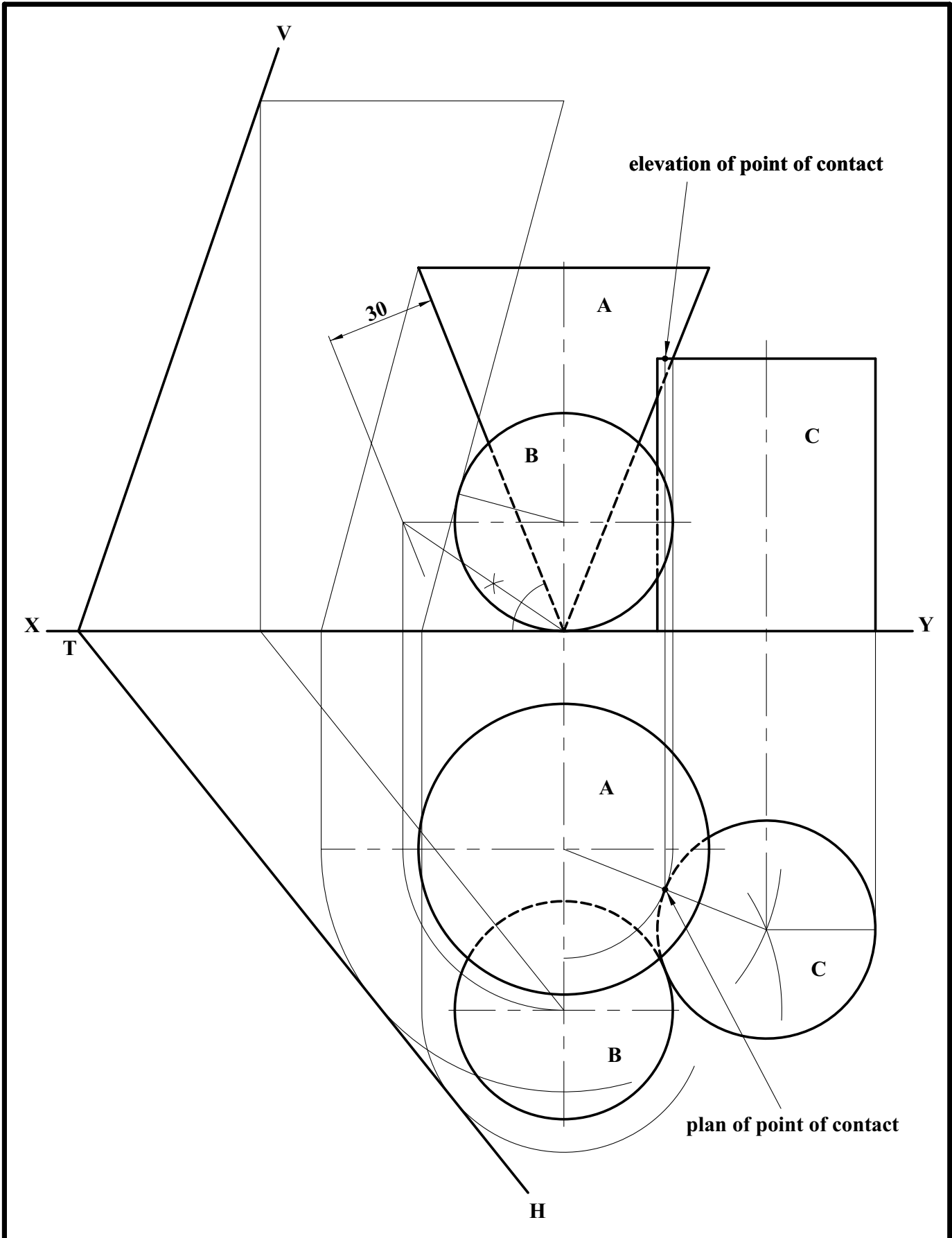
TECHNICAL DRAWING - HIGHER LEVEL - PAPER I.

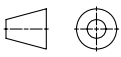
MARKING SCHEME.

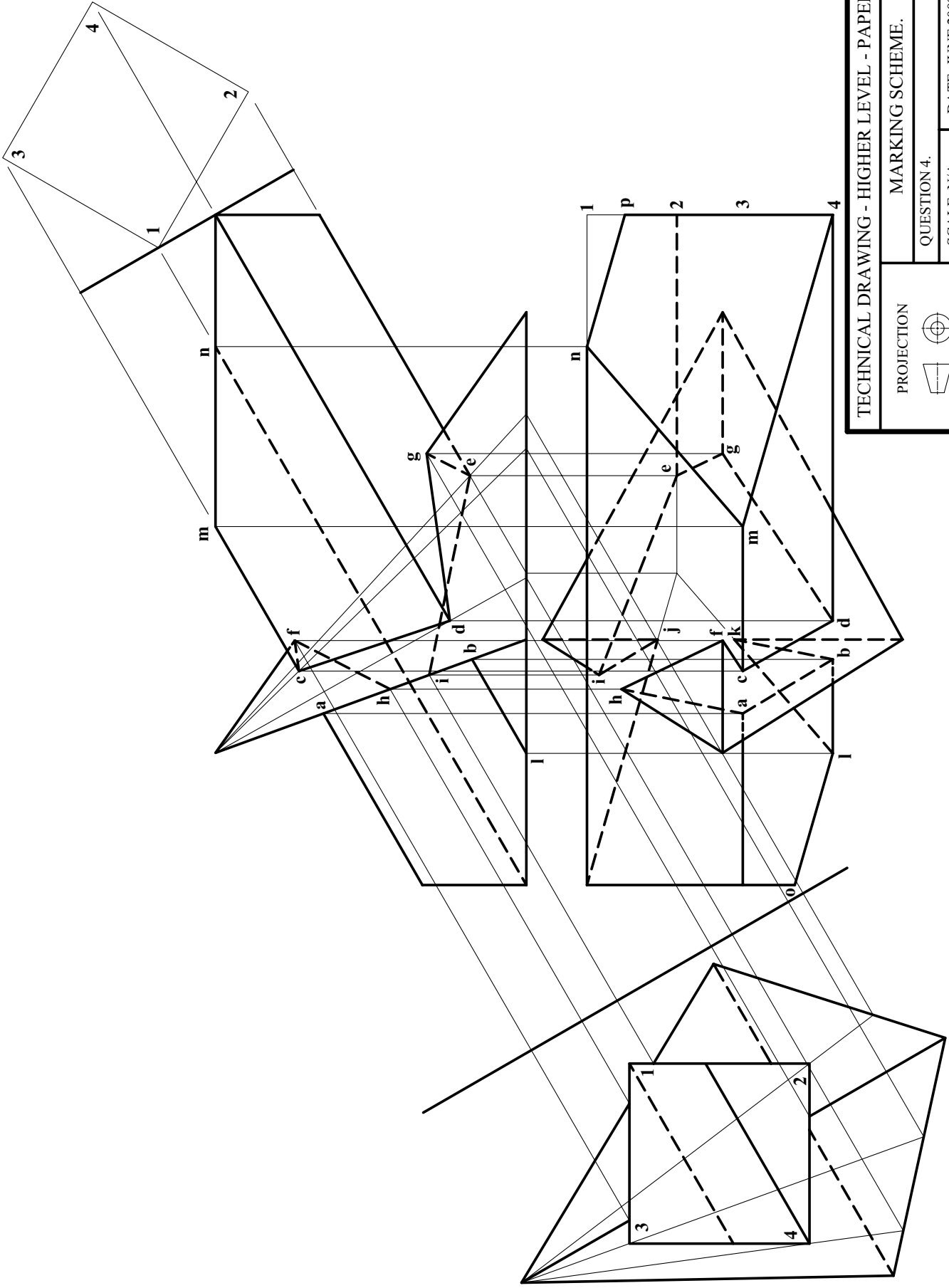
QUESTION 2 (c).

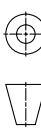
SCALE: 1:1.

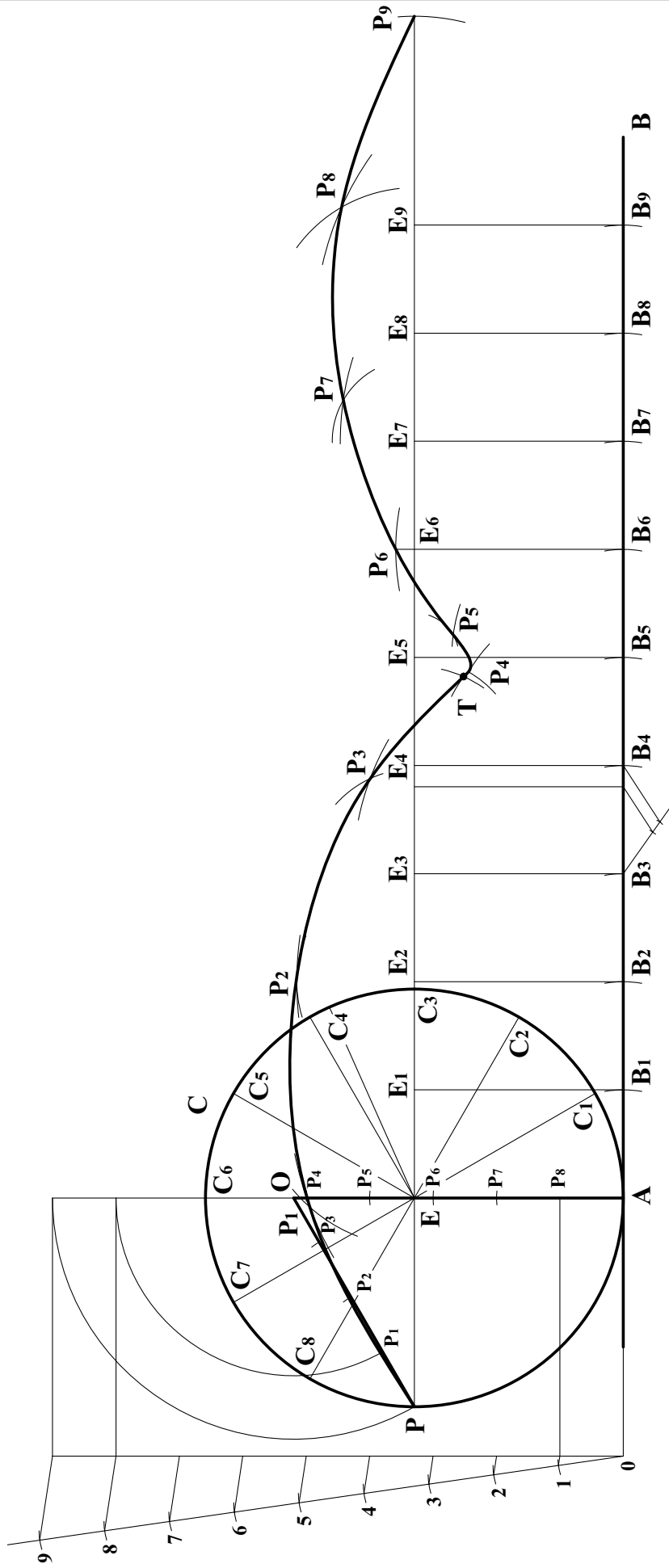
DATE: JUNE 2008.



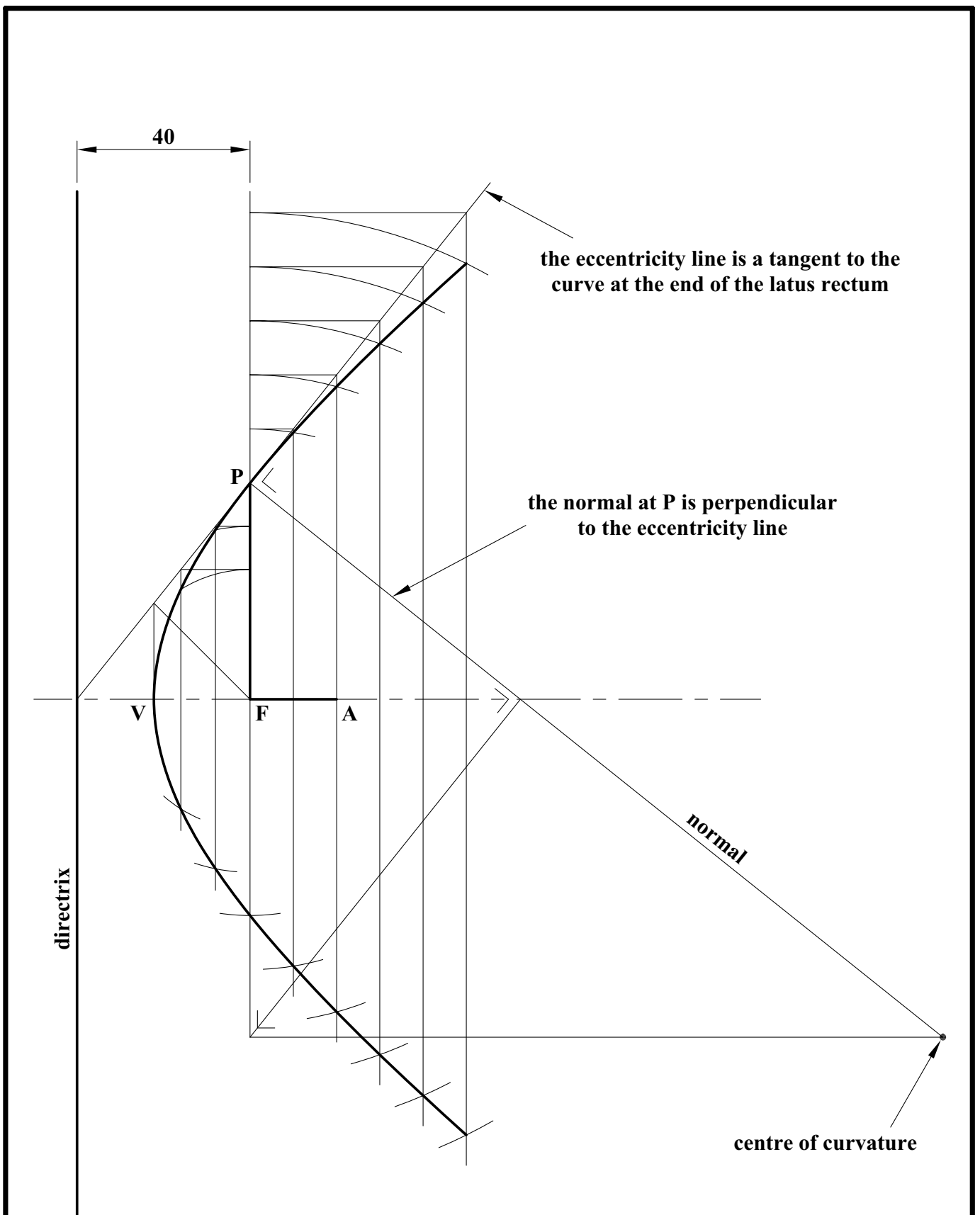
TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
PROJECTION	MARKING SCHEME.
	QUESTION 3.
SCALE: N/A.	DATE: JUNE 2008.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
MARKING SCHEME.	
PROJECTION	QUESTION 4.
	SCALE: N/A.
	DATE: JUNE 2008.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER I.	
MARKING SCHEME.	
QUESTION 5 (a).	
SCALE: N/A	DATE: JUNE 2008.

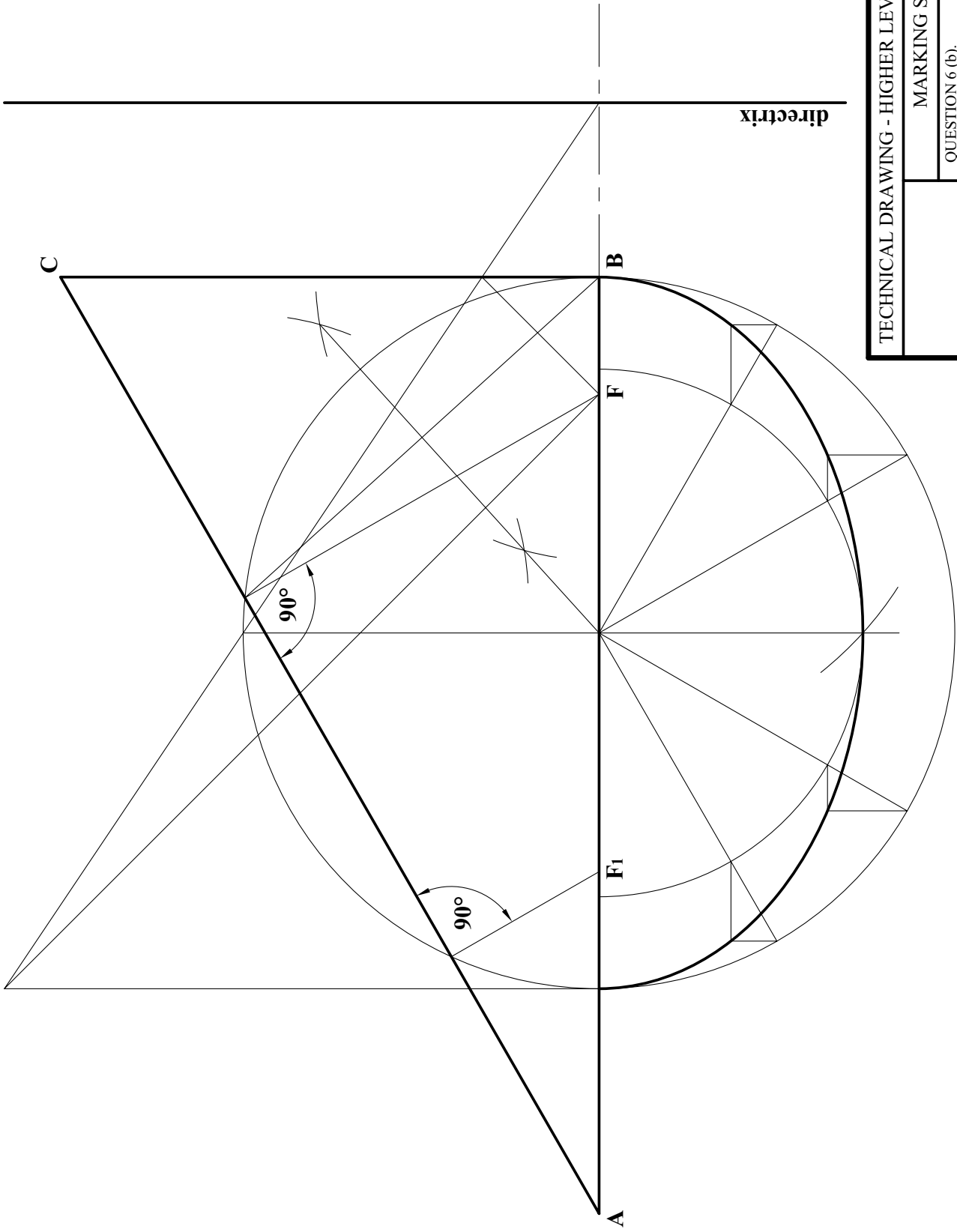


TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.

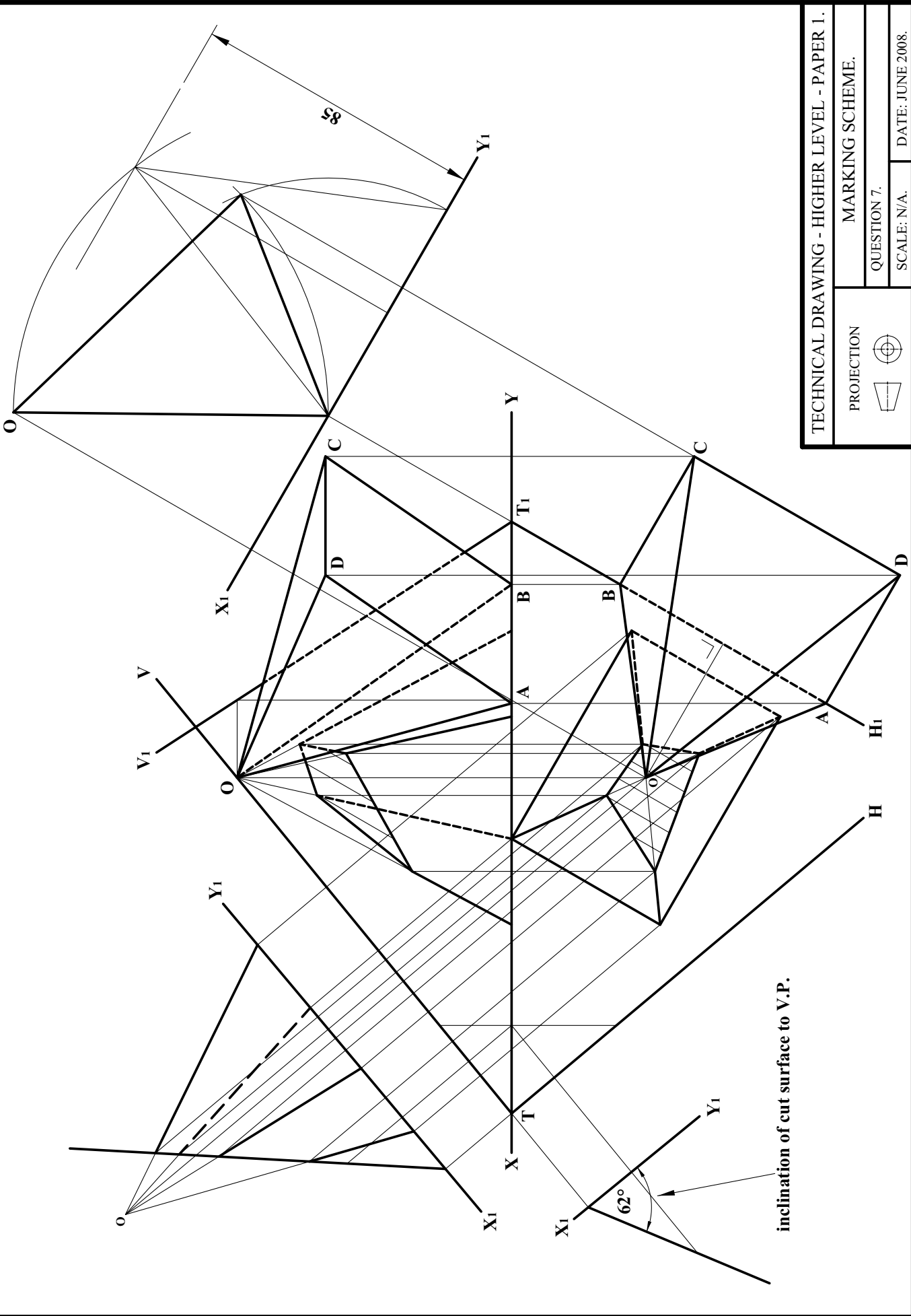
PROJECTION

MARKING SCHEME.

QUESTION 6 (a).
 SCALE: N/A. DATE: JUNE 2008.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.
 MARKING SCHEME.
 QUESTION 6 (b).
 SCALE: N/A. DATE: JUNE 2008.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER I.	
PROJECTION	MARKING SCHEME.
QUESTION 7.	
SCALE: N/A.	DATE: JUNE 2008.

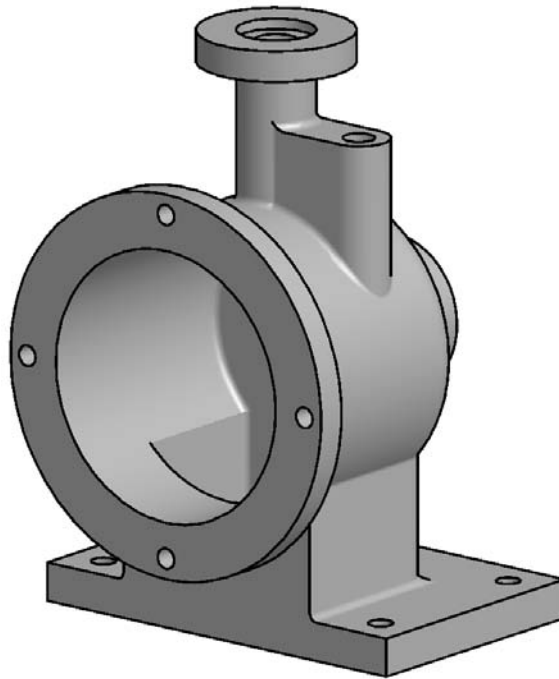


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Leaving Certificate Examination 2008

Technical Drawing

Paper 2A - Higher Level



(Engineering Applications)

Marking Scheme

and Sample Solutions

(Other valid solutions are acceptable and marked accordingly)

MARKING SCHEME: QUESTION 1

(a)	ASSEMBLY	7	
(b)	SECTIONAL ELEVATION	24	
(c)	ADDITIONAL REQUIREMENTS	13	
(d)	SPANNER DESIGN	<u>6</u>	
	TOTAL	50 Marks	

ASSEMBLY	(7)	HANDWHEEL	4
Barrel in correct position in body	1	Wheel rim	1
Centre positioned in barrel	1	Spokes	1
Button in body	1	Boss	1
Lead screw in position	1	Fillets	1
End cover in body	1		
Hand wheel on lead screw	1	M10 WASHER	1
Nut & Washer on lead screw	1	Washer outline	1
		M10 NUT	2
SECTIONAL ELEVATION	(24)	Three faces on nut	1
		Curves on faces	1
BODY	5		
Base area	1	ADDITIONAL REQUIREMENTS (13)	
Left & right support	1	Centre lines	1
Top cylinder	1	Hatching of components	3
Holes	1	Parts item referenced	3
Fillets	1	(Leaders; Terminations; Numbers)	
CENTRE	2	Title supplied	2
Point/ end	1	(G=1; Ex=2)	
Tapered body	1	Overall presentation	4
		(F=2; G=3; Ex=4)	
BARREL	3		
Barrel outline	1	SPANNER DESIGN	(6)
Ø18 x 70mm bore/ M16 threads	1	Suitable spanner suggested	2
Keyway	1	Details & features shown in sketch	2
BUTTON	1	Sketch presentation	2
Button outline	1		
LEAD SCREW	3		
End/ shoulder/ shank	1		
M16 & M10 thread convention	1		
Square convention	1		
END COVER	3		
Flange	1		
Drilled holes	1		
M36 thread convention & chamfer	1		

MARKING SCHEME: QUESTION 2

(a)	CAM & DISPLACEMENT DIAGRAM	30
(b)	MECHANISM	<u>20</u>
	TOTAL	50 Marks

CAM	(30)	MECHANISM	(20)
DISPLACEMENT DIAGRAM	14	LAYOUT	5
Suitable divisions 0 ⁰ to 360 ⁰	1	Crank OA	1
Correct height	1	Crank QB	1
S.H.M construction	3	Crank PD	1
S.H.M curve drawn & correct	1	Link AB	1
Dwell	1	Link CD	1
U.A.R construction	3		
U.A.R curve drawn & correct	1		
Dwell	1	LOCUS	15
Presentation	2	Circle OA divided into 12 parts	1
		Location of points C	4
CAM PROFILE	16	Locus C drawn & correct	2
Centre point	2	Location of points E	4
Rotation correct	1	Locus E drawn & correct	2
Nearest approach correct	2	Presentation	2
Heights projected and swung	1		
Roller followers drawn	1		
S.H.M drawn	1		
Dwell arc drawn	2		
U.A.R drawn	1		
Dwell arc drawn	2		
Camshaft	1		
Presentation	2		

MARKING SCHEME: QUESTION 3

(a)	GIVEN VIEWS	6
(b)	TRUE LENGTHS	6
(c)	DEVELOPMENT	25
(d)	FOLD ANGLE	7
(e)	SHEET METAL SKETCHES	<u>6</u>
	TOTAL	50 Marks

GIVEN VIEWS	(6)
Elevation correct	3
Plan correct	3

TRUE LENGTHS	(6)
True lengths obtained	3
T/L layout	2
Identification system	1

DEVELOPMENT	(25)
Triangular area correct (9 triangles)	18
One piece development	1
Seam correct	1
Accuracy	2
Identification system	1
Presentation	2

FOLD ANGLE	(7)
Auxiliary projection	1
Auxiliary heights	1
1 st auxiliary view	1
Auxiliary projection	1
Auxiliary heights	1
2 nd auxiliary view/ Edge view	1
Fold angle identified/ value	1

Note: Rabatment method also acceptable.

SHEET METAL SKETCHES	(6)
Safe edge	3
Panel stiffening	3

Note: Other edges and stiffening methods acceptable.

MARKING SCHEME: QUESTION 4

(a)	ISOMETRIC DRAWING	34
(b)	CONNECTION	8
(c)	MODIFICATION	<u>8</u>
Total		50 Marks

ISOMETRIC DRAWING	(34)	CONNECTION	(8)
Base	11	Exploded isometric sketch provided	2
Base outline	1	Suitable connection suggested	2
End support	1	Details & features correct	2
Isometric semicircles	2	Sketch presentation	2
M14 hole/ Thread	2	MODIFICATION	(8)
Fixed jaw	1	Separate sketch provided	1
Vee angle	1	Suitable modification suggested	3
R15arcs	2	Details & features correct	2
Tangents	1	Sketch presentation	2
Siding Jaw	5		
Jaw	2		
Vee angle	1		
R15 arcs	2		
Hand Screw	6		
Hexagonal head	2		
Head length	1		
M14 Shank & thread	1		
Shank length	1		
Isometric arc screw	1		
VIEW DETAILS	12		
Exploded isometric provided	1		
Correct viewpoint	1		
Isometric scale	2		
Method of assembly shown	1		
Construction for circles/arcs	3		
Construction for hexagon	1		
Centre lines	1		
Presentation	2		

MARKING SCHEME: QUESTION 5

(a)	PUMP HOUSING	46
(b)	ADDITIONAL REQUIREMENTS	<u>4</u>
	TOTAL	50 Marks

PUMP HOUSING	(46)	PLAN	13
SECTIONAL ELEVATION	18	Projected correctly	1
Centre lines	1	Base outline	1
Base area/ pocket	1	Four Ø12mm base holes	1
Ø150mm flange	1	Ø150mm x 12mm flange	1
Two M8 threads/ convention	1	Ø 120mm x 88mm cylinder	1
Ø120mm cylinder	1	Ø 60mm top flange circle	1
Wall thickness 7mm	1	C'Bore hole circles	1
Ø60mm top flange	1	Stepped area	1
C'Bore and drilled hole	1	M12 threads/ convention	1
Ø60mm x 35mm boss	1	Ø60mm x 35mm boss	1
C'Bore hole	1	Web	1
Webs	1	Fillets	1
Fillets	1	Presentation	1
Hidden detail/ surface lines removed	1		
Correct areas hatched	3	ADDITIONAL REQUIREMENTS (4)	
Presentation	2	(i) Four dimensions	2
		(ii) Projection symbol	1
		(iii) Title: Pump Housing	1

SECTIONAL END ELEVATION	15
Projected correctly	1
Centre lines	1
Ø60mm top flange	1
C'Bore and drilled hole	1
M12 threads & Ø4mm hole details	1
Ø46mm C'Bore circles	1
Ø120mm cylinder	1
Wall thickness 7mm	1
Base area/ pocket	1
Fillets	1
Hidden detail/ surface lines removed	1
Correct areas hatched	2
Presentation	2

MARKING SCHEME: QUESTION 6A

(a)	SPUR GEAR	25
(b)	FREEHAND SKETCH	<u>25</u>
	TOTAL	50 Marks

SPUR GEAR	(25)	FREEHAND SKETCH	(25)
GEAR TEETH	16	SECTIONAL ELEVATION	18
Centre lines	1	Drawn in open position	2
PCD	1	Body	2
Addendum circle	1	Nut/ Washer/ Pin	2
Dedendum circle	1	Spindle	2
Base circle	1	Spindle guide	2
Tooth thickness	1	Packing	1
Construction of tooth profile <i>(involute curve or any recognised approximate method acceptable)</i>	4	Packing nut	1
Root radii drawn	1	Handle	1
Second tooth drawn	2	Handle cap	1
Presentation	3	Scale and proportion	2
(F=1; G=2, Ex=3)		Presentation/ Line work	2
		ADDITIONAL REQUIREMENTS 7	
TABLE OF GEAR VALUES	9	Labelling of four parts	4
Calculations and formulae shown	1	(Washer 1)	
Gear Data (6 off x 1 mark each)	6	(Packing 1)	
Table drawn	1	(Packing nut 1)	
Presentation	1	(Handle 1)	
		Leakage prevention explained	3

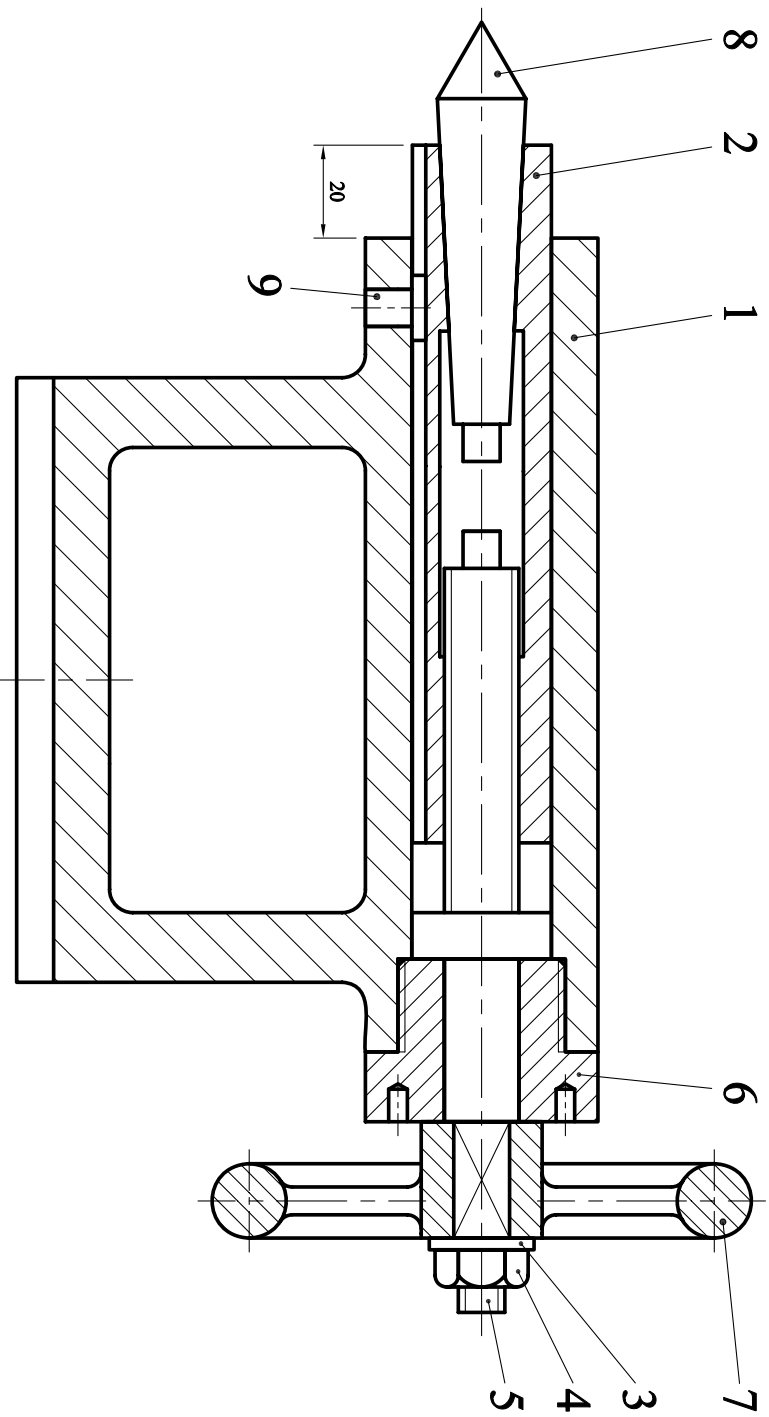
MARKING SCHEME: QUESTION 6B

(a)	SHORT CAD QUESTIONS	12
(b)	3D MODEL	10
(c)	CAD COMMAND PAIRS	11
(d)	CAD PROFILE	<u>17</u>
Total		50 Marks

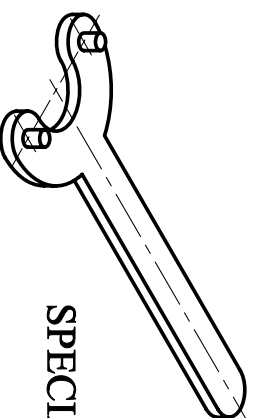
	SHORT CAD QUESTIONS	(12)	CAD PROFILE	(17)
(i)	Four advantages of CAD	2	Sheet size	1
(ii)	Oblique angle	2	Lines AB, BC, CD, DE, EF	3
(iii)	Two line types	2	Mirroring of lines	2
(iv)	Three arc methods	2	Arc	1
(v)	Use of OSNAP	2	Polygon	1
(vi)	Hyperlink	2	Circle 1	1
(vii)	Two downloading problems	2	Circle 2	1
(viii)	Object selection	2	Circle 3	1
	<i>Maximum 12 marks</i>		Array of circle 3	2
			Semi ellipse	3
			Presentation	1

	3D MODEL	(10)
	CAD package	1
	Commands used to draw the model	9
	(Explanation 5)	
	(Sketches 4)	

	CAD COMMAND PAIRS	(11)
(i)	Baseline/Continue	2
(ii)	Hatch/Gradient	2
(iii)	Plot/Publish	2
(iv)	Freezing/Locking layers	2
(v)	Erase/Wipeout	3

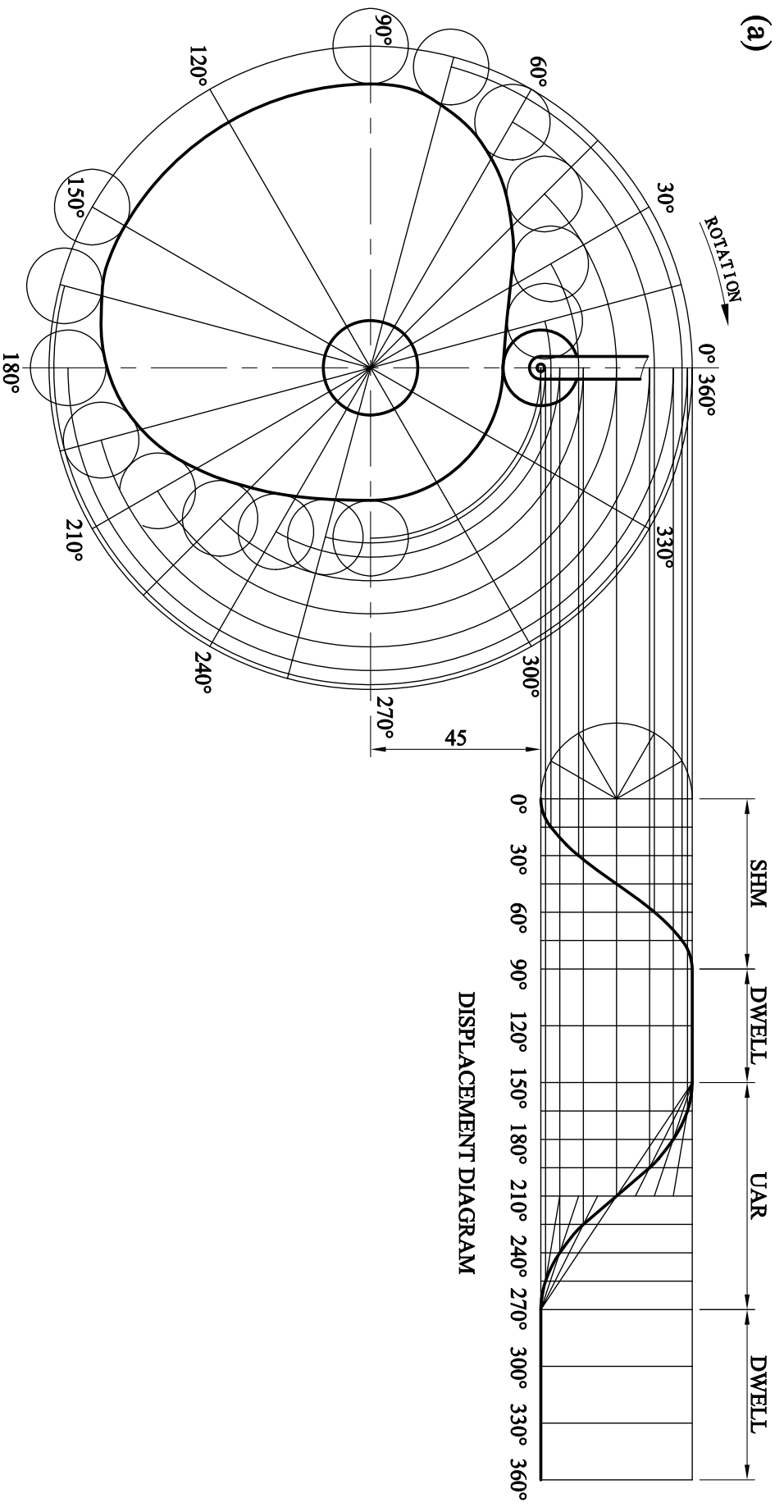


LATHE TAILSTOCK



SPECIAL SPANNER

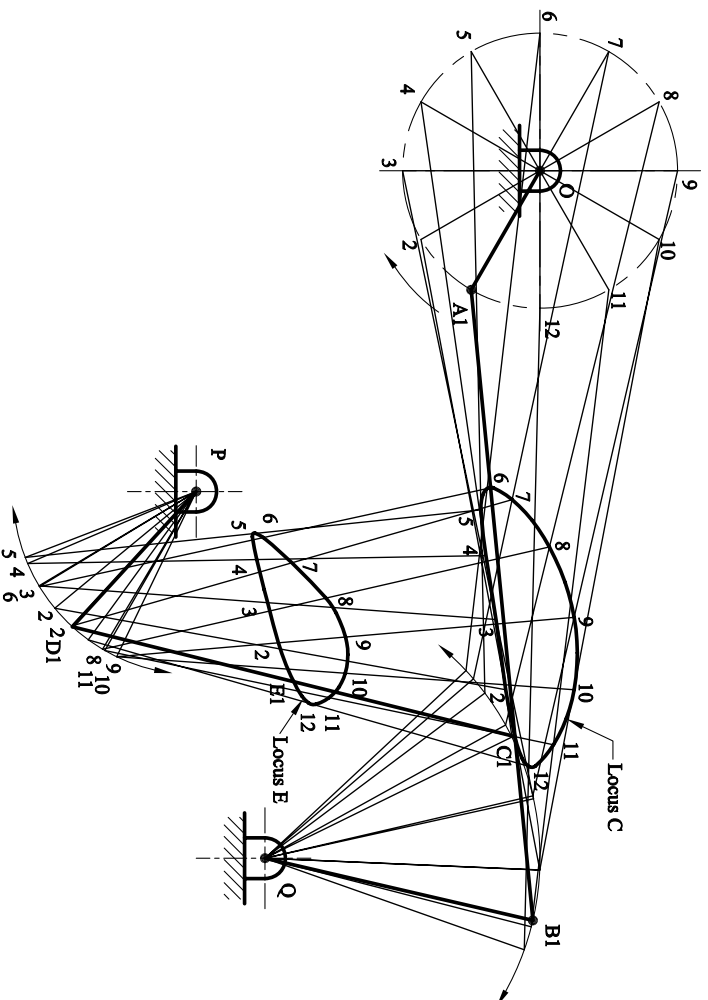
(a)



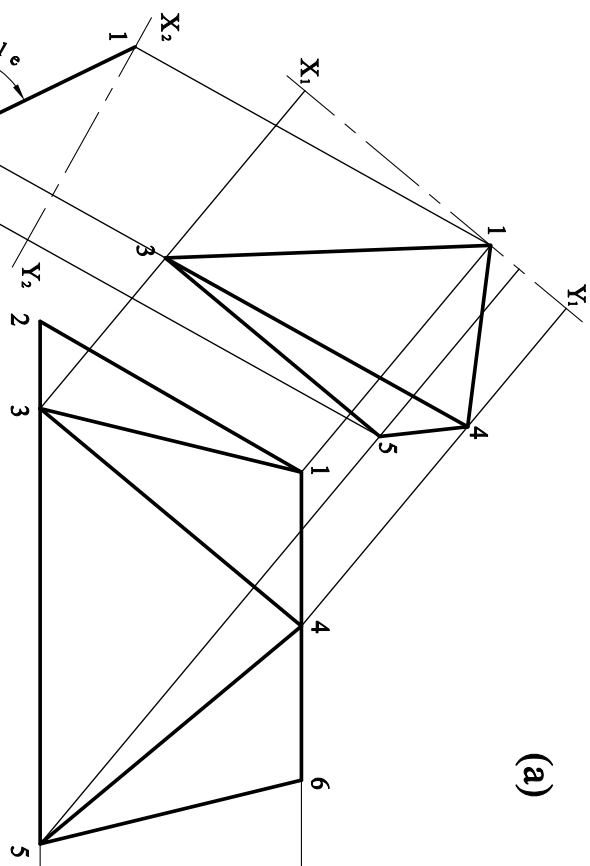
CAM PROFILE

DISPLACEMENT DIAGRAM

(b)

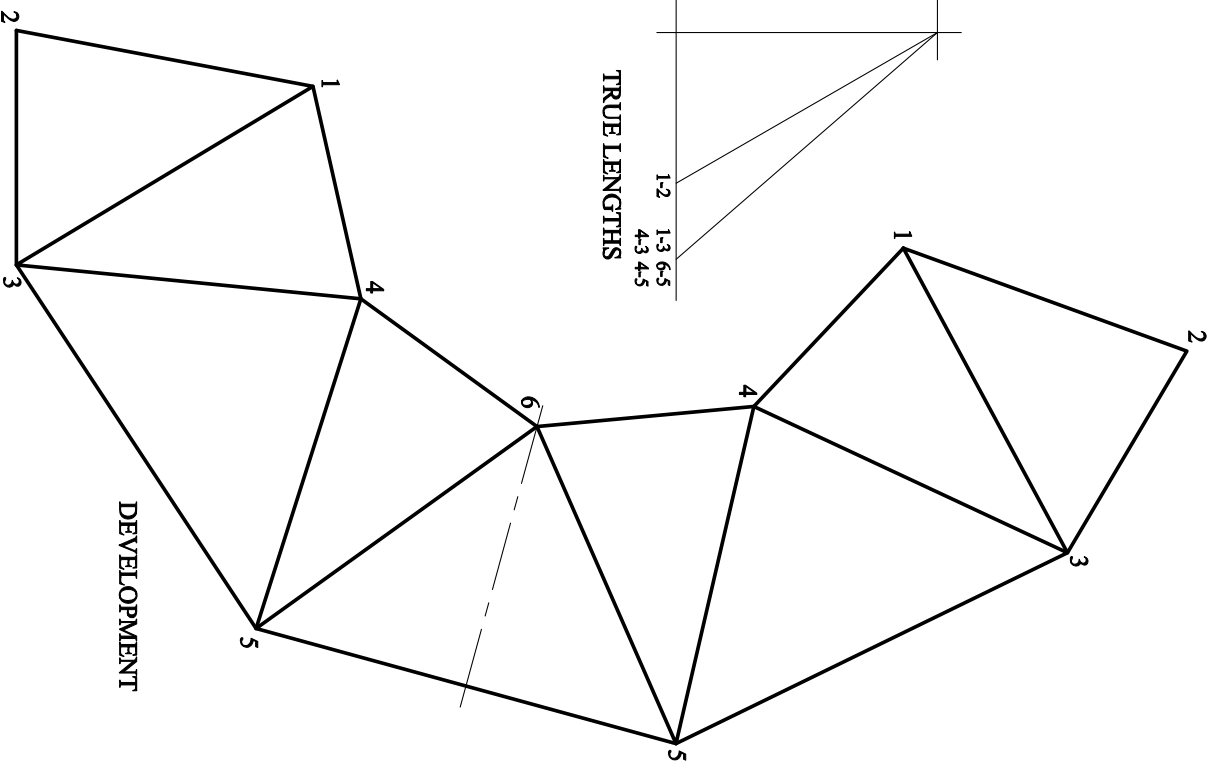


(a)

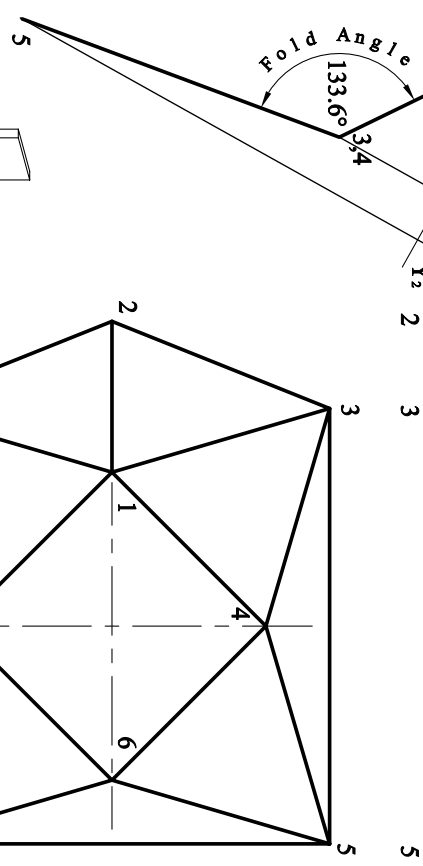


TRUE LENGTHS

- 1-2 1-3 6-5
- 4-3 4-5

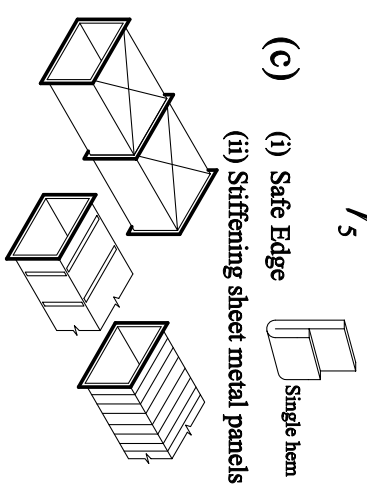


(b)



(c)

- (i) Safe Edge
- (ii) Stiffening sheet metal panels

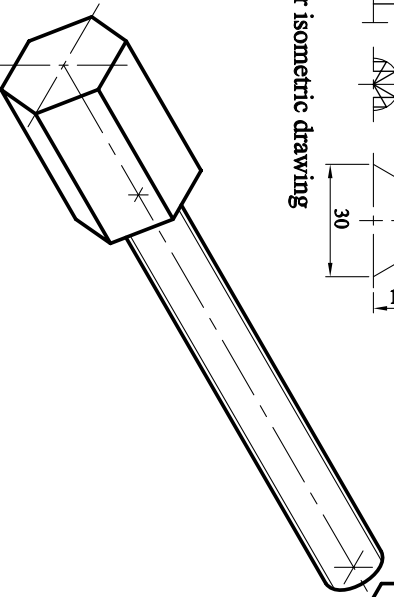
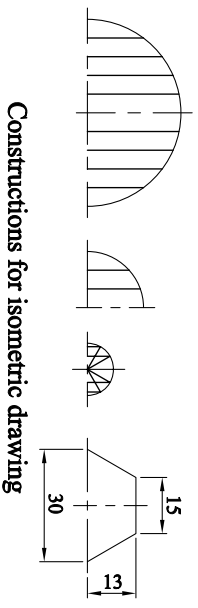
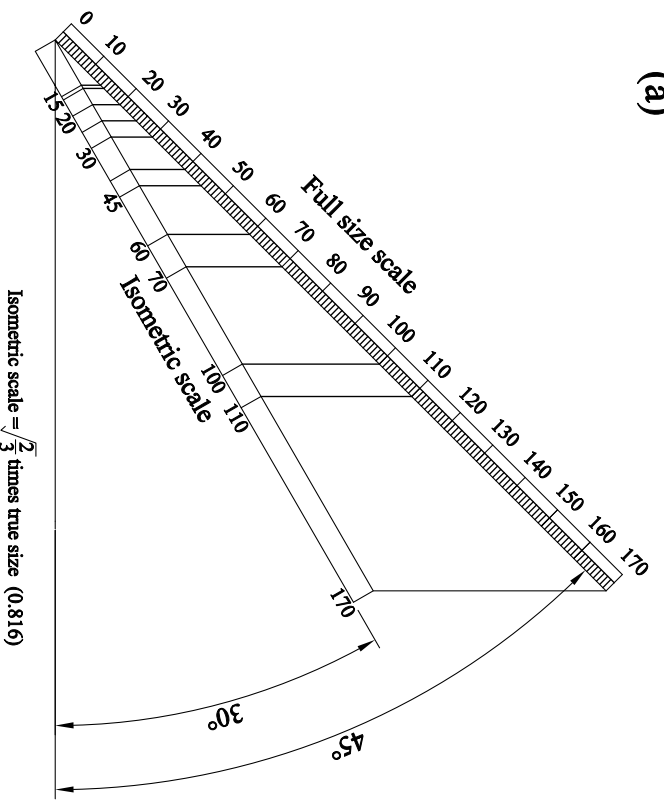


Cross breaking/diagonal bends between joints, swaging, beading or pleating on ducts. Hems, flanges, wired edges may also be used to stiffen panels.

Examples of panel Cross Sections

SOLUTIONS / QUESTION 3 / HIGHER LEVEL / 2008

(a)

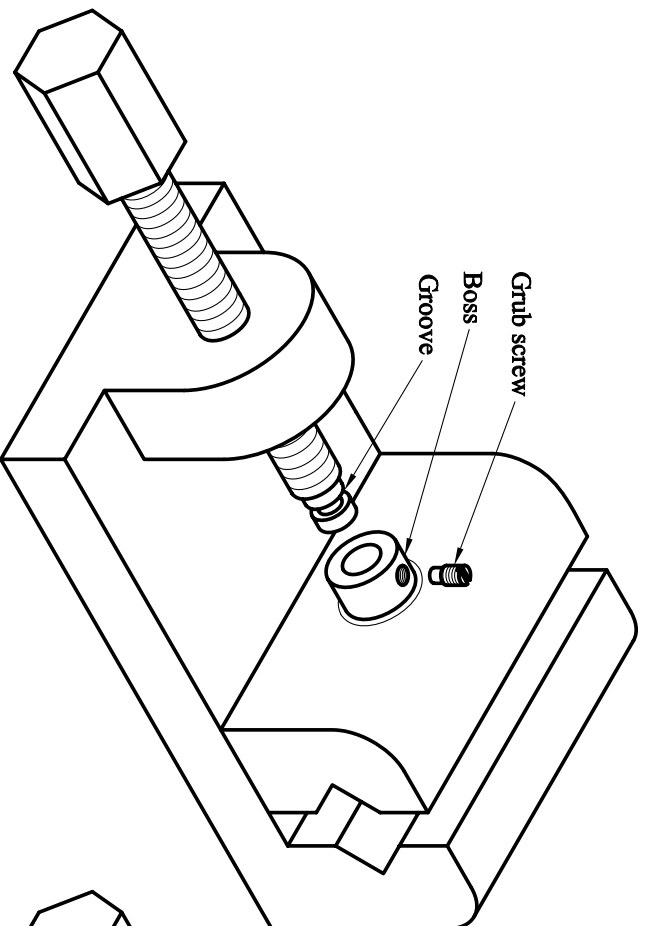


EXPLODED ISOMETRIC

(b)

CONNECTION METHOD

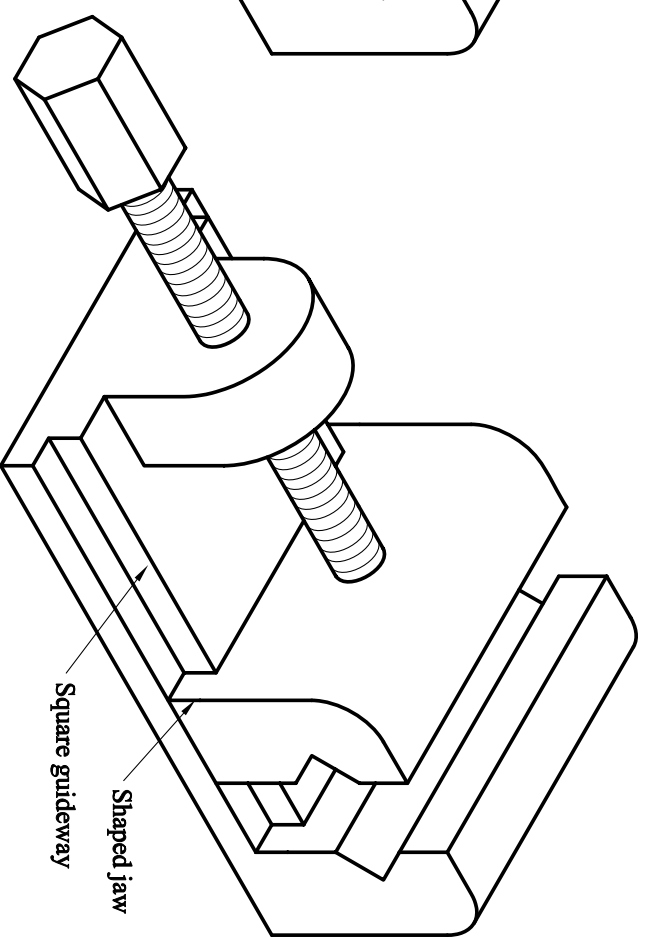
In the method shown a boss is cast onto the sliding jaw. The end of the hand screw is modified so that it can be inserted into the drilled hole in the boss. A grub screw is used to connect the two parts. The hand screw is free to rotate as the dog end of the grub screw sits in the groove on the hand screw. Other solutions/connections are acceptable.

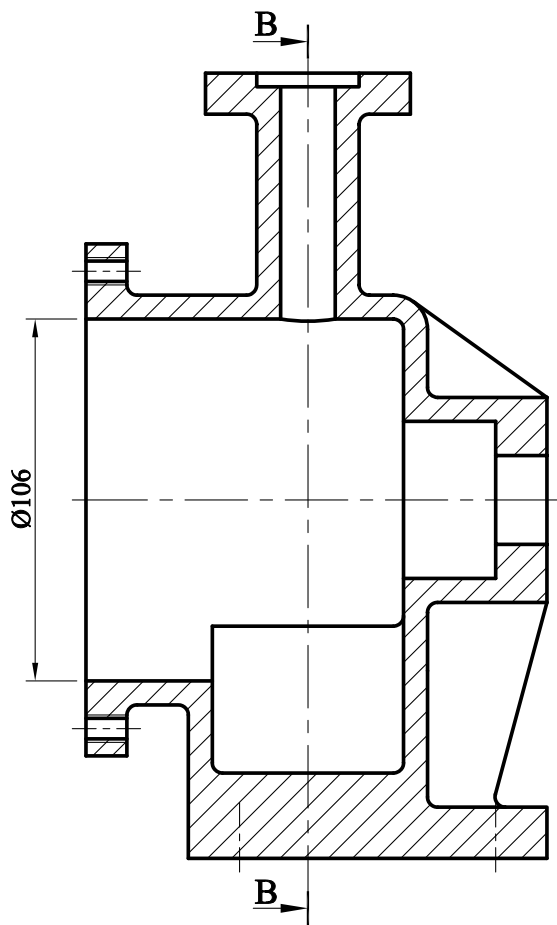


(c)

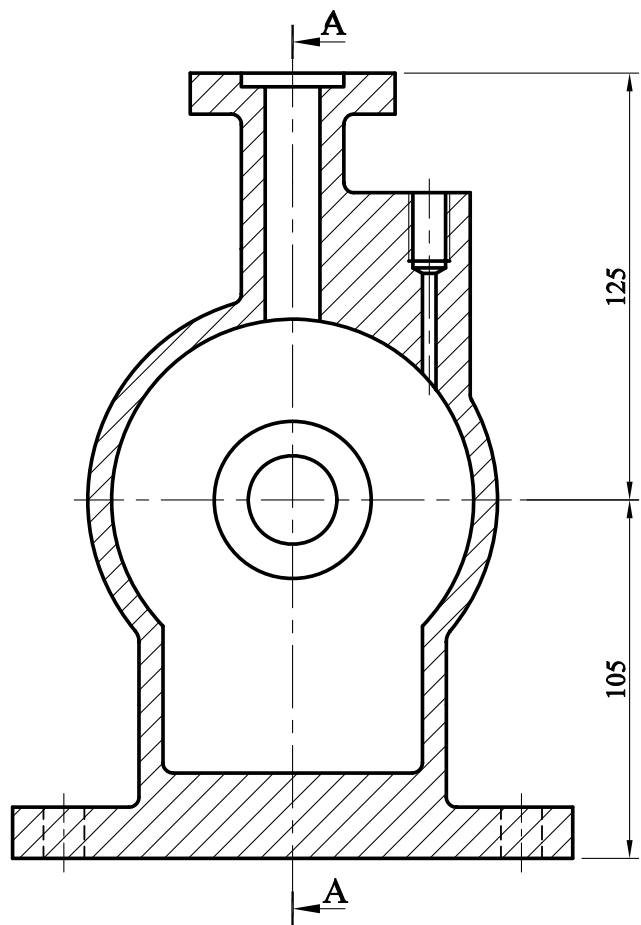
MODIFICATION - GUIDING ARRANGEMENT

Some form of guiding arrangement is necessary to ensure parallel alignment of the sliding jaw. In the method shown the moving jaw slides along a square guideway on the base. Other solutions/ guiding arrangements are acceptable.

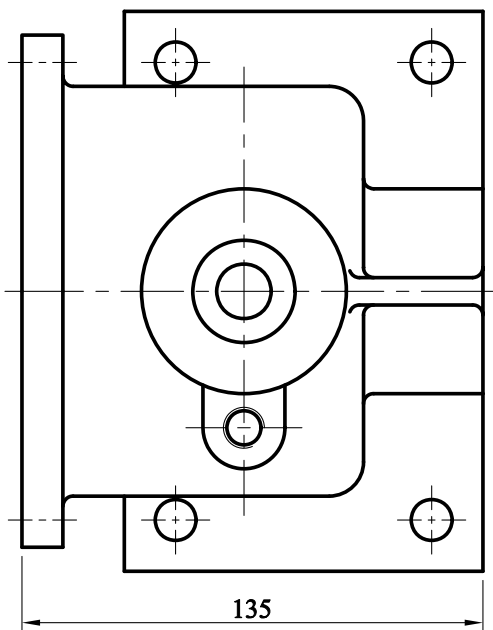




SECTION A-A

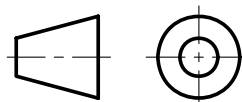


SECTION B-B



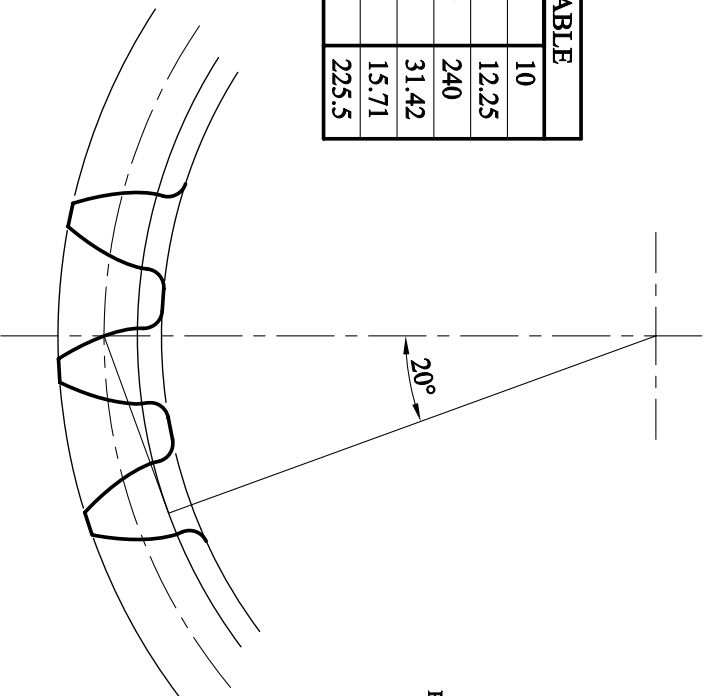
PLAN

PUMP HOUSING

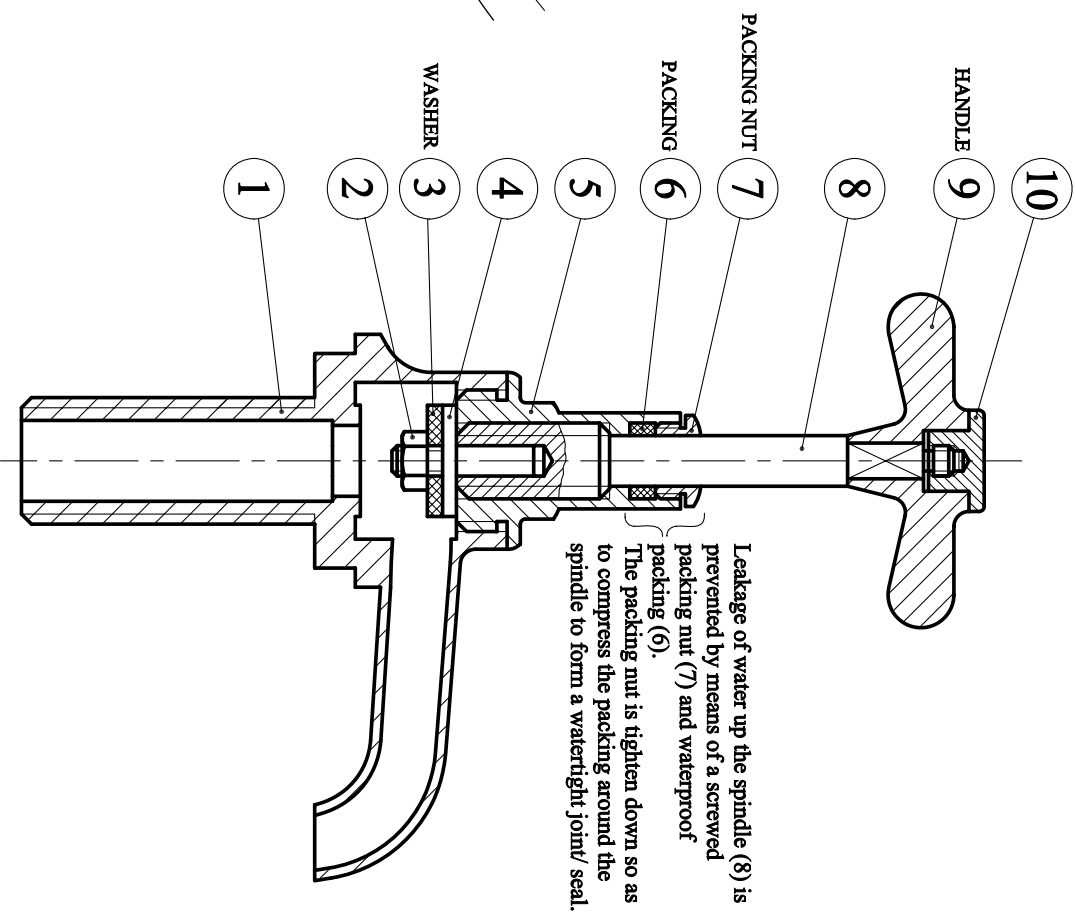


(a)

SPUR GEAR TABLE	
Addendum	10
Dedendum	12.25
Pitch circle diameter	240
Circular pitch	31.42
Tooth thickness	15.71
Base circle diameter	225.5



(b)



WATER TAP

CALCULATIONS
Addendum = module = 10mm
Dedendum = 1.25 x module = 1.25 x 10 = 12.25mm
PCD = $m \times T$ = 10 x 24 = 240mm
Circular pitch $p = \pi \times m$ = 3.142 x 10 = 31.42mm
Tooth thickness = $\frac{p}{2}$ = $\frac{31.42}{2}$ = 15.71mm
Base circle = $\cos 20^\circ \times \text{PCD}$ = 0.939 x 240 = 225.5 mm

(a) (i) Advantages of CAD: Higher productivity, faster and easier creation of drawings which can be easily retrieved and modified.

Understanding presentation possible, rendering allows photo realistic images with full animation.

Ability to store frequently used parts in libraries.

Automatic creation of elevations, cross sections and bill of materials.

Testing of the design using finite element analysis and so on.

(ii) Oblique angle value controls the slant of the text.

(iii) Dashdot 

Zigzag 

(iv) Draw Arcs by specifying:


(a) Three points 


(b) Start, Center, End 

(c) Start, Center, Length 

(d) Start, End, Angle 

(e) Start, End, Direction 

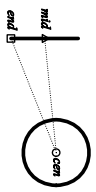
(f) Start, End, Radius 

(g) Center, Start, End 

(h) Center, Start, Angle 

(i) Center, Start, Length 

(v) Object Snap allows you to specify precise locations on objects. For example, you can use an object snap to draw a line from the center of a circle to the midpoint or end of a line segment.



(vi) Hyperlink: is a piece of text or an object defined in a web drawing and clicking it performs an action such as moving to a different part of the same drawing or displaying a new page/web site etc.

(vii) Potential problems: (a) security issues - download file might be hiding spyware or malware (identity thieves and hackers), viruses and trojans, corrupt spoofing files, popup ads, cookies, deceptive links etc. (b) a large download file could tie up your internet connection (slow download speed), file might not unpack, file might be corrupted, computer could crash, risk of breaking copyright laws, etc.

(viii) 'Previous' would reselect the group of objects again.

(b) Package: Solid Edge V19.

STEPS:

(i) Begin by creating a new part document. Select reference plane and sketch outline of base to size and protrude.

(ii) Select vertical edges and insert four rounds/filletlets at the corners.

(iii) Select top face, draw hole use center of fillet for hole center, set hole parameters and define extent/depth.

(iv) Select profile plane- top surface of base, draw circle and protrude upwards to create cylinder.

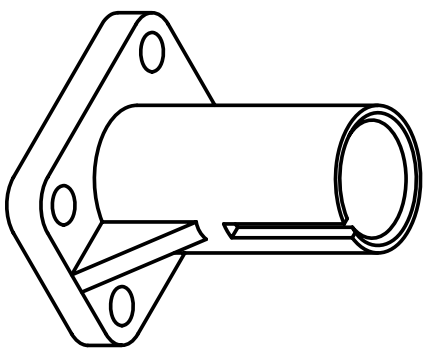
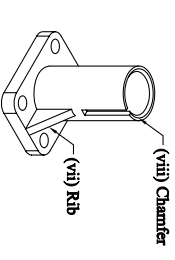
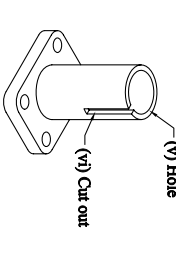
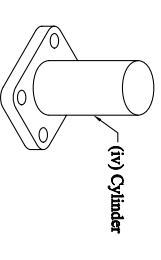
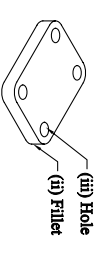
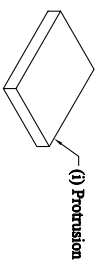
(v) Select top surface of cylinder, insert hole use center of cylinder for center, set hole parameters and define extent/depth.

(vi) Define profile plane, and use cutout to create slot on cylinder.

(vii) Define profile plane, sketch rib profile and define thickness.

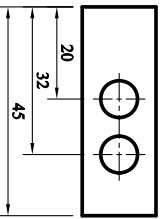
(viii) Chamfer edge of cylinder hole to size.

(ix) Save the part document and close.

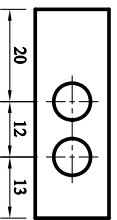


(c)

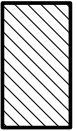
(i) BASELINE:



CONTINUOUS:



(ii) HATCH: Fills an enclosed area or selected objects with a hatch pattern, solid fill, or gradient fill.
GRADIENT: Fills an enclosed area or selected objects with a gradient fill. The fill uses a transition between shades of one color or between two colors.



Hatch



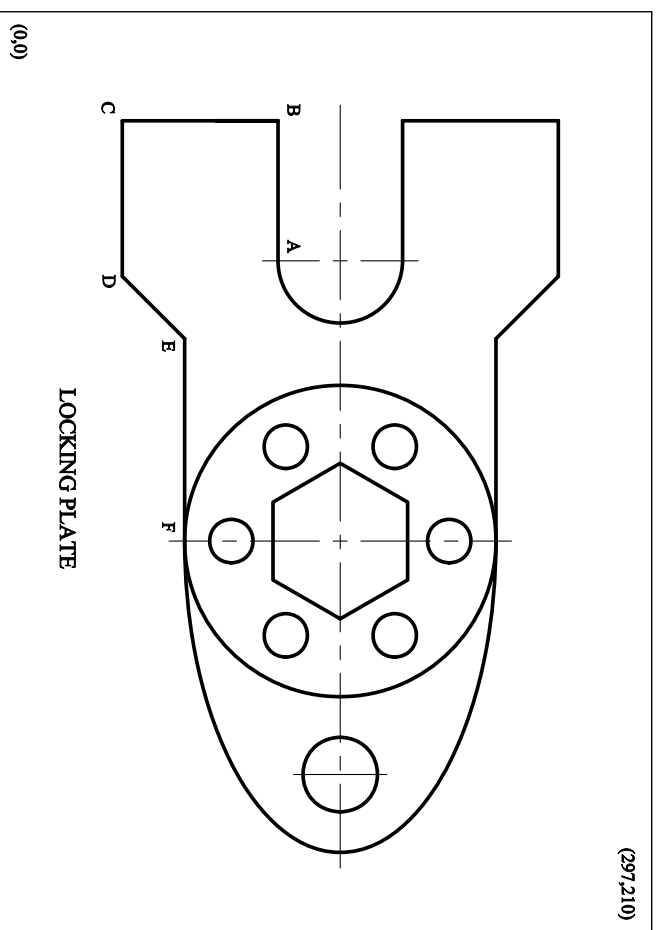
Gradient

(iii) The PLOT command allows you to create a single plot on paper. However, there are many times when you need to create a set of drawings. The PUBLISH command allows you to easily assemble a collection of drawings and, with one click, create multiple plots or an electronic drawing set.

(iv) FREEZING a layer: Frozen layers are invisible. They are not regenerated or plotted.
LOCKING a layer prevents editing of objects on the locked layer.

(v) ERASE: Removes objects from a drawing
WIPEOUT: Covers existing objects with a blank area.

(c)





Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2008

Technical Drawing
Paper 2B - Higher Level



(Building Applications)

Marking Scheme
and Sample Solutions

(Other valid solutions are acceptable and marked accordingly)

QUESTION 1

	MARKS
1. Draw the given plan	2
2. Position spectator and plan of picture plane (1, 3)	4
3. Plan of vanishing points.....	2
4. Ground line, horizon line, vanishing points in elevation (1, 1, 2).....	4
5. Projection lines from plan to spectator	1
6. Perspective of base lines of structure.....	2
7. Measure and apply height 1	2
8. Determine auxiliary vanishing points or alternative (2,1).....	3
9. Complete perspective of base of structure	2
10 Determine base lines of main structure.....	3
11. Measure height 2 and complete perspective of structure to height line 2	3
12. Measure height 3, construction for finding points on curves (1, 4)	5
13. Complete perspective view of main structure (excluding holes).....	5
14. Measure and apply heights 4, 5, 6, 7.....	3
15. Draw inclined lines vanishing to AVPs	4
16. Complete perspective view, presentation.....	5
Total	50

QUESTION 2

Part (a) 27	MARKS
1. Set up given dimensions for surfaces A and B in plan	3
2. Draw edge views of surfaces A, B and C (2, 2, 2).....	6
3. Determine line of intersection between surfaces A and B in plan.....	3
4. Construction to complete surface A in plan, draw surface in plan.....	3
5. Projection to complete surface A in elevation, draw surface in elevation	3
6. View showing true length of line of intersection between A and B.....	4
7. Construction to find dihedral angle.....	3
8. Indicating dihedral angle.....	2
Part (b) 10	
9. View showing true length of line of intersection between B and D.....	3
10. Construction to determine trace of surface D in plan	3
11. Construction to complete surface D in plan.....	2
12. Complete plan and elevation of surface D.....	2
Part (c) 13	
13. Draw the projections of surface E.....	3
14. Construction to apply pitch of surfaces F and G	5
15. Construction to determine lines on int. between F and C, also G and C	2
16. Complete the projections of the roof	3
Total	50

QUESTION 3

Given Plan and Elevation (10) MARKS

- 1. Draw the given plan and elevation (4, 4) 8
- 2. Draw light rays in plan and elevation (1, 1) 2

Shadow and Shade in Plan and Elevation (40)

- 3. Determine points e, f, g on ground 6
 - 4. Draw outline shadow of straight part of main building on ground..... 4
 - 5. Construction to determine shadow cast by curved part on ground..... 4
 - 6. Complete shadow cast by main building on ground 4
 - 7. Determine area of shade on main building in plan 2
 - 8. Indicate shade on main building in elevation 2
 - 9. Construction to determine outline shadow cast by cone on ground 2
 - 10. Draw outline shadow of cone on the ground 2
 - 11. Determine shade on cone in plan and elevation (2, 2) 4
 - 12. Construction to determine shadow cast by cone on main building 3
 - 13. Determine points a, b, c, d 4
 - 14. Complete shadow cast on main building in plan 3
- Total 50**

QUESTION 4

MARKS

1. Set up given dimensions, axes and circle outline in plan	4
2. Set up given dimensions in elevation.....	2
3. Draw constructional semi-circles.....	4
4. Construction to determine hyperbolic curves in plan /elevation	6
5. Draw outline of hyperbolic curves in plan.....	6
6. Draw hyperbolic curve in elevation.....	4
7. Method for determining elevation of curved ends of building	6
8. Complete elevation of curved ends.....	4
9. Construction for parabola in elevation.....	4
10. Set up outline of entrance in plan.....	2
11. Construction to determine plan of curve of intersection of entrance with main structure.....	4
12. Complete plan	4
Total	50

QUESTION 5

(a) Set up, Dip, Strike & Thickness of Stratum (35)	MARKS
1. Outline of bore-holes in plan, points A and B in elevation (2, 2, 1, 1).....	6
2. Bore-hole A in elevation, points 1 and 3 in elevation and plan (3, 2, 2).....	7
3. Bore-hole B in elevation, points 2 and 4 in elevation and plan (3, 2, 2).....	7
4. Draw lines 1, 2 and 3, 4 on headwall and footwall in plan (1, 1).....	2
5. Draw lines 1, 2 and 3, 4 on headwall and footwall in elevation (1, 1).....	2
6. Determine a plane parallel to line in elevation	2
7. Determine this plane in plan	2
8. Determine the strike in plan	1
9. Direction of auxiliary elevation, dip and thickness (2, 2, 2).....	6
(b) (15)	
10. Outline of bore-holes R and S in plan, points R and S in elevation	2
11. Set up view of bore-hole R in elevation showing inclination of 60°	1
12. Set up given strike in plan	1
13. Direction for aux. view, set up XY line, point 1 in aux. view	3
14. Set up given dip angle and thickness of stratum.....	2
15. Project bore-hole R to auxiliary view	1
16. Identify pt. 2 in aux.view, project to plan, rotate and proj. to const. elev	3
17. Indicate required distance	1
18. Construction to determine required inclination.....	1
Total	50

QUESTION 6

(a) Plan and Elevation (27)	MARKS
1. Draw the plan and elevation of edges ABCD (3, 3)	4
2. Set up outline projections of plane roof surfaces R and S	3
3. Draw elements on ABCD in plan, project to elevation	5
4. Extend elements in elevation to edge view of surface R	2
5. Extend elements in plan, determine points on curve of intersection	3
6. Method for finding points on line of int. between surface S and ABCD	7
7. Complete plan and elevation.....	3
 (b) Curvature along A to C (9)	
8. Draw line AC in plan, proj. of int. with elements to elements in elev.	2
9. Set up XY line parallel to AC, projections at right angles to AC.....	2
10. Measure heights from elevation in auxiliary view.....	2
11. Draw curve	3
 (c) Traces of plane director (14)	
12. Plane parallel to element in plan	2
13. Plane parallel to element in elevation	2
14. Determine direction of horizontal trace	2
15. Determine direction of vertical trace	1
16. Draw traces to contain point A	2
17. Construction to find distance of D to plane director, indicate distance.....	5
Total	50

QUESTION 7**Earthworks between A and B - Level - Cuttings (6) MARKS**

1. Parallel lines at 5m intervals 2
2. Intersections with contours, drawing curves 4

Embankments (6)

3. Parallel lines at 7.5m intervals 2
4. Intersections with contours, drawing curves..... 4

Earthworks between B and D - Embankments (8)

5. Determine arc rad. 15m at 60m level, draw tangents from 50m level..... 2
6. Determine parallel lines at 7.5m intervals 3
7. Intersections with contours, drawing curves..... 3

Earthworks between B and D - Cuttings (8)

8. Determine arc rad. 10m at 50m level, tangents from 60m level 2
9. Determine parallel lines at 5m intervals 3
10. Intersections with contours, drawing curves..... 3

Parking area (16)

11. Edge at B - Parallel lines at 7.5m intervals 2
12. Intersections with contours, drawing curve 2
13. Inclined edges -Arcs rad.15m at 60m level, tangents from 50m level 4
14. Parallel lines at 7.5 m intervals, intersection with contours, draw curves..... 2
15. Edge at C - locate line at 50m level, parallel lines at 7.5m intervals..... 4
16. Intersections with contours, drawing curve 2

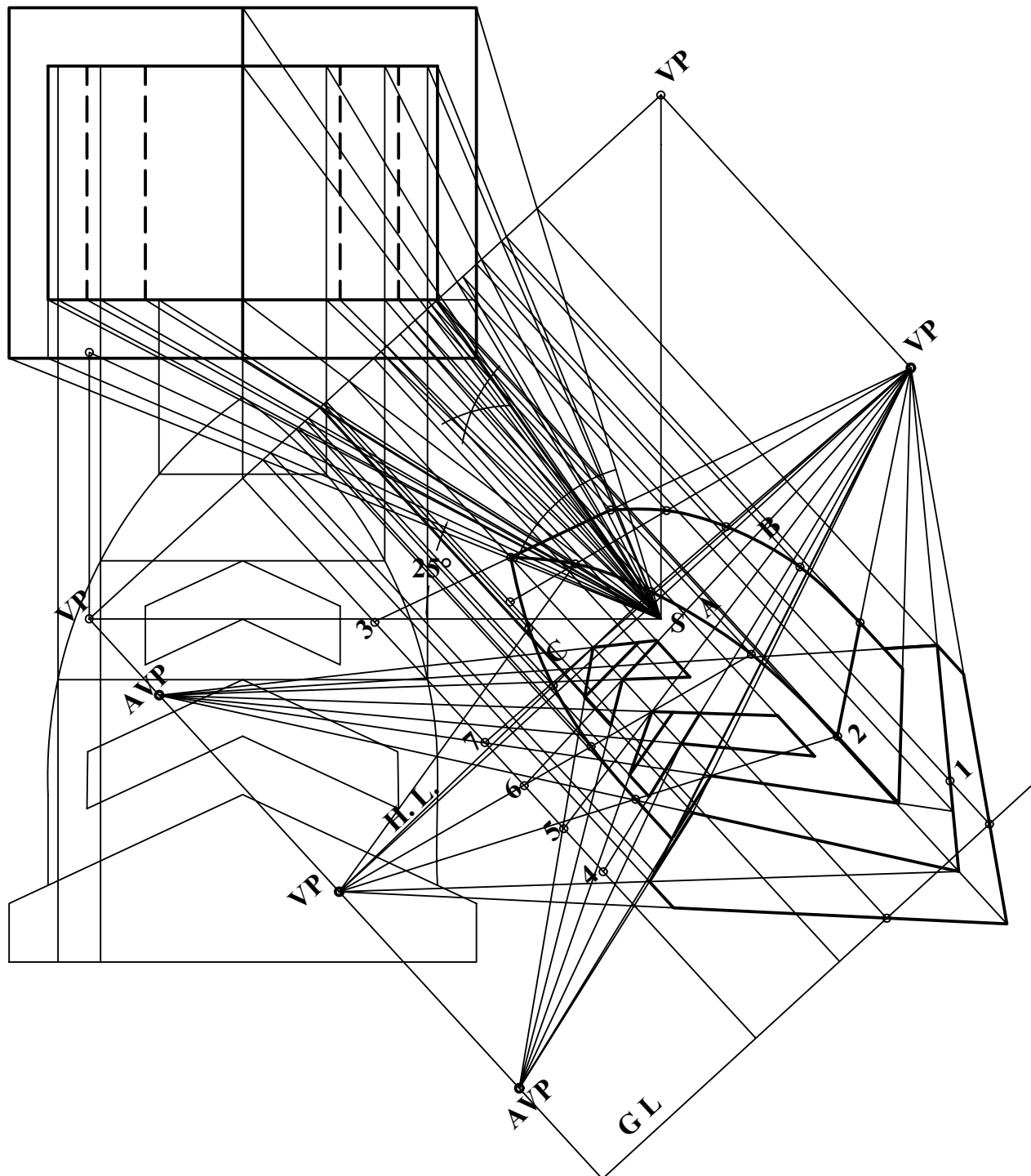
Completion and Presentation (6)

17. Determine intersections of cut and fill curves, presentation..... 6

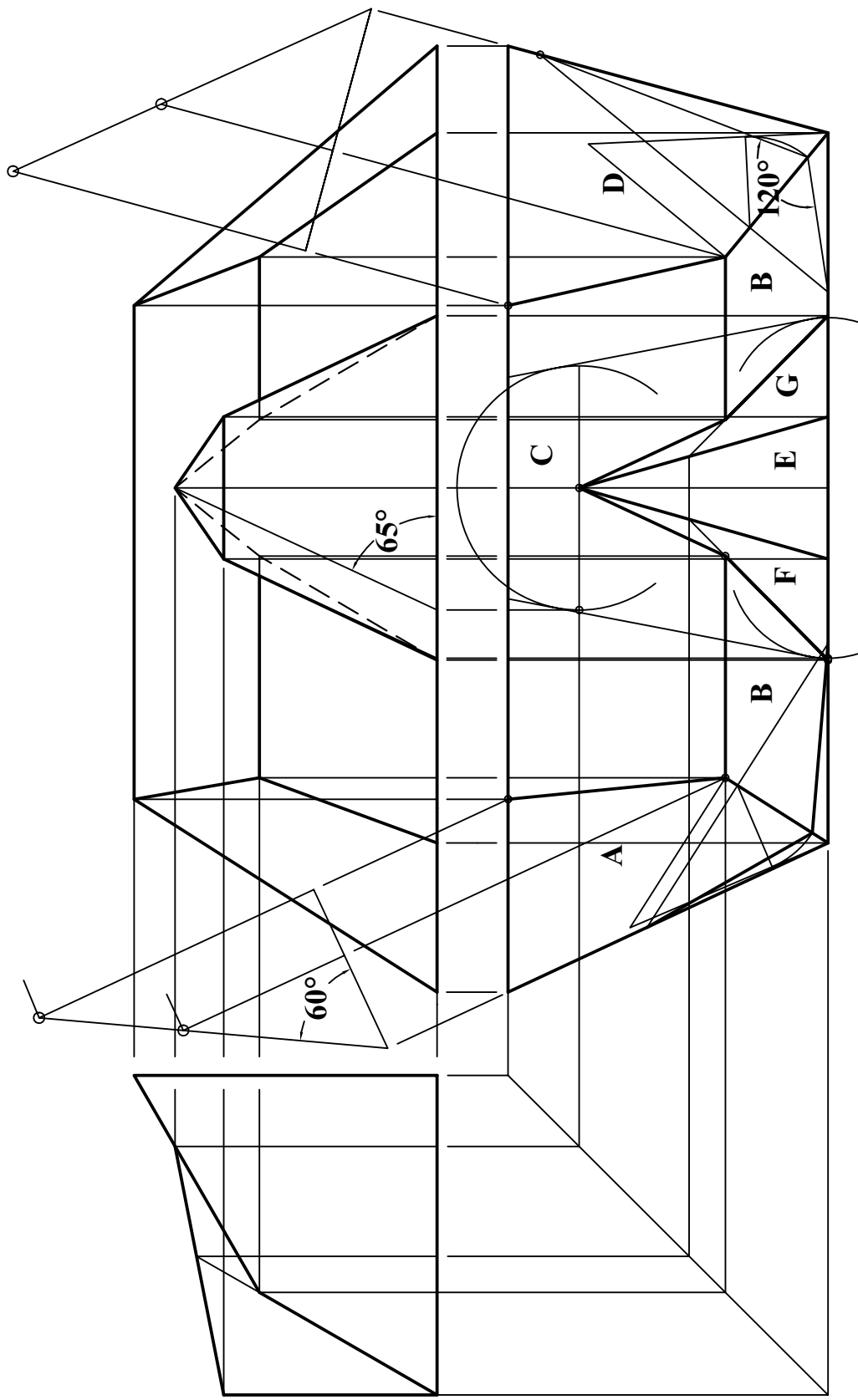
Total 50

QUESTION 1

2008

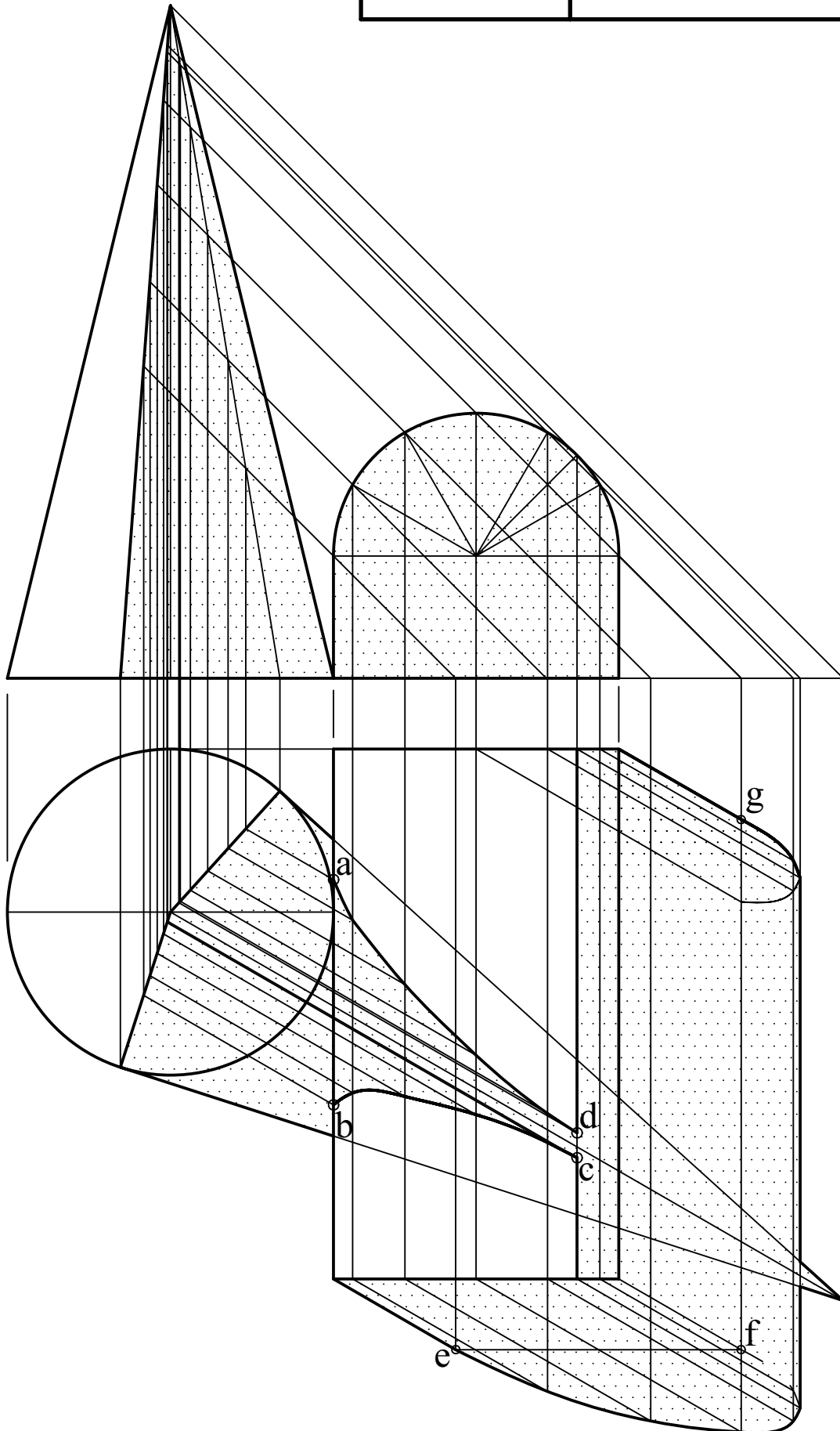


QUESTION 2 2008

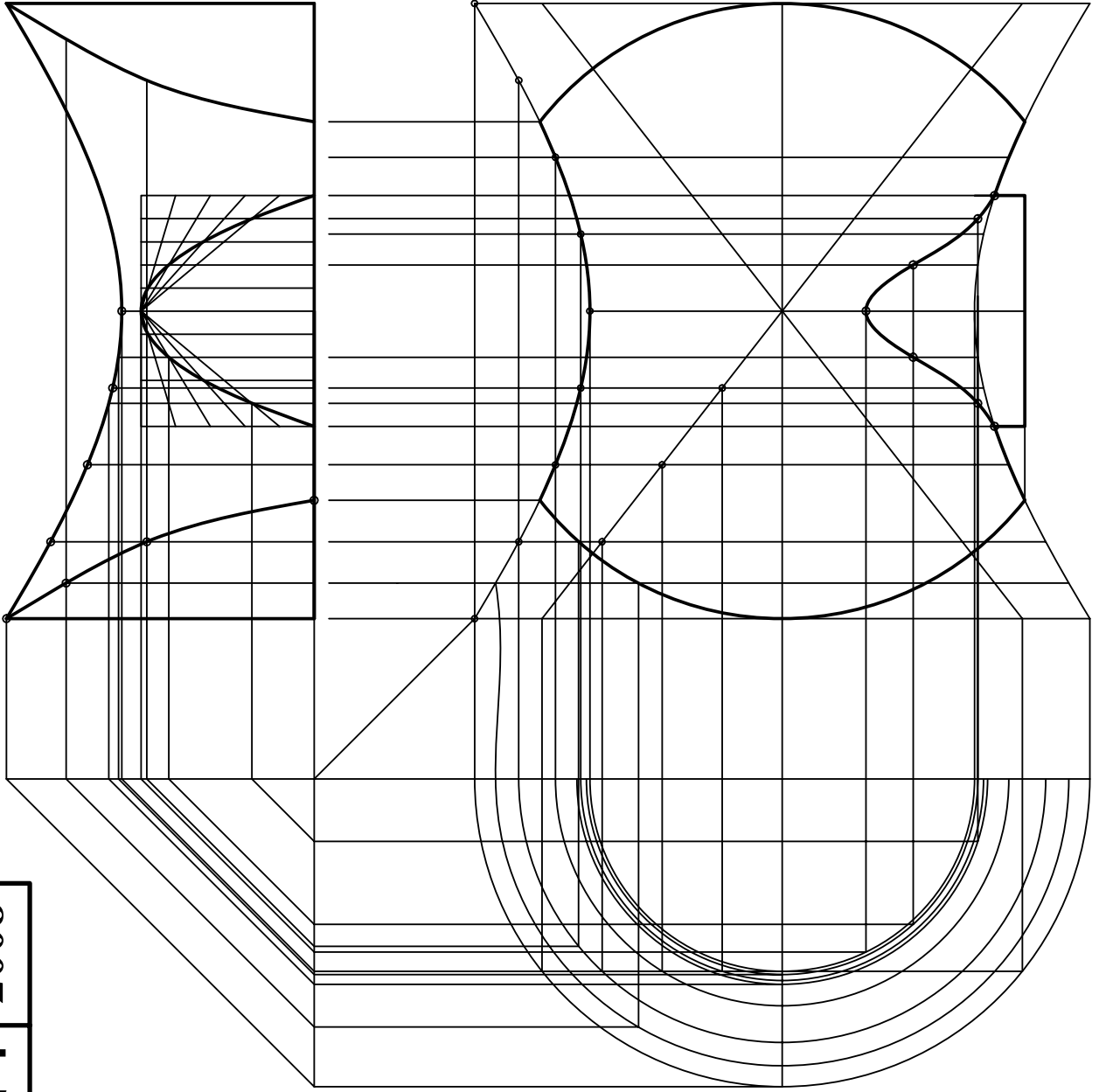


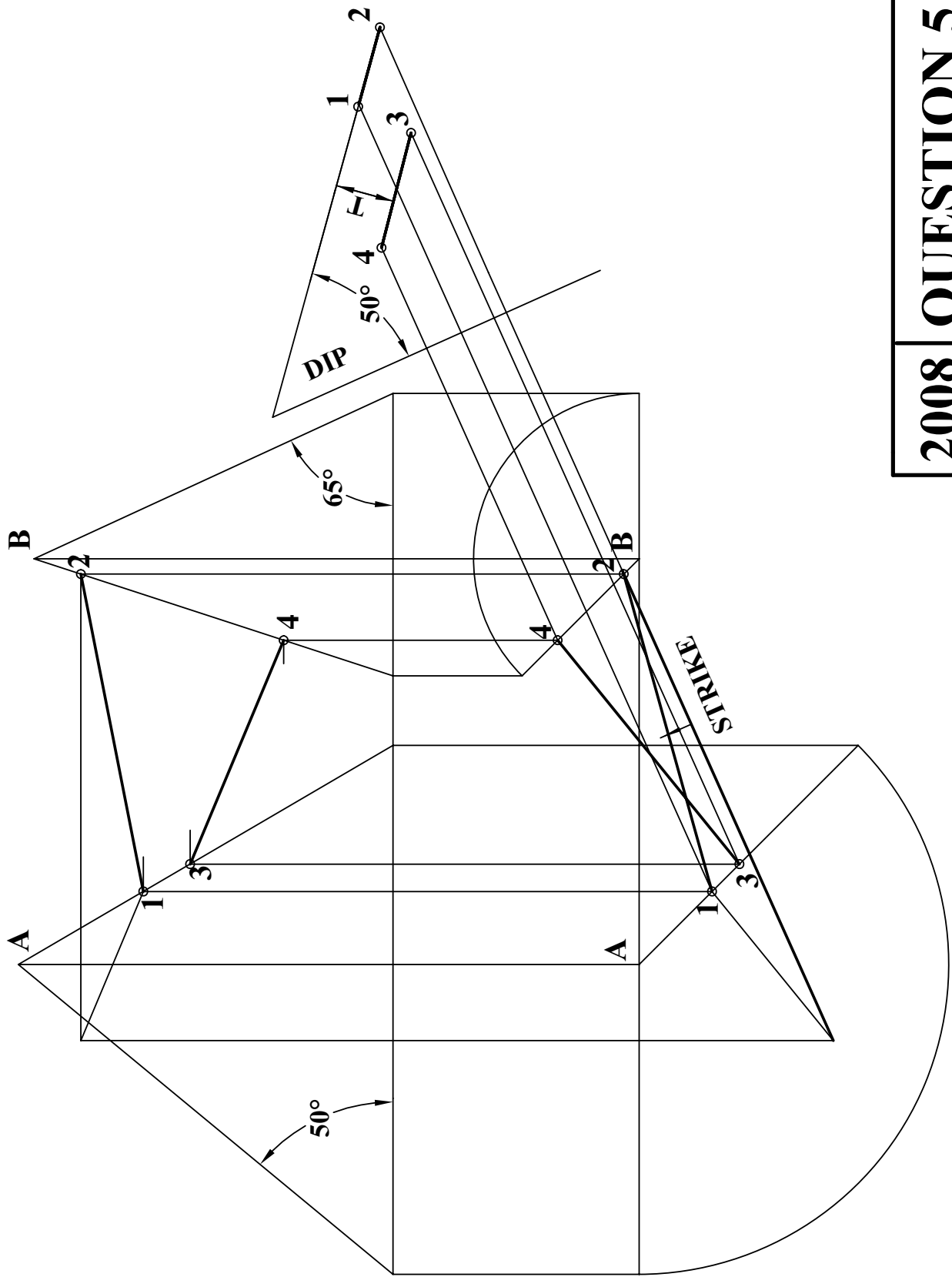
2008

QUESTION 3



QUESTION 4 2008

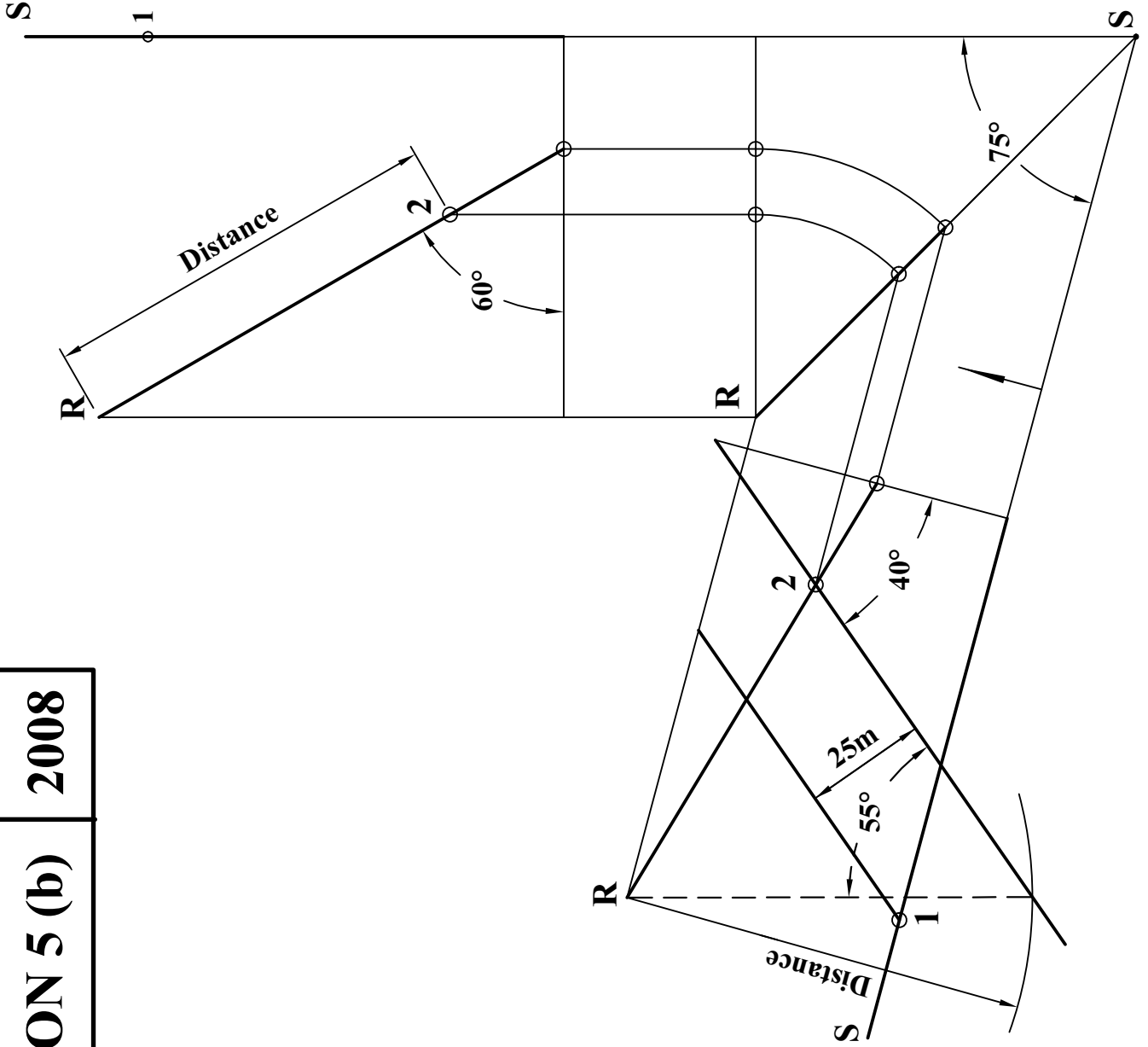




2008 QUESTION 5 (a)

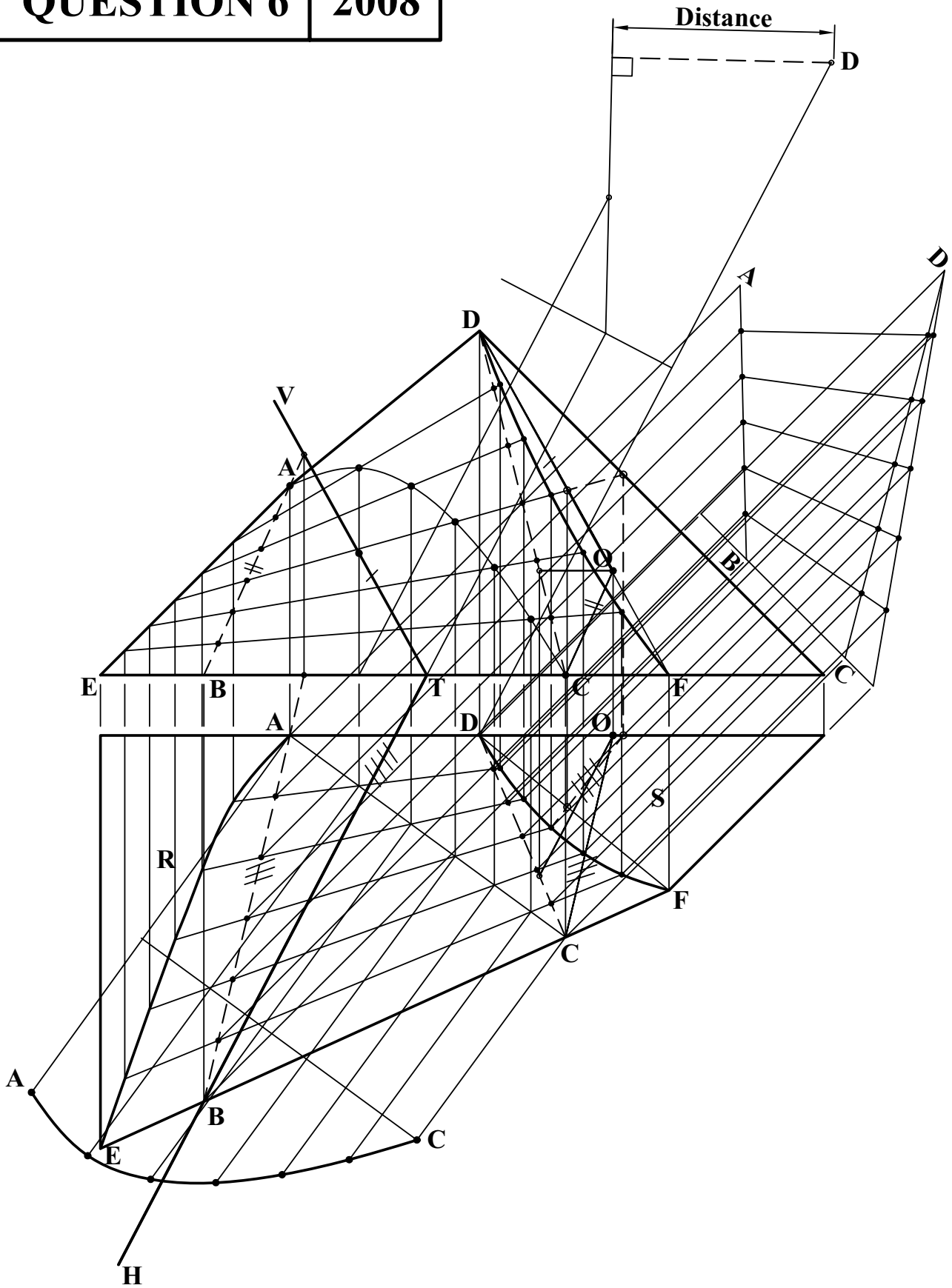
QUESTION 5 (b)

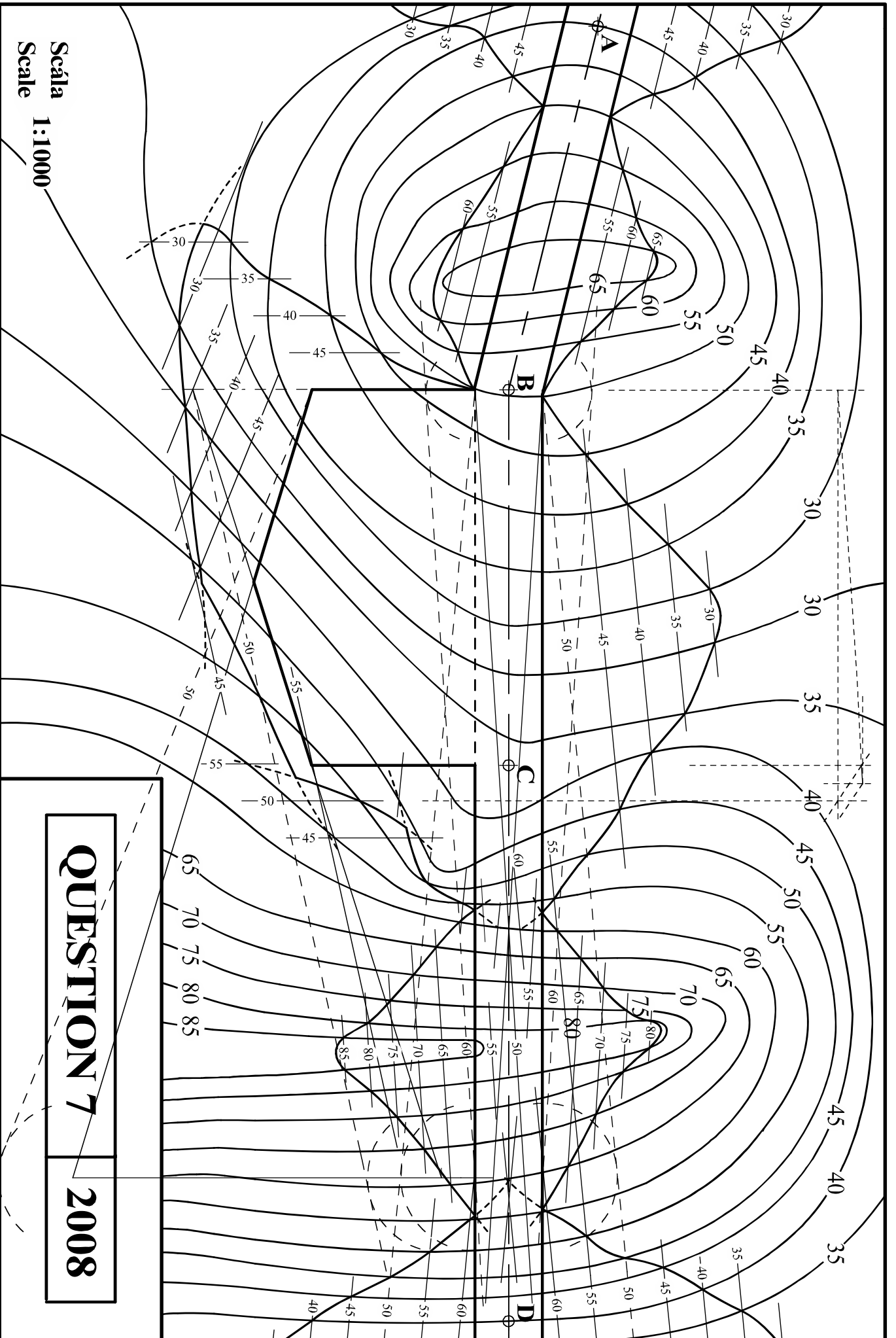
2008



QUESTION 6

2008





Scala
Scale
1:1000

QUESTION 7

2008

