Coimisiún na Scrúduithe Stáit
State Examinations Commission

Scéimeanna Marcála *Scrúduithe Ardteistiméireachta, 2003*

Líníocht Theicniúil *Ardleibhéal*

Marking Scheme *Leaving Certificate Examination, 2003*

Technical Drawing *Higher Level*

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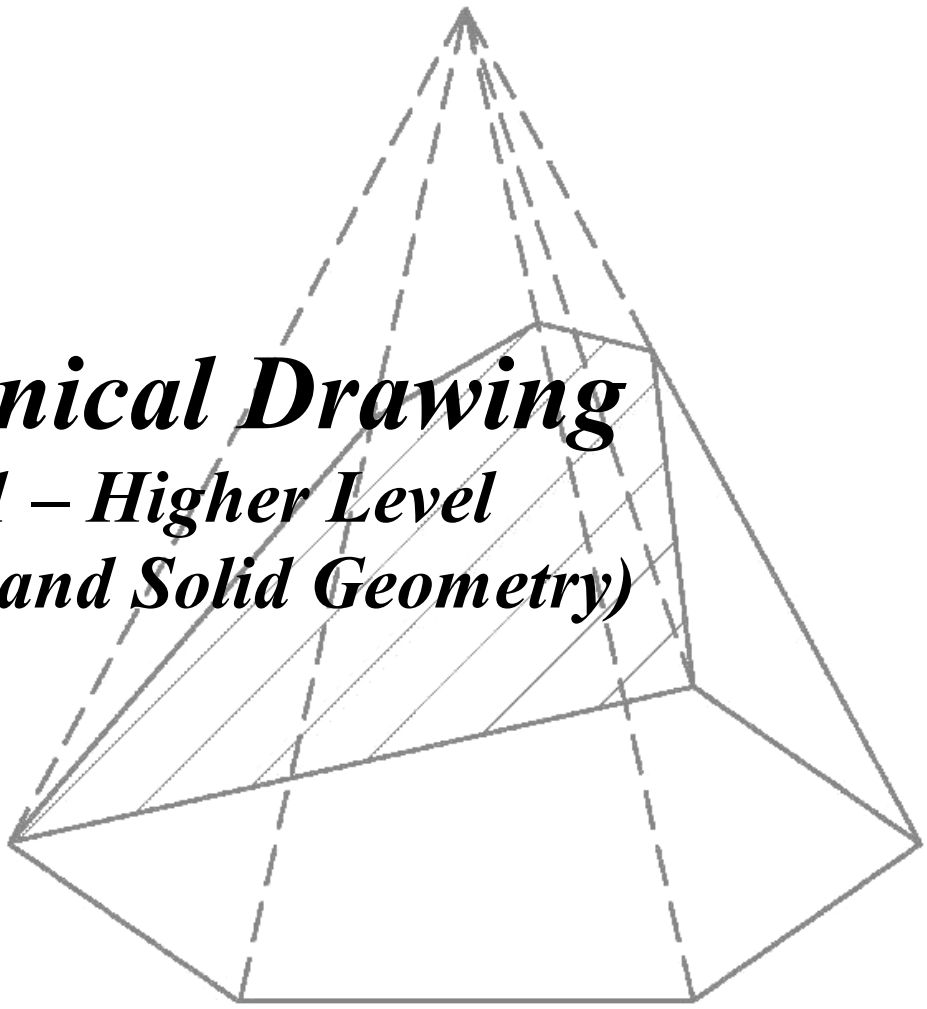


Technical Drawing

Paper 1 – Higher Level
(Plane and Solid Geometry)

Marking Scheme &
Sample Solutions

QUESTION 1

MARKS

Plan and Elevation of planes ABC and DEF

(i) Interpretation of co-ordinates **2**

(ii) Drawing outline of planes **2**

(a) Line of Intersection

(iii) Horiontal 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 elevation **2**

or

(iii) Edge view of one plane in auxiliary view…(11) **2**

(iv) Projection of other plane **2**

(v) Determining projections of line of intersection **2**

(b) Dihedral angle

(i) New X_1Y_1 taken parallel to line of intersection **4**

(ii) Projection of ABC and DEF on new X_1Y_1 ..... **3**

(iii) New X_2Y_2 taken perpendicular to line of intersection **4**

(iv) Projection of ABC and DEF on X_2Y_2 and indicating dihedral angle ... **5**

(c) Determining line from D

(i) Drawing 70mm cone with base 75mm above H.P. in any elevation **5**

(ii) Drawing plan of cone **3**

(iii) Locating line 75mm above H.P. on plane ABC in plan
or locating required point on plan of cone.. ..... **3**

(iv) Drawing correct required line in plan and elevation…. **2**

(d) Skew lines

(i) Creating a plane containing DF (or AC) and parallel to AC (or DF) **3**

(ii) Finding edge view of plane **2**

(iii) X_2Y_2 parallel to edge view of plane **2**

(iv) Location of shortest distance and projection to 1st aux. **2**

(v) Projecting or measuring to plan and elevation..... **2**

or

(i) Auxiliary view of AC and DF showing true length of one **2**

(ii) Auxiliary view of AC and DF showing point view of one..... **2**

(iii) Drawing perpendicular from point to other line **2**

(iv) Projecting back to 1st aux. and drawing line perpendicular to true length line…(12) **3**

(v) Projecting or measuring to plan and elevation..... **2**

Total ***50***

QUESTION 2

MARKS

(a) Drawing given figure

(i) Drawing rectangle 65mm × 70mm **2**

(ii) Constructing equivalent rectangle with one side 40mm….(212) **5**

(iii) Drawing lines AF and FC…(21) **3**

(iv) Bisecting AC and drawing circle **2**

(v) Location of points B and D **4**

(vi) Location of point E **3**

(vii) Completion of pentagon **4**

(b) Division of Area

(i) Conversion of ABCDE into quadrilateral leaving point A and line CD intact…(Any = 1) **3**

(ii) Conversion of quadrilateral into triangle leaving point A and line CD intact…(Any = 1) **3**

(iii) Bisection of base and drawing of dividing line from A…(31) **4**

(c) Inscribed equilateral triangle

(i) Redrawing of pentagon ABCDE **3**

(ii) Positioning of vertex 1 at B **2**

(iii) Locating various (2) positions for vertex 2 on AE (or CD) ..(21) **3**

(iv) Locating positions for third vertex and drawing locus (or one position and 60° line) **5**

(v) Finding position for 2nd vertex and drawing triangle **4**

Total ***50***

QUESTION 3

MARKS

(a) Cone A and Sphere B

(i) Plan and elevation of cone A and elevation of sphere B **3**

(ii) Bisection of angle between cone edge and XY line
or draw line 35mm from edge of cone **2**

(iii) Draw line 35mm above H.P. **2**

(iv) Locate centre **2**

(v) Project centre point to plan and rotate about cone A **4**

(vi) Locate centre in plan and draw plan of sphere (incl. hidden detail) **4**

(b) Tangent Plane and Point of Contact

(i) Elevation and plan of circumscribing cone about sphere B (32).. ..... **5**

(ii) Horiontal trace tangential to both circles … …(21) **3**

(iii) Construct and draw vertical trace … …(21) **3**

(iv) X_1Y_1 perpendicular to H.T. **3**

(v) Projection of centre of sphere on X_1Y_1 ..... **3**

(vi) Draw inclined plane and locate point of contact…(12) **3**

(c) Projections of 2nd sphere

(i) Locate plan of point P and draw line OP extended…(11) **2**

(ii) Location of P at edge of cone in elevation or auxiliary view **2**

(iii) Drawing of perpendicular at P in elevation or auxiliary view **1**

(iv) Stepping of distances on perpendicular in elevation/auxiliary view **1**

(v) Projection of points to plan and drawing set of relevant arcs/lines **2**

(vi) Drawing second set of arcs/lines corresponding with (v) **1**

(vii) Drawing of correct locus and location of centre in elevation **2**

(viii) Drawing required projections of correct sphere (incl. hidden detail) ... **2**

Total ***50***

QUESTION 4

MARKS

Outline Plan and Elevation

(i) Drawing outline plan of triangular prism **3**

(ii) Determination of height and drawing outline elevation of cut prism…(22) **4**

(iii) Drawing of cut surface in plan **4**

(iv) Drawing outline elevation of inclined prism…(31) **4**

(v) Transfer of widths to plan **4**

Interpenetration

(vi) Determining points **A, B & C** in elevation and plan..... **3**

(vii) Determining points **D, E, F & G** in elevation and plan…(4x2)..... **8**

(viii) Determining points **H, I, J & K** in elevation and plan…(4x1) **4**

(ix) Determining points **L, M & N** in plan…(3x1).. ..... **3**

(x) Determining points **P, Q & R** in plan…(3x1) **3**

(xi) Joining intersection points in correct order..... **5**

(xii) Completion of drawing (hidden detail) **5**

Total ***50***

QUESTION 5

MARKS

(i) Drawing figure as given **4**

(ii) Dividing circle into a number of equal parts **2**

(iii) Stepping distances to locate B_1 B_2 B_3 and B_4 ..... **2**

(iv) Erection of perpendiculars to locate O_1 O_2 O_3 and O_4 ..... **3**

(v) Drawing arcs radius 30mm from O_1 O_2 etc. **4**

(vi) Drawing arcs C_1-P C_2-P etc from B_1 B_2 etc respectively **4**

(vii) Location of points O_R and P_R before rotation…(21) **3**

(viii) Location of points O_R and P_R in rotated positions **2**

Inclined line

(i) Stepping distances to locate B_5 B_6 B_7 ..... **2**

(ii) Erection of perpendiculars to locate O_5 O_6 O_7 ..... **2**

(iii) Drawing arcs radius 30mm from O_5 O_6 and O_7 ..... **3**

(iv) Drawing arcs C_5-P C_6-P C_7-P from B_5 B_6 B_7 respectively **3**

(v) Location of centre of circle at intersection of line and curve **2**

(vi) Location of P on circle **2**

Curve

(i) Stepping distances along arc **1**

(ii) Drawing path of centre and locating centres corresponding with (i) **2**

(iii) Locating more positions for P (min 1 end) **2**

(iv) Plotting of correct curve **7**

Total ***50***

QUESTION 6

MARKS

(a)	(i)	Drawing straight line DFV	**3**
	(ii)	Locating point on eccentricity line	**3**
	(iii)	Drawing eccentricity line	**3**
	(iv)	Determining second vertex	**4**
	(v)	Locating points on the curve (min 6 excluding vertices)	**5**
	(vi)	Drawing curve…(Any = 2)	**4**
(b)	(i)	Drawing triangle ABF	**3**
	(ii)	Drawing arc radius 85mm with centre A	**4**
	(iii)	Drawing arc radius 55mm with centre B	**4**
	(iv)	Drawing of axis and location of vertices…(211)	**4**
	(v)	Determination of points on both branches of curve (min 2 more on each branch)	**4**
	(vi)	Drawing curves…(Any = 1)	**3**
Asymptotes			
	(vii)	Correct location and drawing of asymptotes	**6**

Total ***50***

QUESTION 7

MARKS

(a) Outline Plan and Elevation

(i) Drawing plan of pyramid resting on H.P **5**

(ii) Auxiliary direction and X_1Y_1… …(21). **3**

(iii) Rotated pyramid in auxiliary elevation **4**

(iv) Required plan of pyramid (3 further points apex & 1 line) **5**

(v) Drawing elevation of pyramid..... **5**

(b) Cut surface

(i) Location of 40° cone(s) under A and B in elevation and plan **5**

(ii) Drawing H.T. tangential to circle(s). **3**

(iii) X_1Y_1 perpendicular to H.T. **2**

(iv) Edge view of plane **3**

(v) Identification of cut surface in auxiliary view **3**

(vi) Cut surface in plan and elevation **6**

(vii) Completion of plan and elevation **6**

or

(i) Location of 40° cone(s) under A and B in elevation and plan **5**

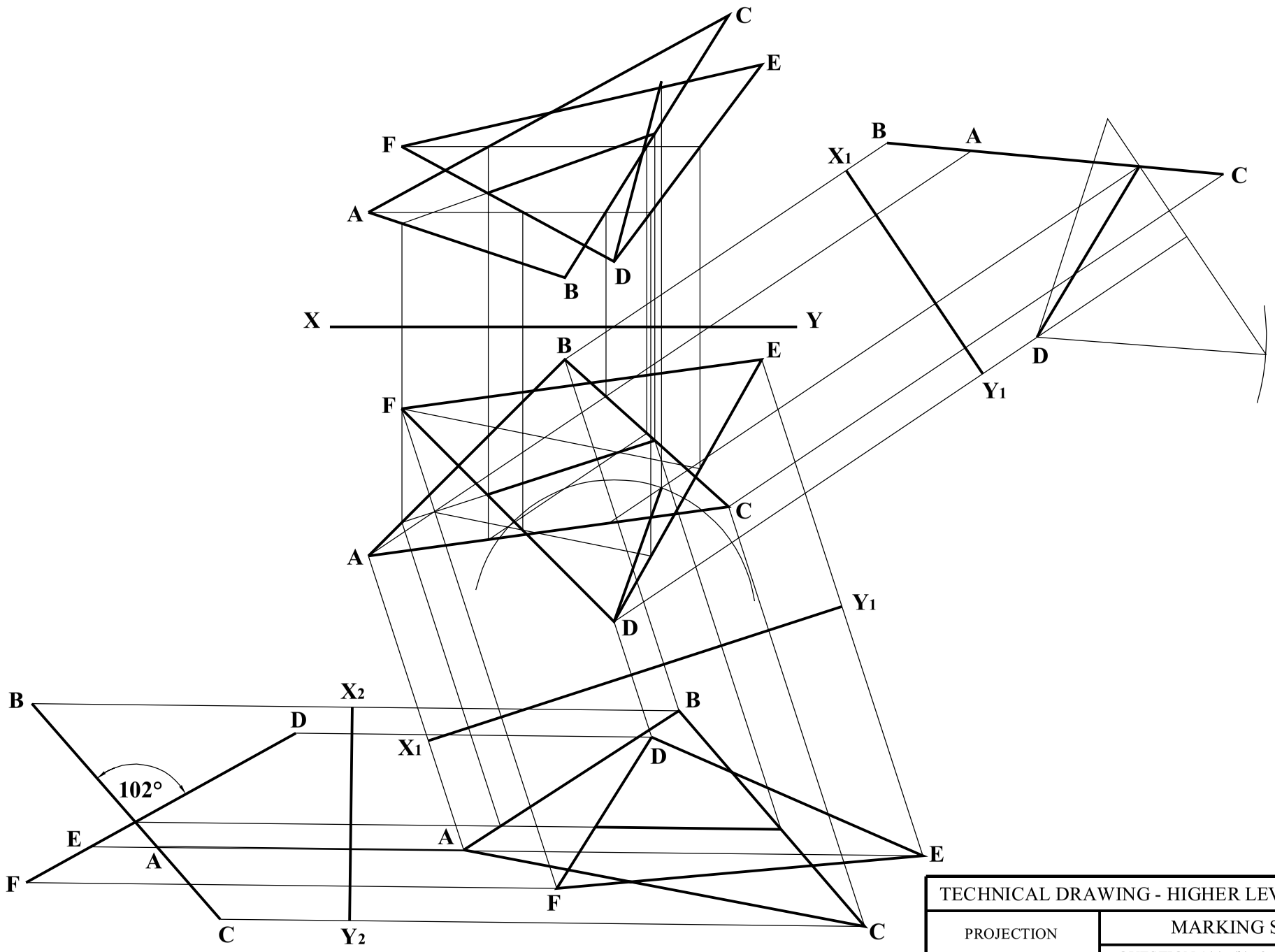
(ii) Drawing H.T. tangential to circle(s). **3**

(iii) Determine direction of V.T **2**

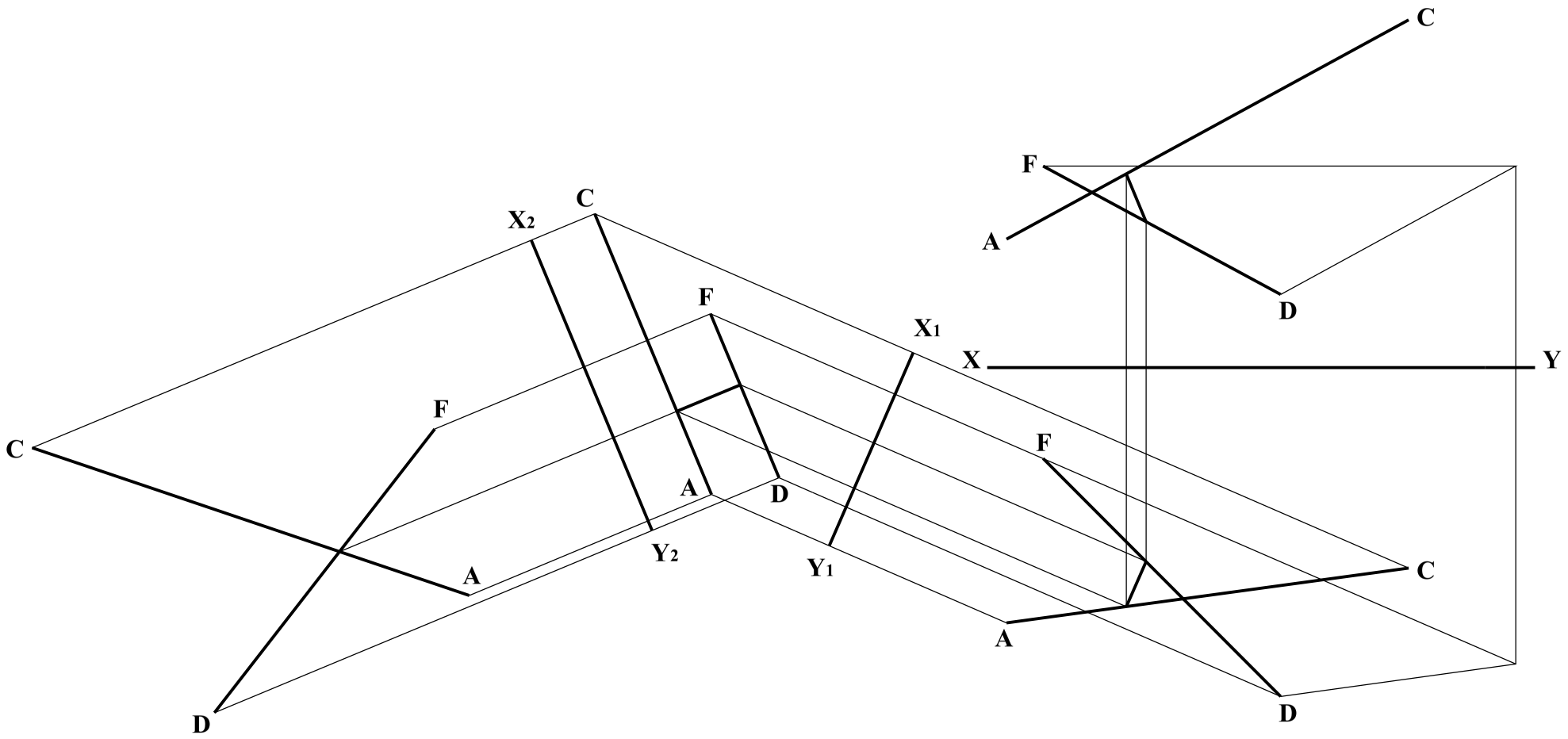
(iv) Cut surface in plan and elevation…(6 x 2) **12**

(v) Completion of plan and elevation **6**

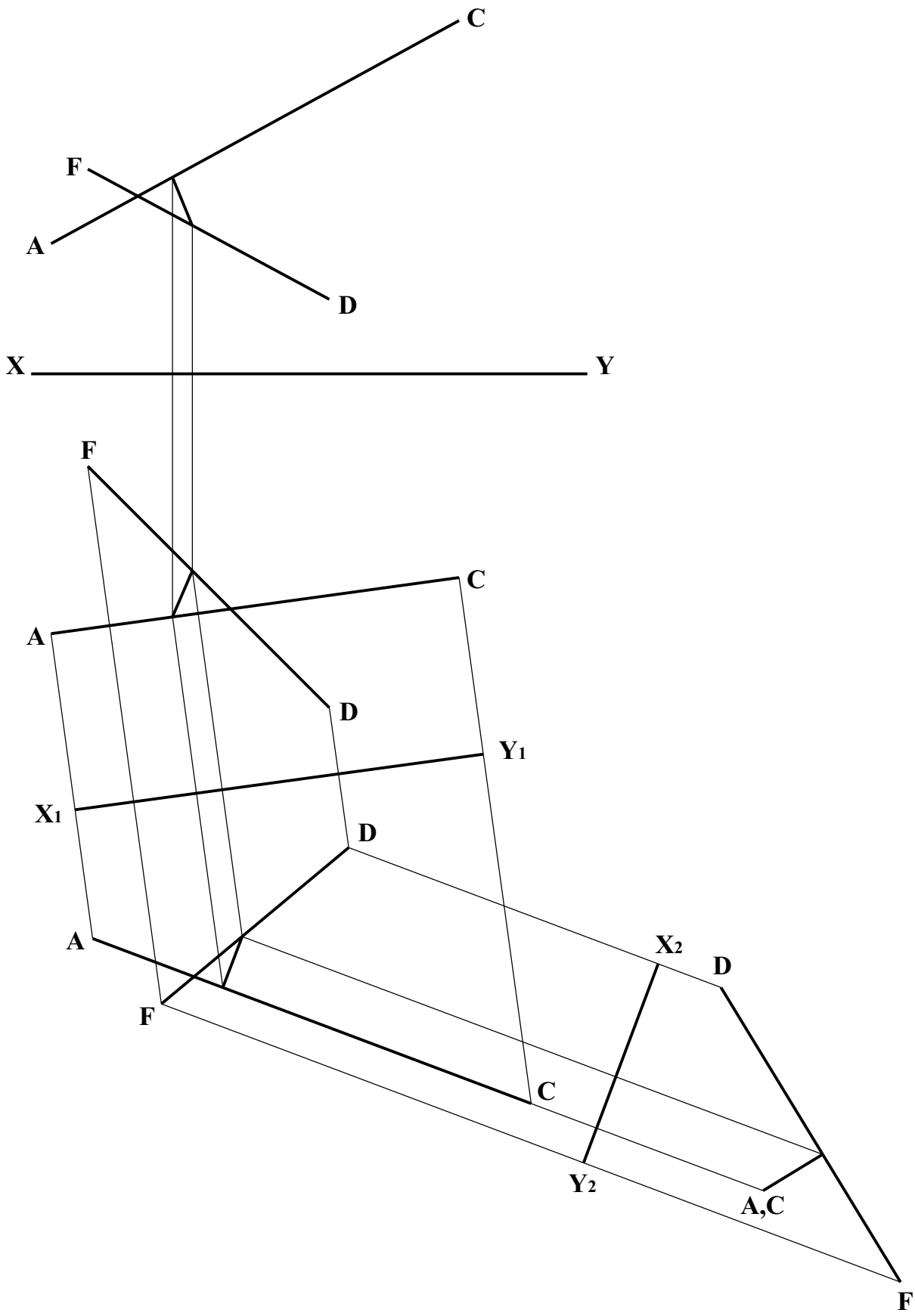
Total ***50***



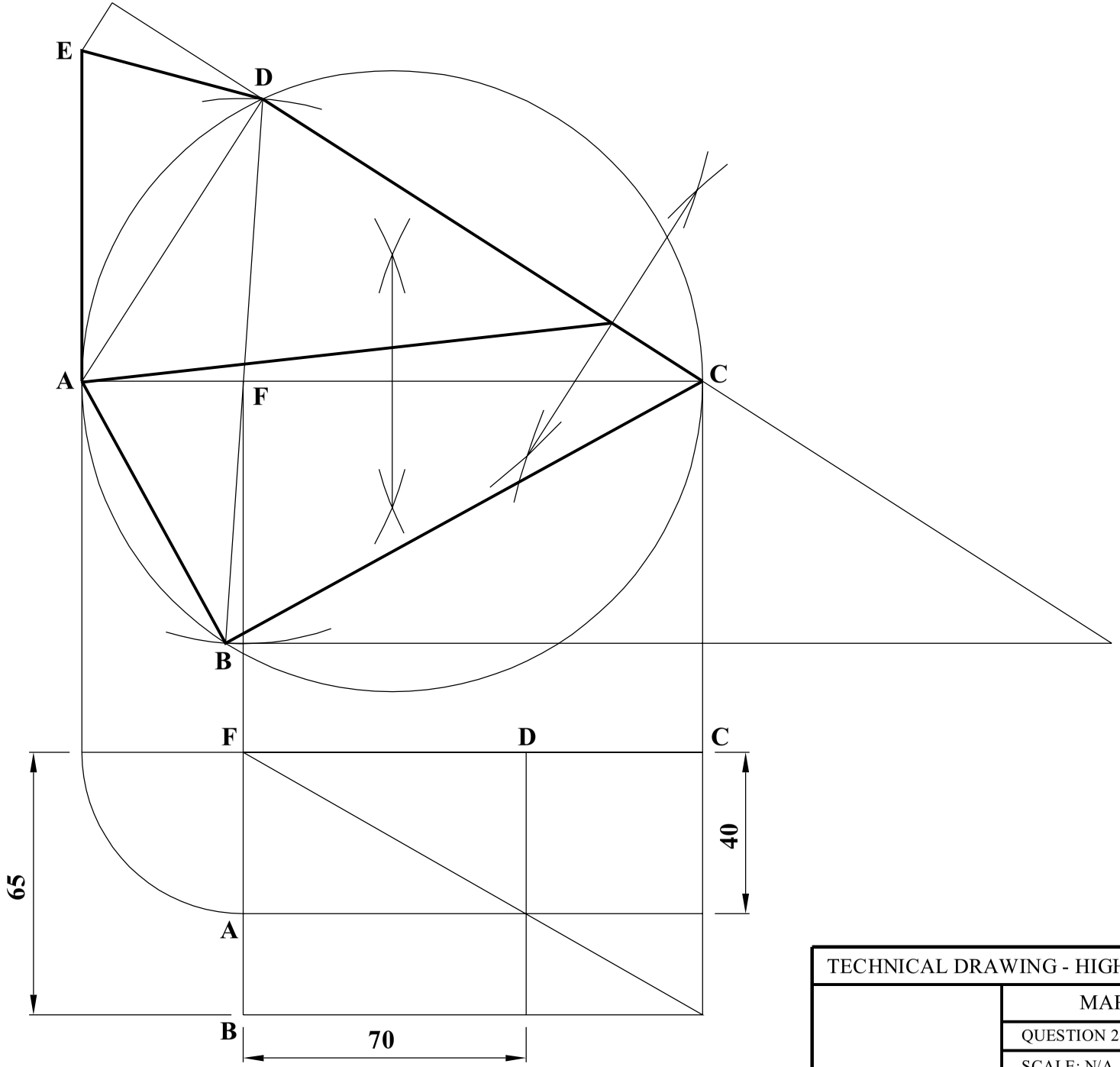
TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
PROJECTION	MARKING SCHEME.
	QUESTION 1(a) (b) & (c).
	SCALE: N/A. DATE: JUNE 2003.



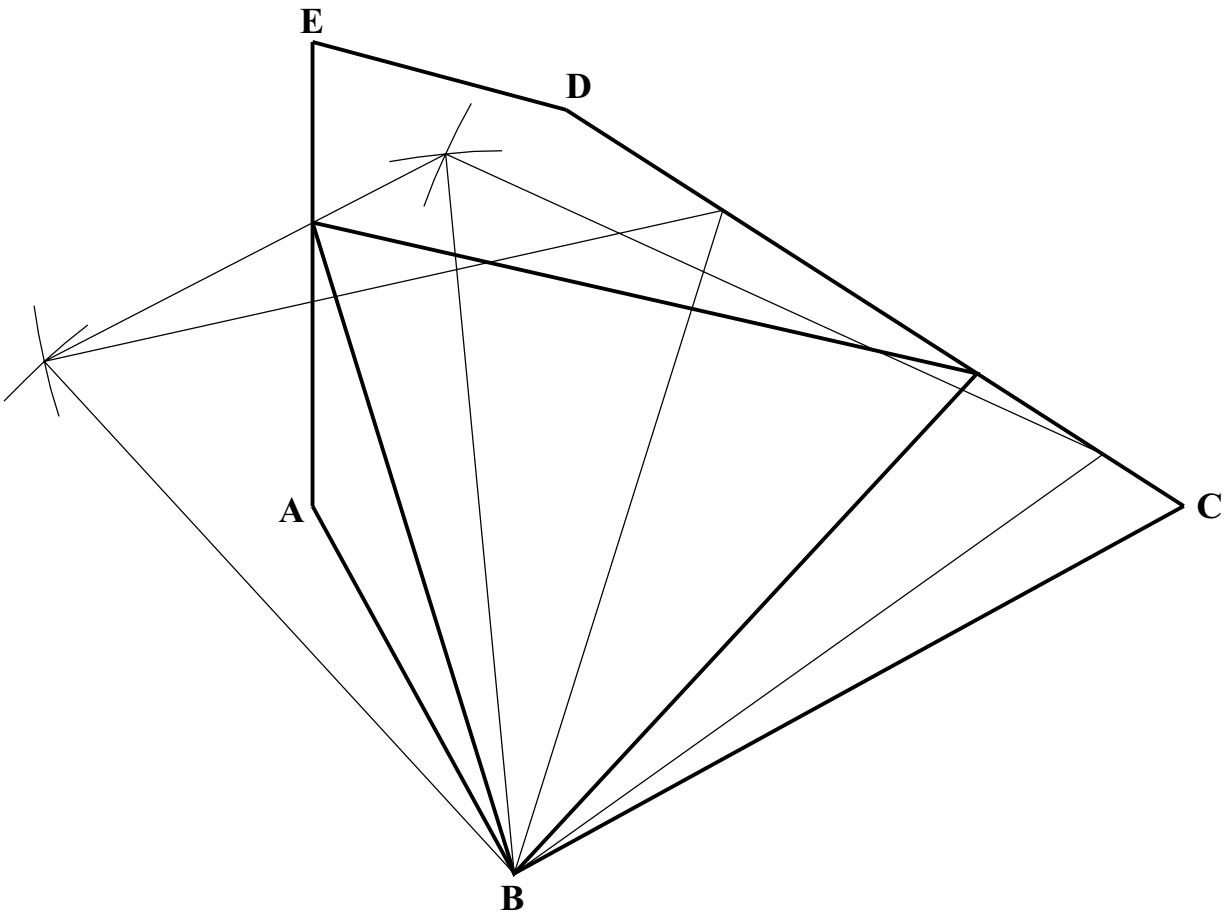
TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.		
PROJECTION	MARKING SCHEME.	
	QUESTION 1(d)	
	SCALE: N/A.	DATE: JUNE 2003.

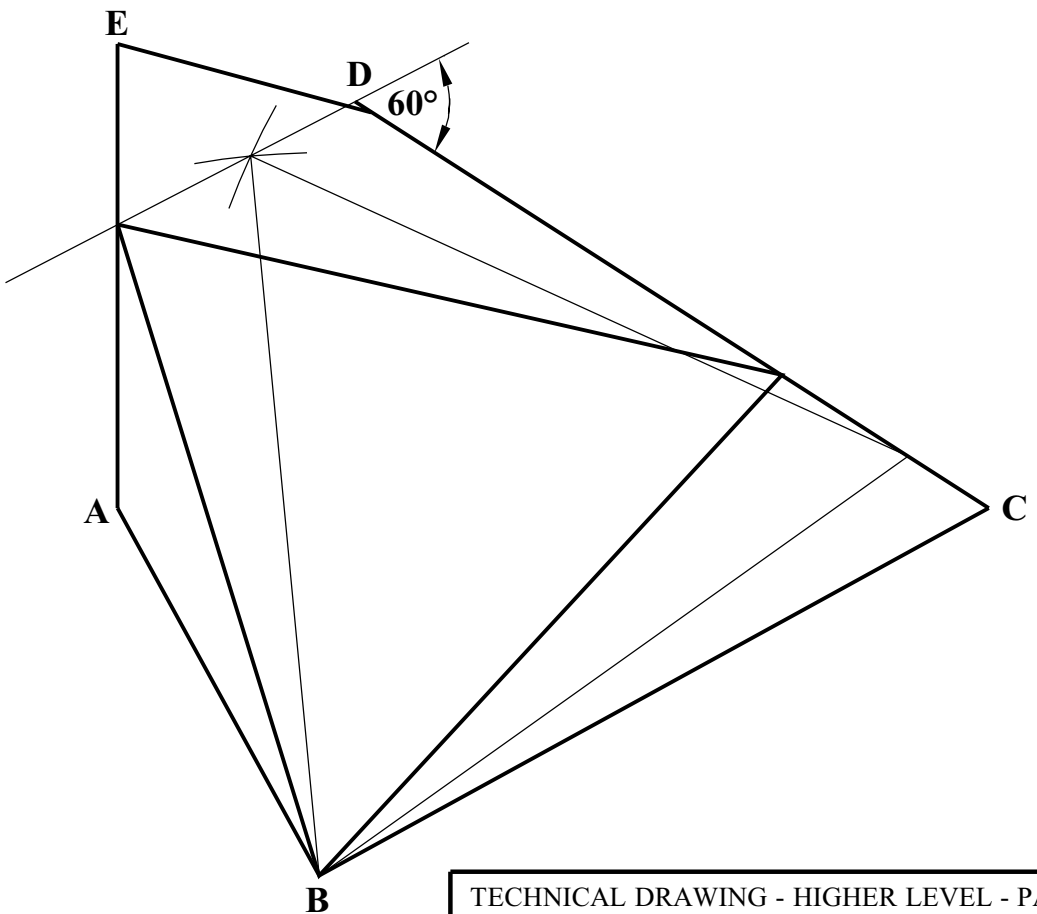


TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.		
PROJECTION	MARKING SCHEME.	
	QUESTION 1(d).	
	SCALE: N/A.	DATE: JUNE 2003.

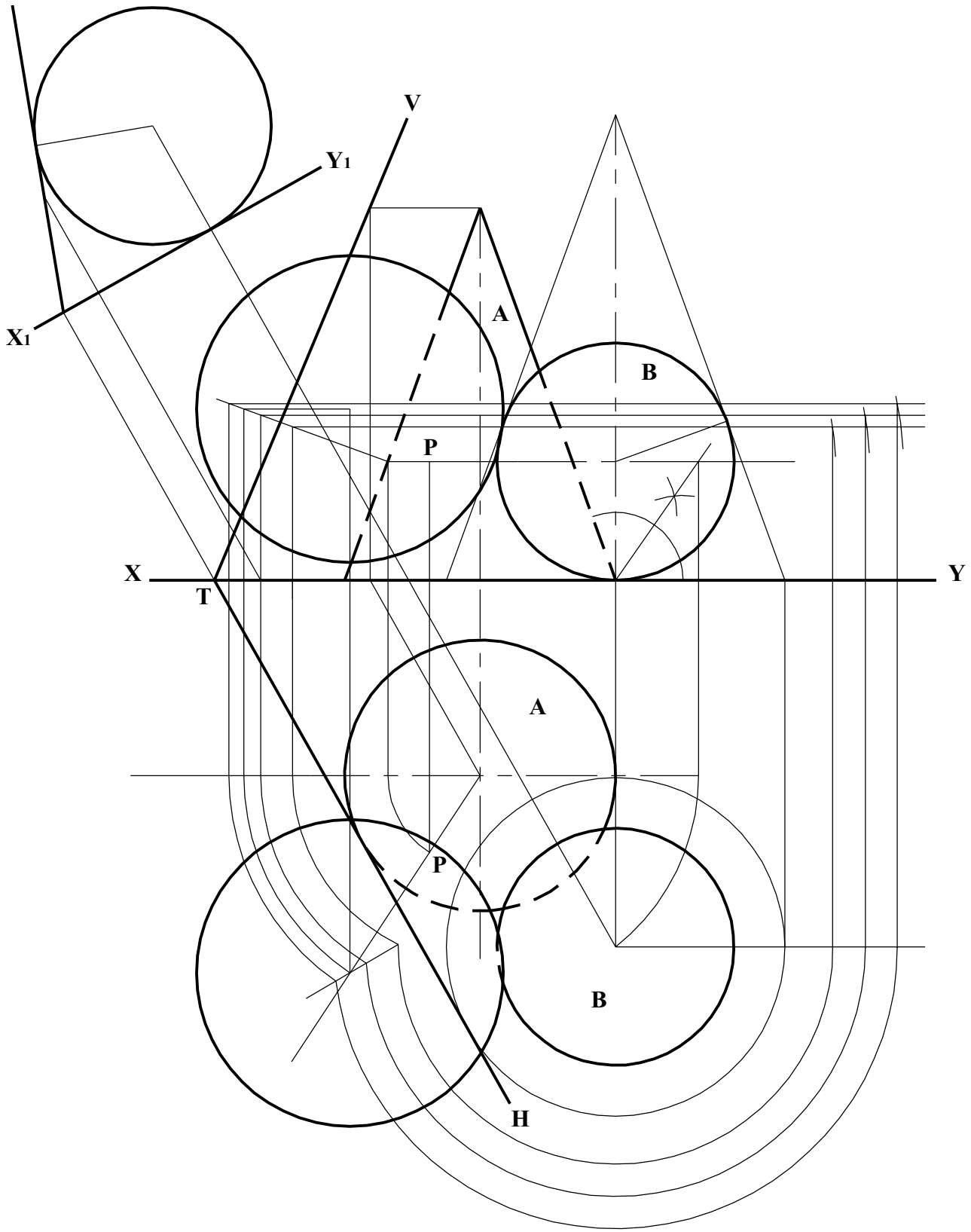


TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
	MARKING SCHEME.
	QUESTION 2(a) & (b).
	SCALE: N/A. DATE: JUNE 2003.

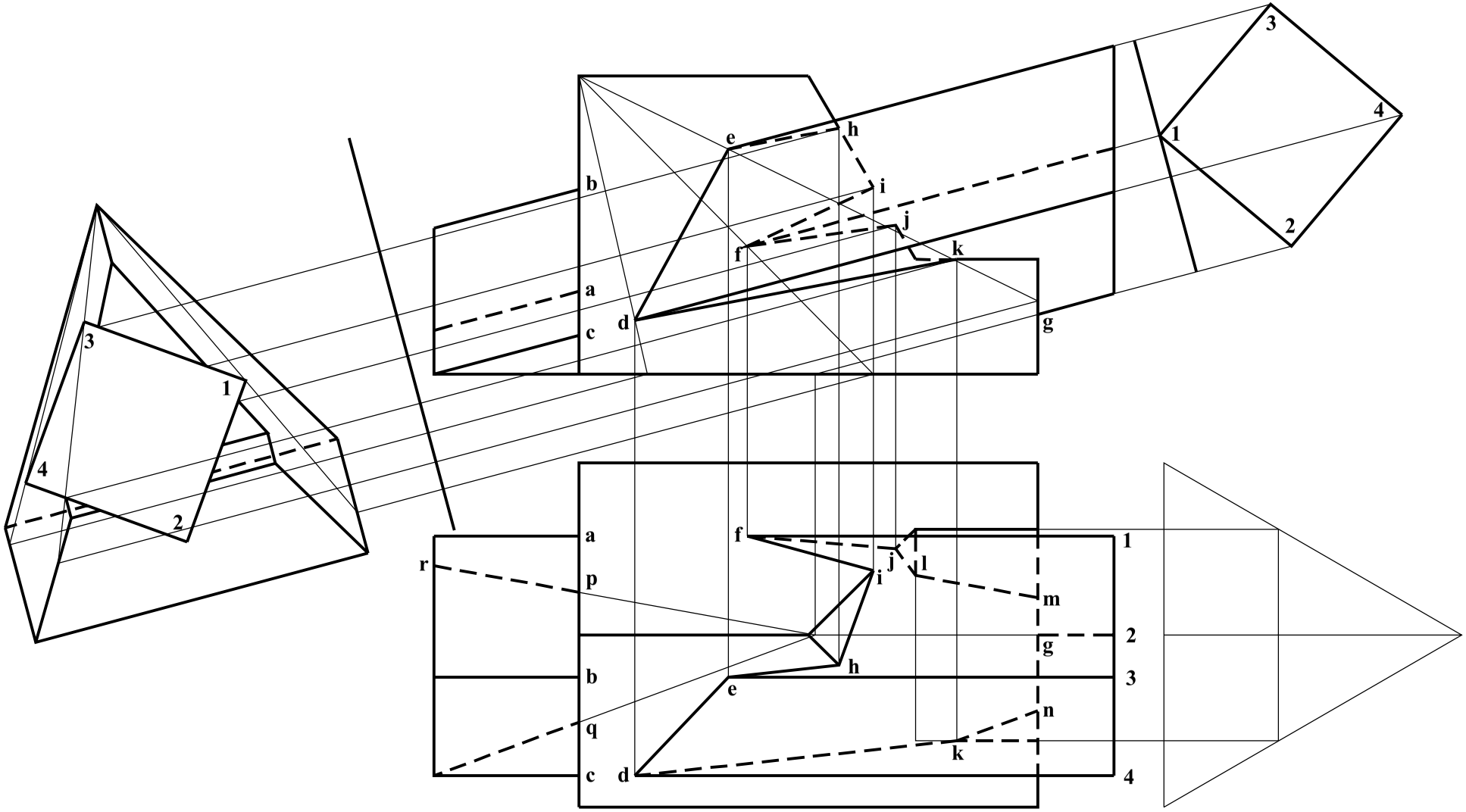




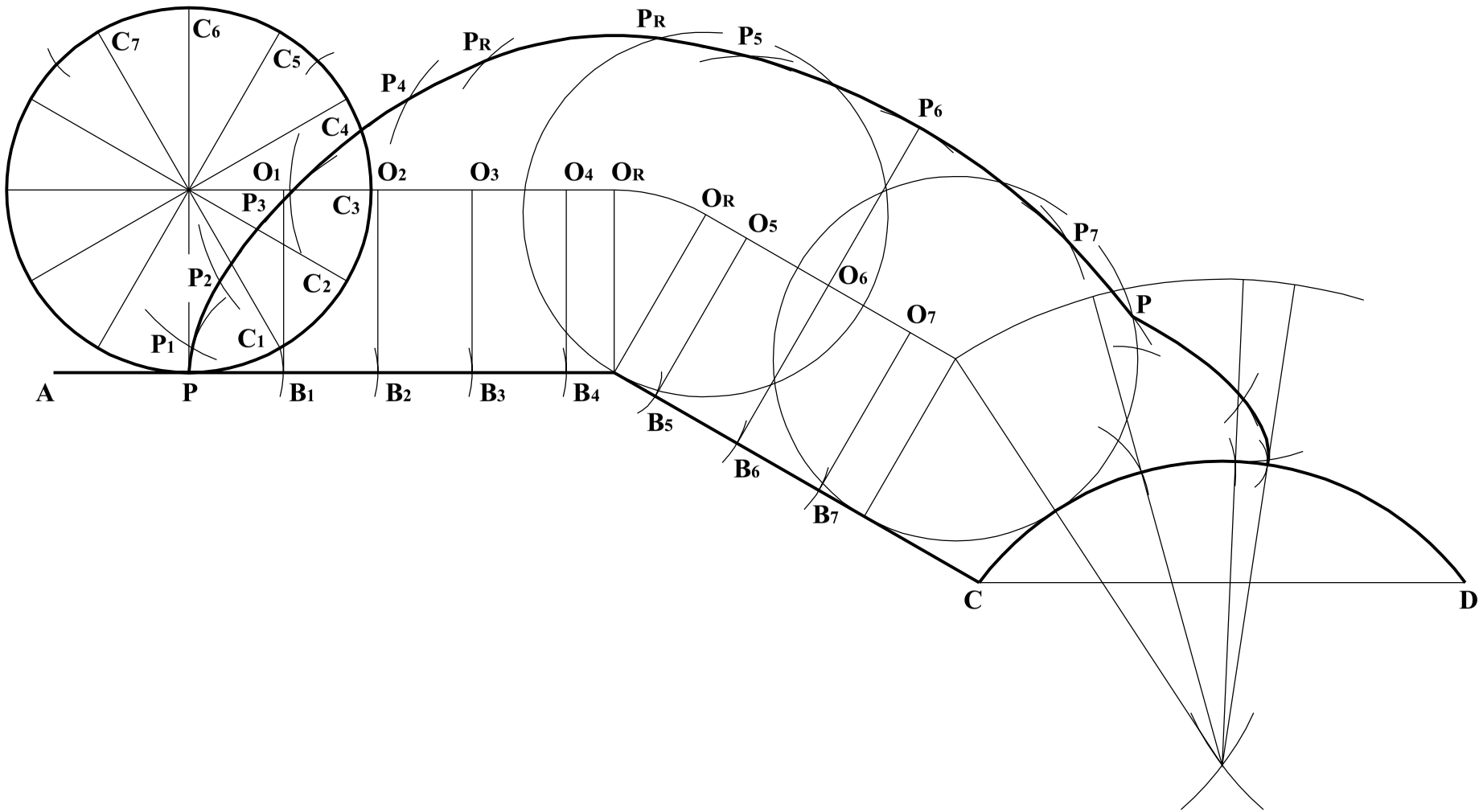
TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
PROJECTION	MARKING SCHEME.
	QUESTION 2(c).
	SCALE: N/A. DATE: JUNE 2003.



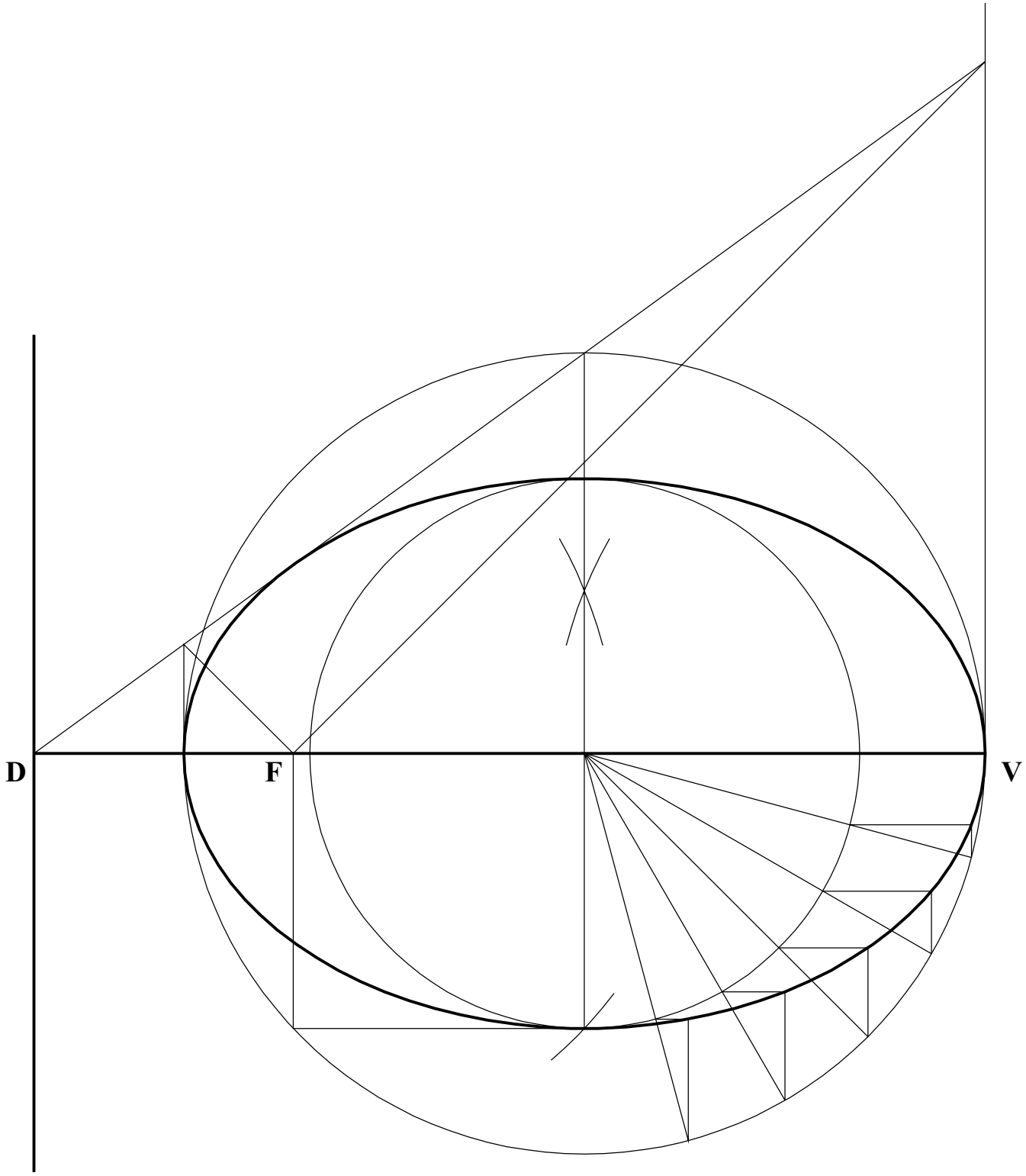
TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.		
PROJECTION	MARKING SCHEME.	
	QUESTION 3.	
	SCALE: N/A.	DATE: JUNE 2003.



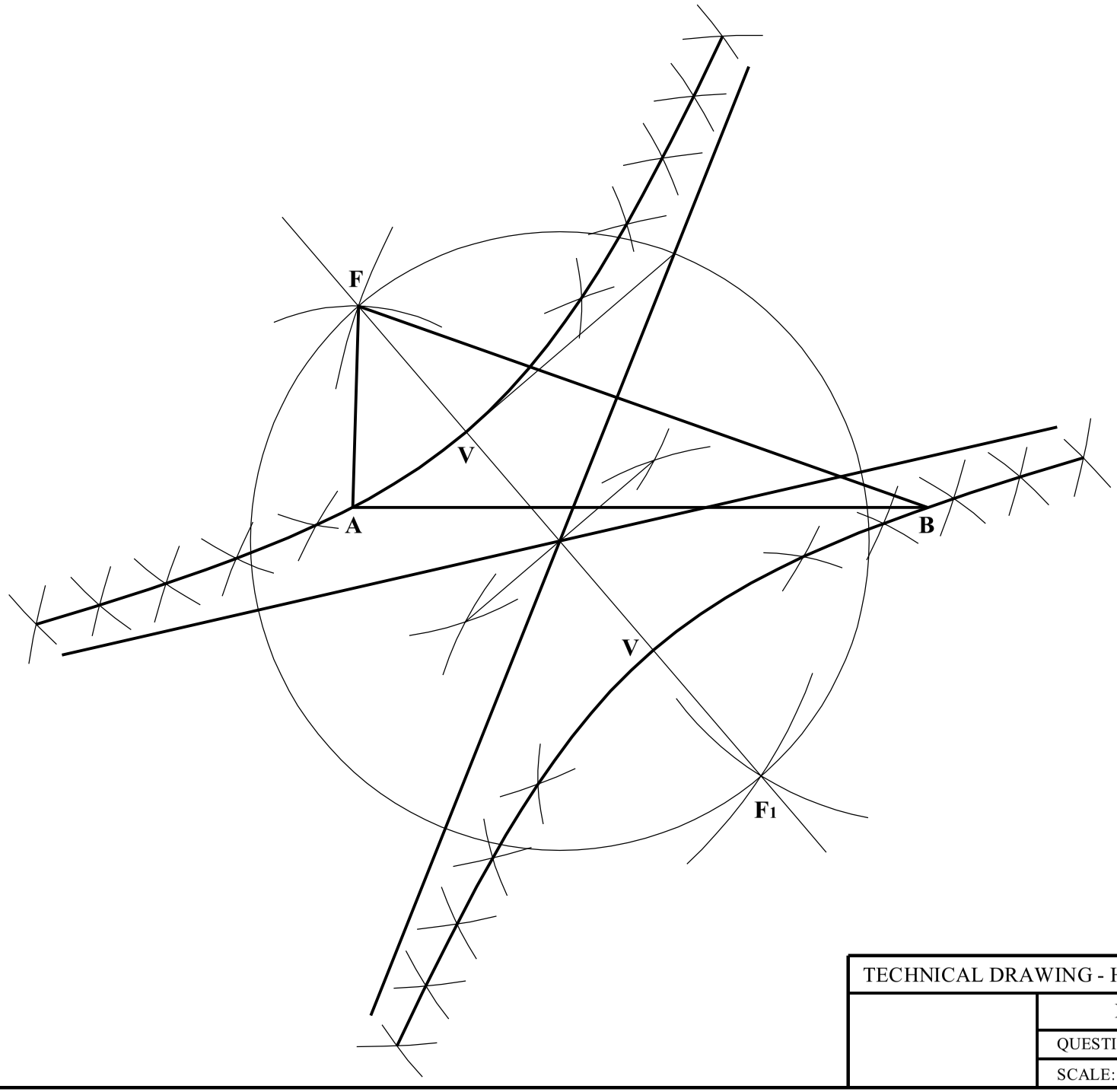
TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.		
PROJECTION	MARKING SCHEME.	
	QUESTION 4.	
	SCALE: N/A.	DATE: JUNE 2003.



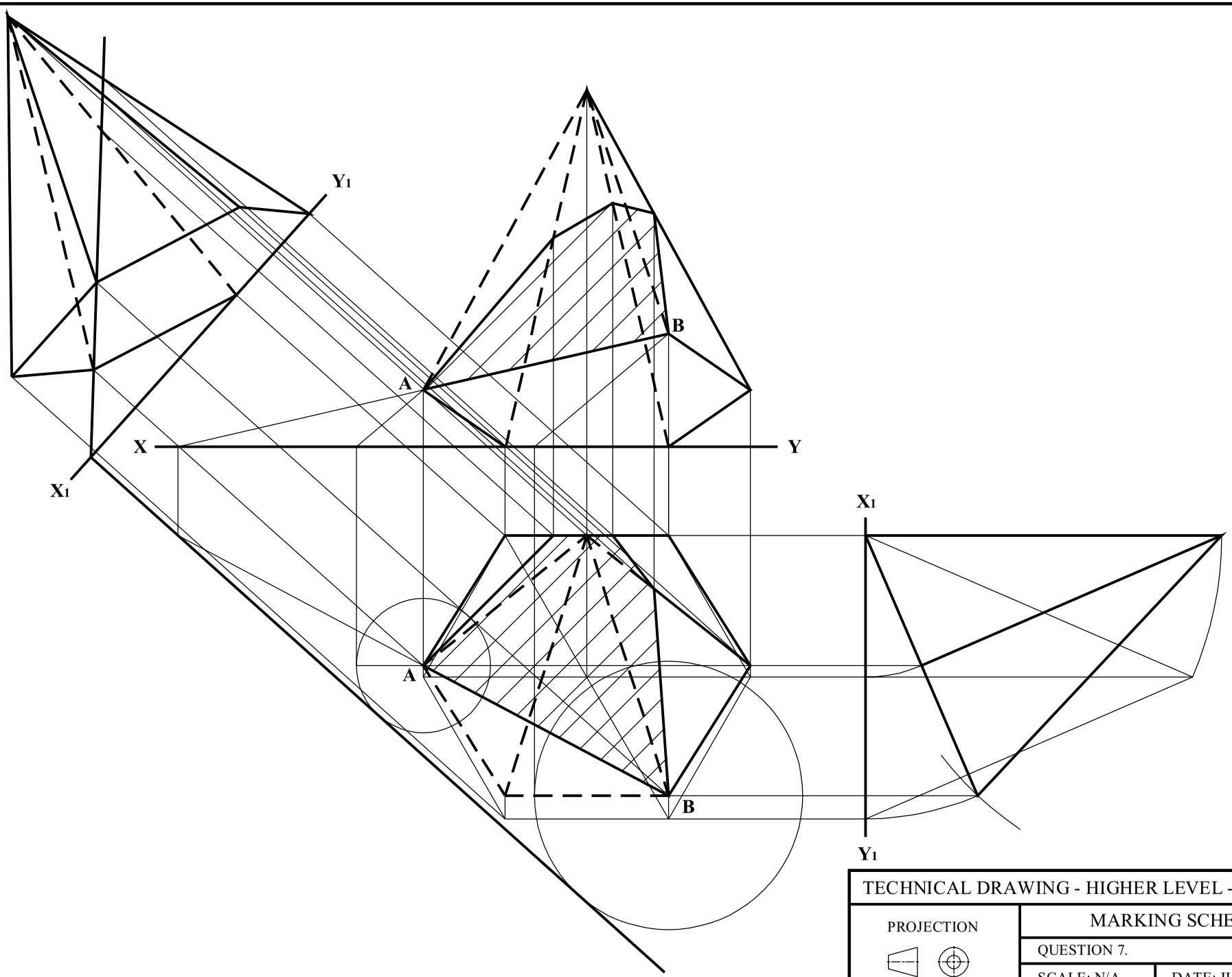
TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
	MARKING SCHEME.
	QUESTION 5.
	SCALE: 1:1. DATE: JUNE 2003.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.		
	MARKING SCHEME.	
	QUESTION 6(a).	
	SCALE: 1:1.	DATE: JUNE 2003.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
	MARKING SCHEME.
	QUESTION 6(b).
	SCALE: 1:1. DATE: JUNE 2003.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.

PROJECTION

MARKING SCHEME.

QUESTION 7.

SCALE: N/A.

DATE: JUNE 2003.

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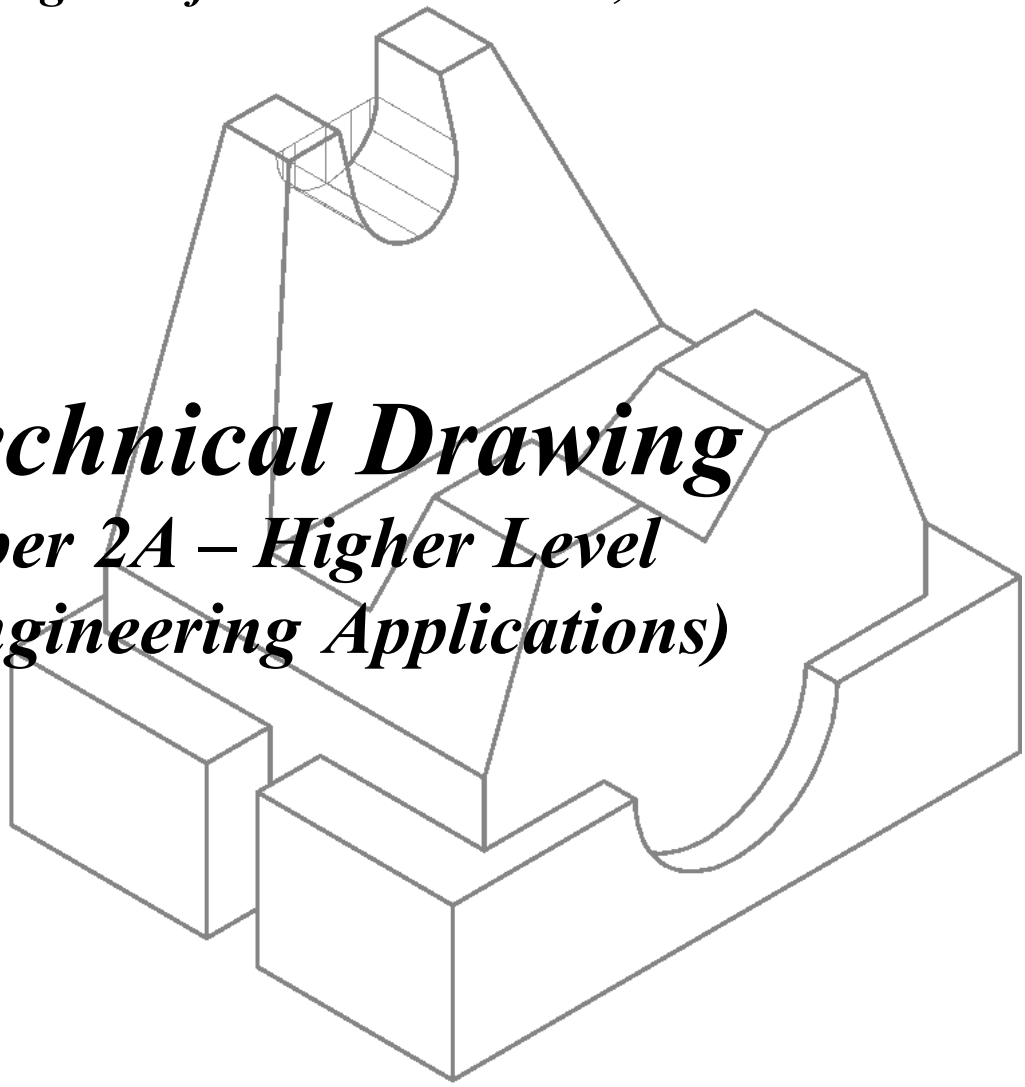


Technical Drawing

Paper 2A – Higher Level
(Engineering Applications)

Marking Scheme &
Sample Solutions

MARKING SCHEME: QUESTION 1

(a)	ASSEMBLY	6
(b)	SECTIONAL ELEVATION A-A	27
(c)	ADDITIONAL REQUIREMENTS	10
(d)	SPECIAL SPANNER	7
	TOTAL	50 Marks

ASSEMBLY	**(6)**
Bolt in body	1
Bush in wheel	1
Wheel on bolt	1
Hook in body	1
Bearing in body	1
Ring nut on hook	1

SECTIONAL ELEVATION	**(27)**

HANGER BRACKET	**7**
Bottom body area	1
Supports	1
Boss and holes	1
Fillets	1
Outside lines/edges removed	1
Correct areas hatched & neat	2

BOLT	**4**
Head and shank	1
Flats on head	1
M12 threads & chamfers	1
Component not hatched	1

BUSH	**2**
Top and bottom areas	1
Correct areas hatched & neat	1

WHEEL	**5**
Top body area	1
Bottom body area	1
Fillets	1
Outside lines/edges removed	1
Correct areas hatched & neat	1

RING NUT	**3**
Stepped surface	1
Drilled holes	1
Correct area hatched & neat	1

BEARING	**2**
Conventional representation	2

HOOK	**4**
Thread convention & radius	1
Collar	1
Tangential arc construction	1
Component not hatched	1

ADDITIONAL REQUIREMENTS	**(10)**
Centre lines	2
Parts item referenced	3
(Leaders; Terminations; Numbers)	
Title supplied	2
(F=1; G=2)	
Overall presentation	3
(F=1; G=2; Ex=3)	

SPECIAL SPANNER	**(7)**
Suitable design suggested	2
Spanner features shown in sketch	2
Sketch presentation	3
(F=1; G=2; Ex=3)	

MARKING SCHEME: QUESTION 2

(a)	CAM & DISPLACEMENT DIAGRAM	25
(b)	MECHANISM	25
	TOTAL	50 Marks

CAM	**(25)**
DISPLACEMENT DIAGRAM	**10**
Six appropriate divisions	1
Correct height	1
Uniform velocity	1
U.A.R correct fall	1
U.A.R construction	2
U.A.R curve drawn & correct	1
Identification system	1
Presentation	2
CAM PROFILE	**15**
Centre lines drawn	1
Angular divisions 0^o to 180^0	1
Intermediate angles used	1
Rotation correct	1
Nearest approach correct	1
Heights projected and swung	1
Follower circles/arcs drawn	1
Cam profile tangential to rollers	1
Uniform velocity drawn/correct	1
U.A.R drawn/correct	1
Identification system	1
Follower limits	2
Presentation	2

MECHANISM	**(25)**
LAYOUT	**5**
Centre lines	1
Crank AB	1
Link BC	1
Link ED	1
Link CF	1
LOCUS	**13**
Circle AB divided into 12 parts	1
Clockwise rotation	1
Arc ED	1
Location of points D on arc ED	2
Location of points C	2
Locus drawn & correct	2
Locus curve neat	1
Locus indexed	1
Location of points F	1
Presentation	2
DIMENSIONING	**4**
Stroke of piston F 27 ±2mm	1
Dimension	1
Angle of travel of ED 34 ± 2^o	1
Dimension	1
MACHINE GUARD	**3**
Suitable guard profile	1
Clearance	1
Presentation	1

MARKING SCHEME: QUESTION 3

(a)	GIVEN VIEWS	5
(b)	TRUE LENGTHS	13
(c)	DEVELOPMENT	22
(d)	SHEETMETAL JOINTS	10
	TOTAL	50 Marks

GIVEN VIEWS	**(5)**
Elevation correct	2
Plan correct	2
Centrelines	1

TRUE LENGTHS	**(13)**
Surface divided into triangles	2
T/L layout	2
True lengths	8
Identification system	1

DEVELOPMENT	**(22)**
Total area correct (17 triangles)	17
One piece development	1
Seam correct	1
Curve drawn & neat	1
Identification system	1
Presentation	1

SHEETMETAL JOINTS	**(10)**
PITTSBURGH LOCK JOINT	**3**
Correct joint provided	1
Sketch detail correct	1
Sketch presentation	1
RETURNED STANDING SEAM	**3**
Correct joint provided	1
Sketch detail correct	1
Sketch presentation	1
PANEL STIFFENING	**3**
Correct method provided	1
Sketch detail correct	1
Sketch presentation	1
LABELLING/PRESENTATION	**1**

MARKING SCHEME: QUESTION 4

(a)	PARTS LIST	15
(b)	GEARBOX ANALYSIS	10
(c)	SPUR GEAR DRAWING	25
	TOTAL	50 Marks

PARTS LIST	**(15)**
Parts list table drawn	1
12 parts identified (1 marks each)	12
Lettering neat	1
Presentation	1

GEARBOX ANALYSIS	**(10)**
(i) Material	2
(ii) Speed	1
Direction of rotation	1
(iii) Identification of bearing	2
(iv) Oil filler plug	1
Oil drain plug	1
(v) Oil return hole	2

SPUR GEAR DRAWING **(25)**

SPUR GEAR ELEVATION	**13**
Pitch circle	1
Addendum circle	1
Dedendum circle	1
Tangent (calculation) for base circle	1
Tooth thickness	1
Construction of tooth profile (involute curve or any recognised approximate method acceptable)	2
Second tooth drawn	1
Root radii drawn	1
Hub drawn	1
Keyway drawn	1
Centre lines & pitch circle line	1
Presentation	1

SECTIONAL ELEVATION	**6**
Face width	1
Fillets	1
Top & bottom teeth drawn	1
Hub & keyway	1
Correct areas hatched & neat	1
Centrelines	1

TABLE OF GEAR VALUES	**6**
Calculations & formulae	1
Table drawn	1
Data (6 off x ½ mark each)	3
Presentation	1

MARKING SCHEME: QUESTION 5

(a)	MACHINE DRAWING	20
(b)	ADDITIONAL REQUIREMENTS	10
(c)	ISOMETRIC DRAWING	20
	TOTAL	50 Marks

MACHINE DRAWING	**(20)**
ELEVATION	**5**
Base area	1
Sloped sides	1
Top slot area	1
90^o slot area	1
Hidden detail	1
END ELEVATION	**5**
Projected correctly	1
Base area	1
Tee area	1
Vee area	1
Hidden detail	1
PLAN	**10**
Projected correctly	1
Base outline	1
Base slots & semicircles	1
88mm x 76mm rectangle	1
90^o slot outline	1
Vee flat rectangle	1
R10 slot & curve	1
Sloped lines	1
Full shape description	1
Presentation	1

ISOMETRIC DRAWING	**(20)**
ISOMETRIC SURFACES	**11**
Left side areas on base	1
Left slot in base	1
Right front area	1
Right front semicircles	1
88mm x 76mm areas	1
90^o slot top areas	1
90^o slot front surface	1
Centre flat area	1
R10 slot & top	1
Front sloped area	1
Left sloped area	1
VIEW DETAILS	**9**
Isometric drawing	1
Correct viewpoint	2
Construction of circles	2
Accuracy of measurements	2
Presentation	2
(G=1; Ex=2)	

ADDITIONAL REQUIREMENTS (10)

(i) Four dimensions	2
(ii) Projection symbol	1
(iii) Machining symbol	3
(Symbol 1)	
(N7 1)	
(All over 1)	
(iv) Limits	3
(Upper limit 1)	
(Lower limit 1)	
(Position 1)	
(v) Title: Machined Block	1

MARKING SCHEME: QUESTION 6A

(a)	BATTERY FASTENING	20
(b)	PISTON ASSEMBLY	20
(c)	FASTENING PINS	10
	Total	50 Marks

BATTERY FASTENING	**(20)**
Suitable method of locating battery	2
Method clearly shown in sketch	2
Suitable method of fastening battery	2
Method clearly shown in sketch	4
Battery shown in sketch	2
Channel shown in sketch	2
Sketch scale & proportion	2
Suitable notes on key features	2
Sketch neatness/presentation	2
(G=1; Ex=2)	

PISTON ASSEMBLY	**(20)**
PISTON	**5**
Piston crown	1
Piston side walls	1
Piston ring grooves	1
Gudgeon pin bosses	1
Piston base	1
RINGS	**2**
Compression rings	1
Oil scraper ring	1
GUDGEON PIN	**2**
Gudgeon pin	1
Gudgeon pin location	1
ROD	**2**
Connecting rod	1
Connecting rod bush	1
LABELLING	**4**
Compression rings	1
Oil scraper ring	1
Connecting rod	1
Gudgeon pin boss	1

SKETCH DETAIL	**5**
Centre lines	1
Hatching neat & correct	1
Full internal shape description	1
Sketch presentation	2
(G=1; Ex=2)	

FASTENING PINS	**(10)**
TAPER PIN	**3**
Taper pin provided	1
Complete shape description	1
Sketch neatness/proportion	1
SPRING PIN	**3**
Spring pin provided	1
Complete shape description	1
Sketch neatness/proportion	1
SPLIT PIN	**3**
Split pin provided	1
Complete shape description	1
Sketch neatness/proportion	1
LABELLING/PRESENTATION	**1**

MARKING SCHEME: QUESTION 6B

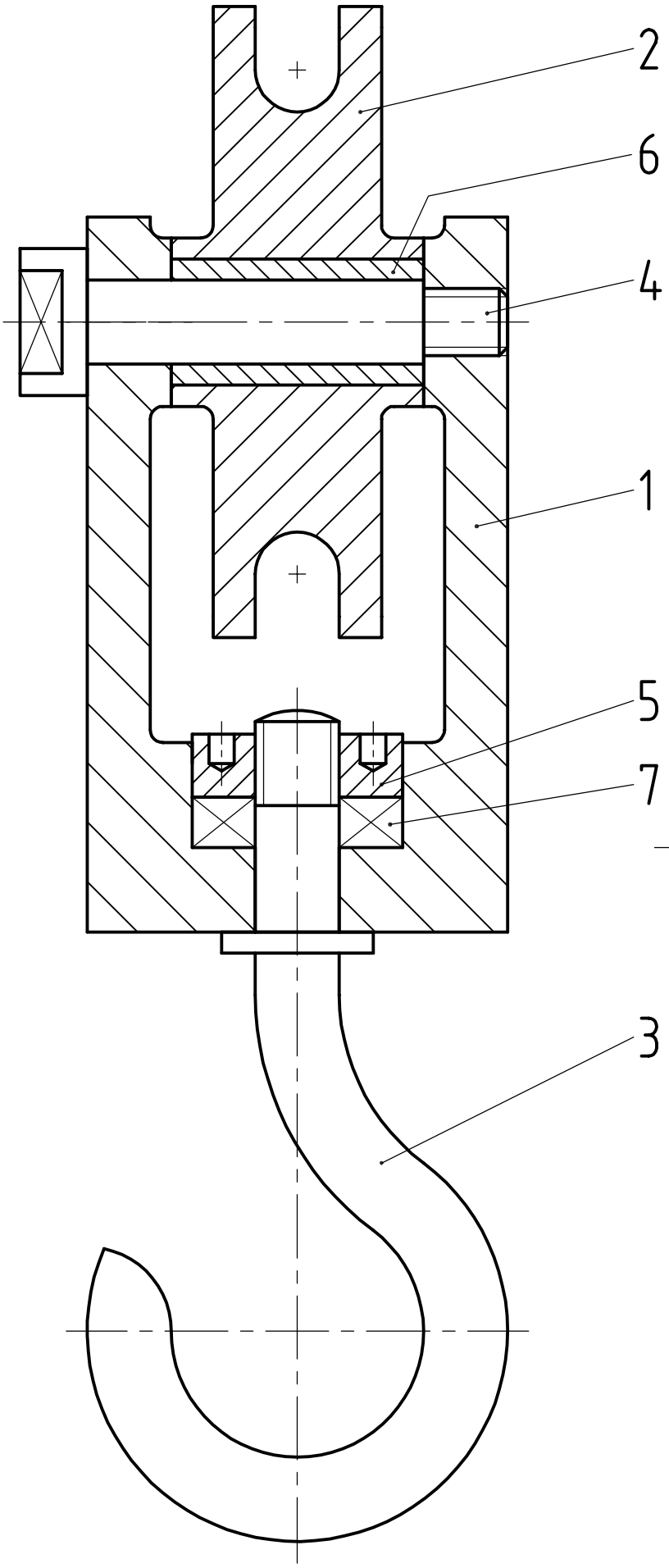
(a)	SHORT CAD QUESTIONS	20
(b)	CAD INTERFACE	10
(c)	3D SURFACES	10
(d)	CAD COMMANDS	10
	Total	50 Marks

SHORT CAD QUESTIONS		**(20)**
(i)	Advantages of CAD (½ mark each)	2
(ii)	Fastest processor	1
	Largest hard disk	1
(iii)	Backup storage media	1
	Reasons	1
(iv)	Aliasing explained	2
(v)	Ordinate dimensions correct	1
	Sketch	1
(vi)	Array rows and columns	1
	Array levels	1
(vii)	Absolute co-ordinate	2
(viii)	Text font	1
	Obliquing angle	1
(ix)	Floppy disk sketch	1
	Write enable switch	1
(x)	Hyperlink explained	2

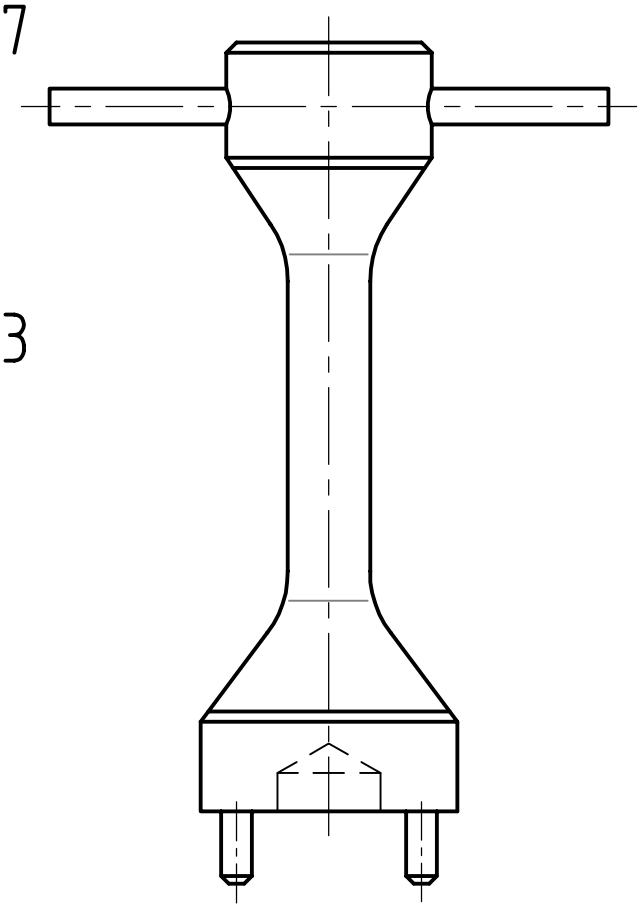
CAD COMMANDS	**(10)**
Mirror	2
Polar array	2
Geometric tolerance	2
Break	2
Spline	2

CAD INTERFACE	**(10)**
1 mark for each correct answer	10

3D SURFACES	**(10)**
Revolved surface sketch	2
Extruded surface sketch	2
Ruled surface sketch	2
Clarity of explanation/sketches	2
Linework & presentation	2

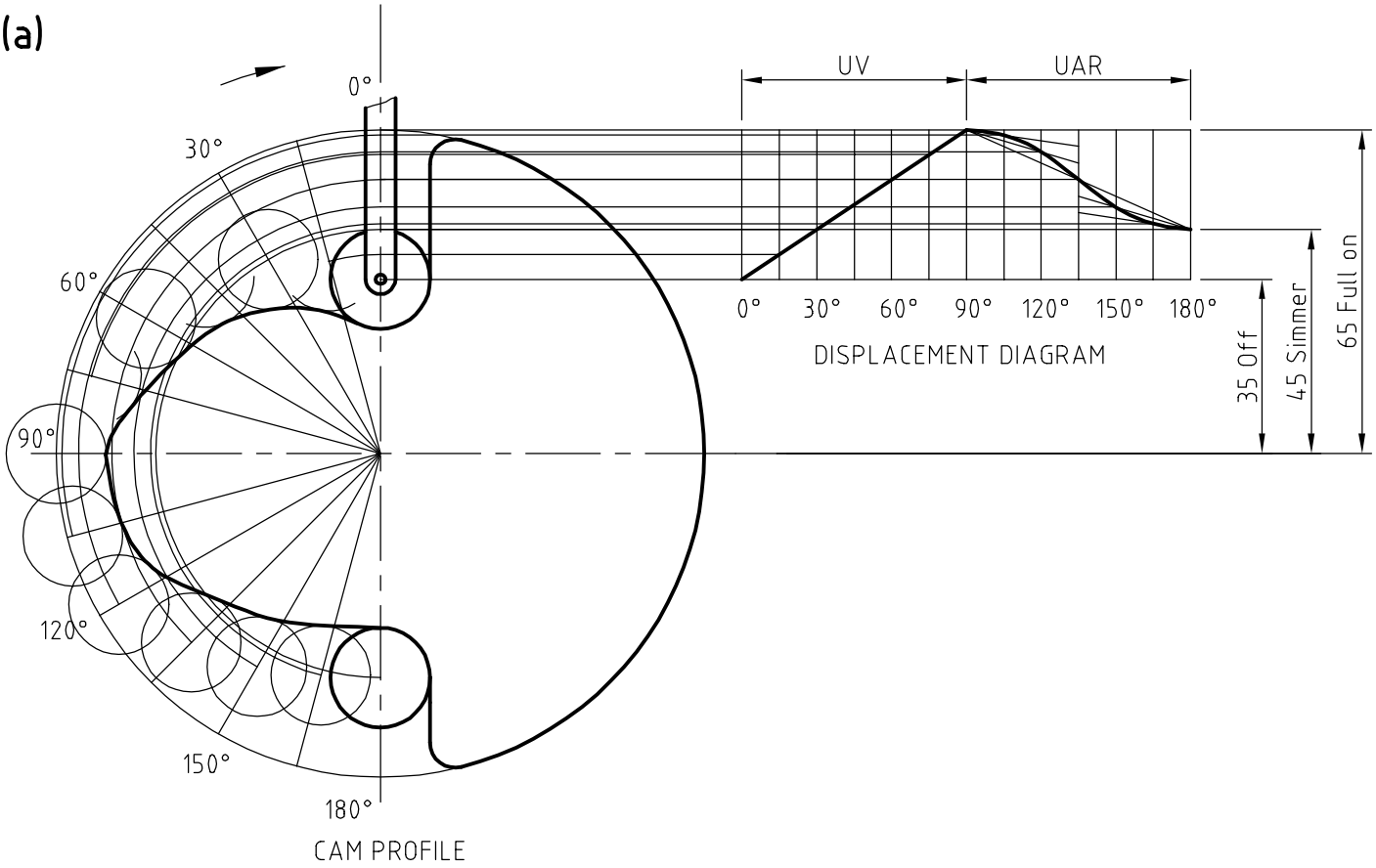


CRANE HOOK



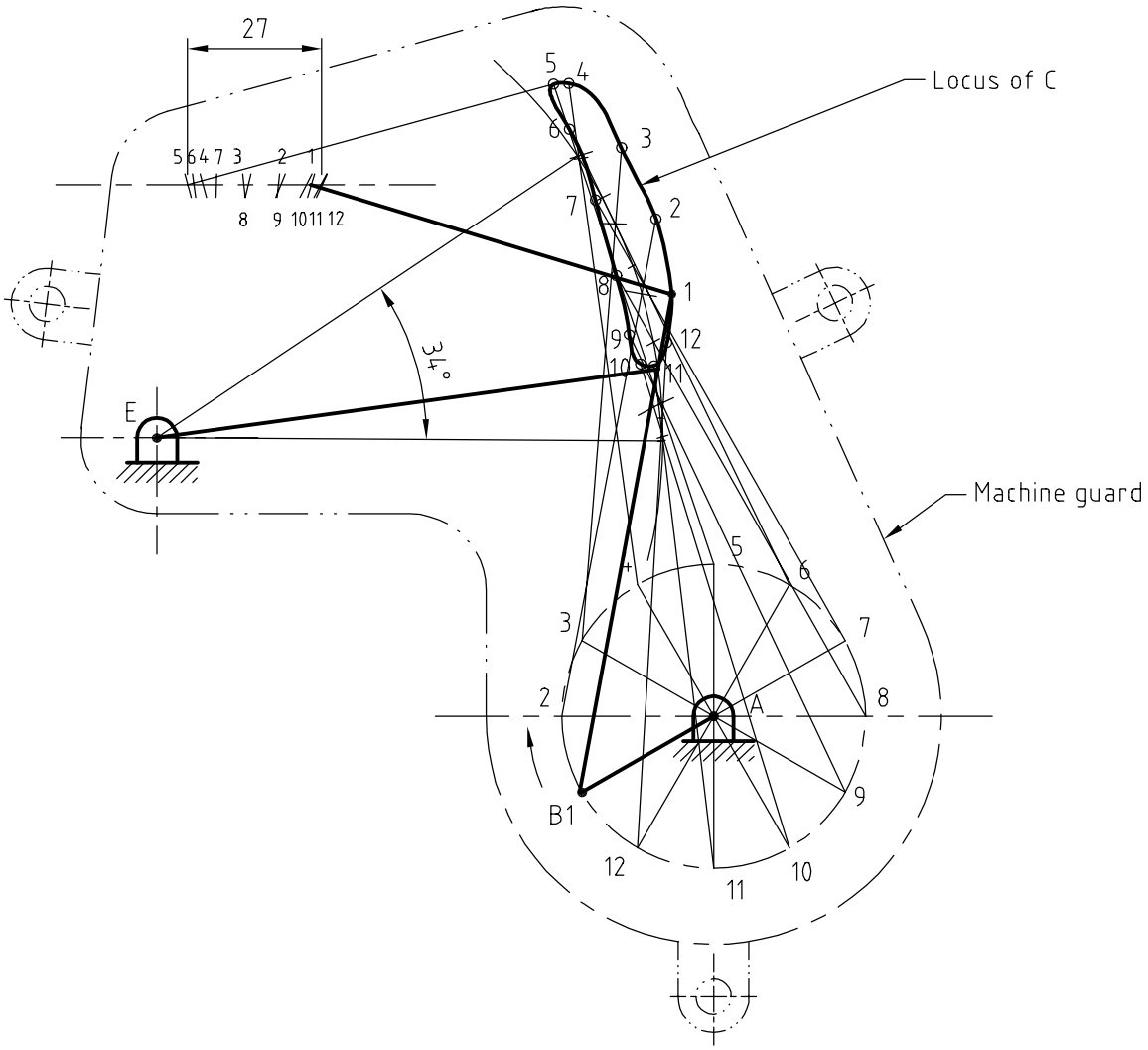
SPECIAL SPANNER

(a)

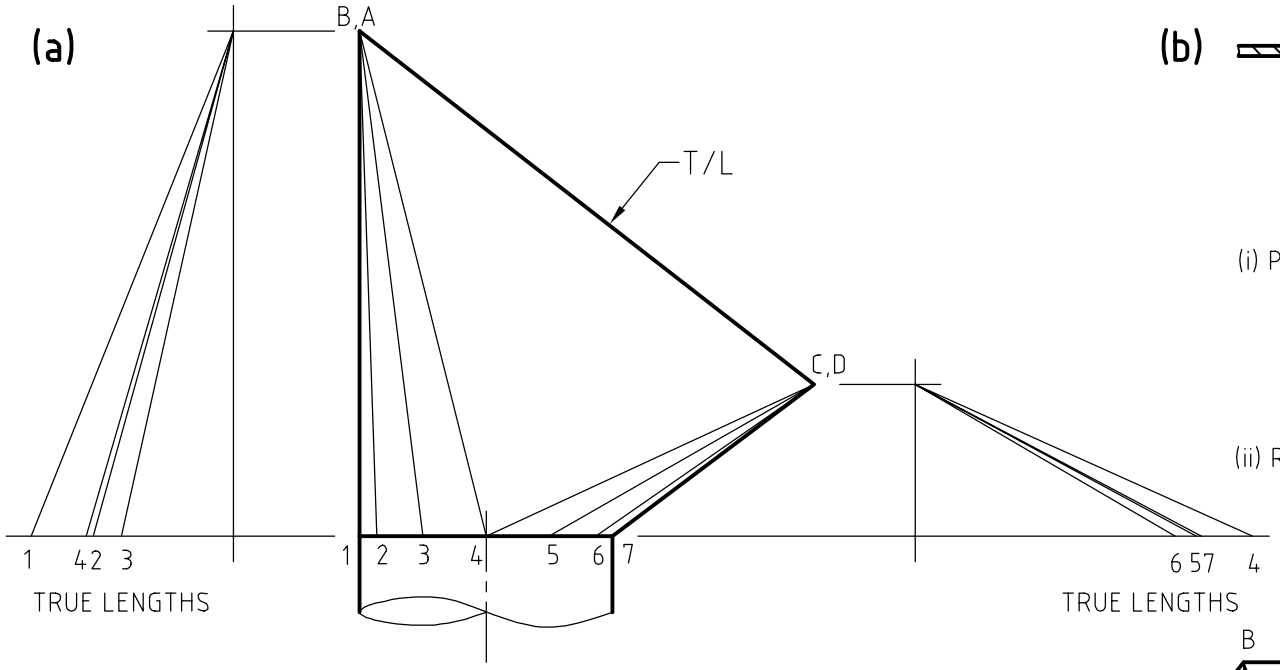


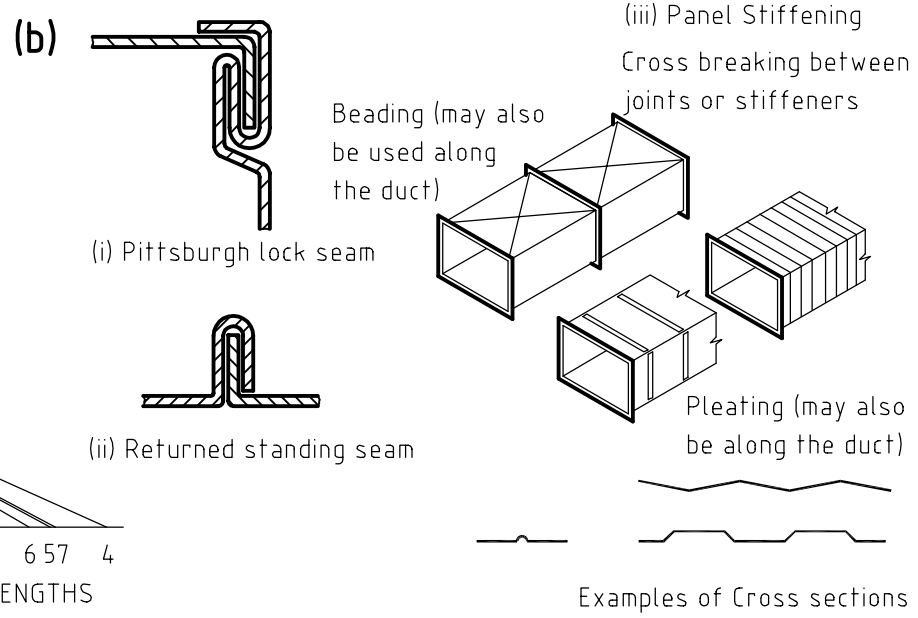
CAM PROFILE

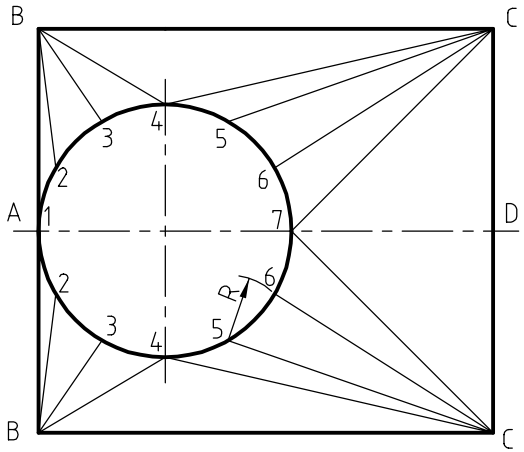
(b)

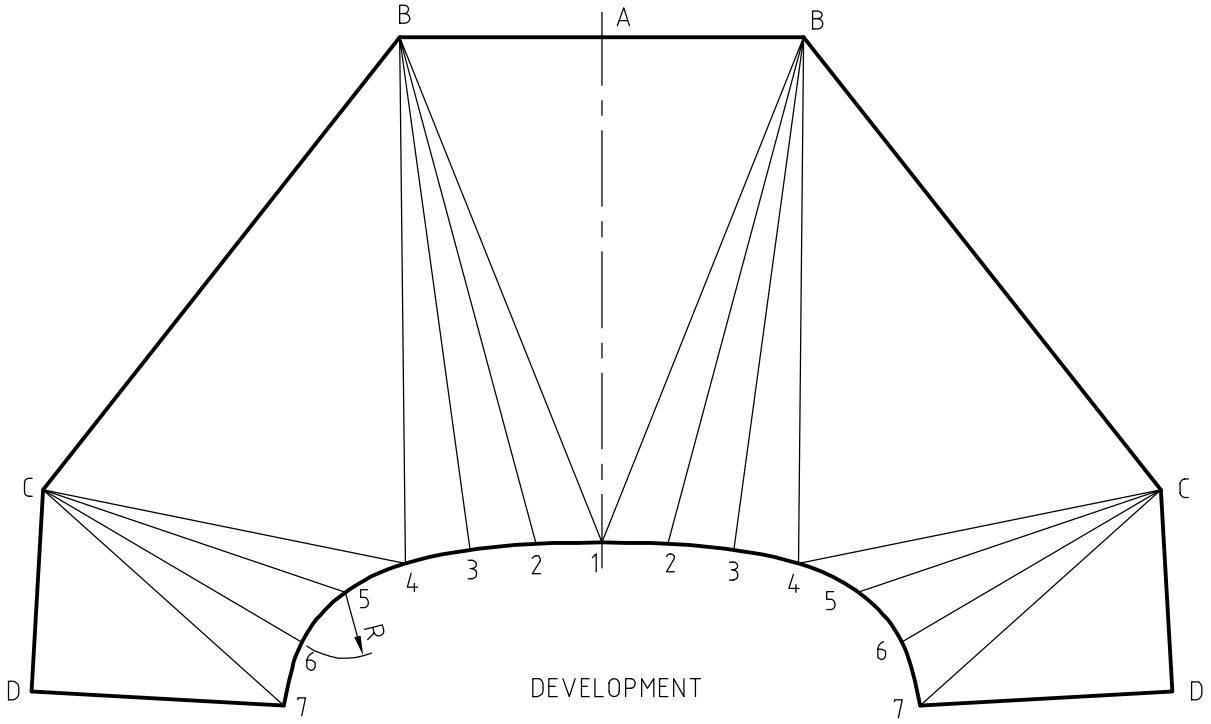


SOLUTIONS / QUESTION 2 / HIGHER LEVEL / 2003

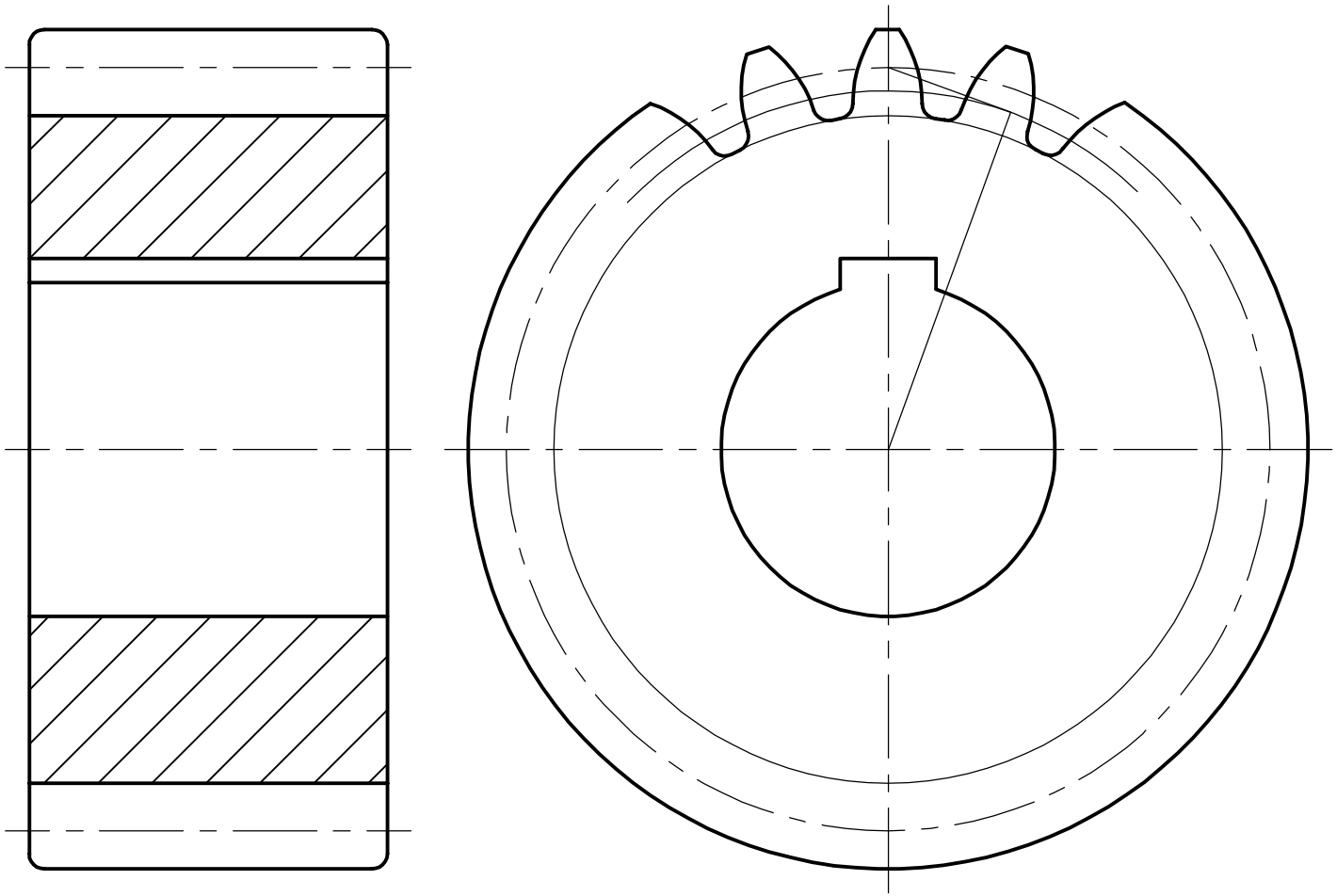

(a)
B,A
T/L
C,D
1 4 2 3
1 2 3 4 5 6 7
6 5 7 4
TRUE LENGTHS
TRUE LENGTHS


(b)
(i) Pittsburgh lock seam
(ii) Returned standing seam
(iii) Panel Stiffening
Cross breaking between joints or stiffeners
Beading (may also be used along the duct)
Pleating (may also be along the duct)
Examples of Cross sections


B
C
A
D
R
B
C


B
A
B
C
C
D
D
R
DEVELOPMENT

(c)



SPUR GEAR TABLE	
ADDENDUM	8
DEDENDUM	10
PCD	160
CIRCULAR PITCH	25.13
TOOTH THICKNESS	12.56
BASE CIRCLE DIAMETER	150.35

CALCULATIONS

PCD= m x T 8 x 20 = 160 mm

Circular pitch, p =pi x m 3.142 x 8 = 25.13 mm

Tooth thickness = $\frac{p}{2} = \frac{25.13}{2}$ = 12.56 mm

Addendum = module = 8 mm

Dedendum = 1.25 x module 1.25 x 8 = 10 mm

Base circle = Cos 20 x PCD 0.939 x 160 = 150.35 mm

(a)

ITEM	ITEM NAME
12	SPRING WASHER
11	WOODRUFF KEY
10	OIL SEAL
9	EXTERNAL CIRCLIP
8	COPPER WASHER
7	GASKET
6	NEEDLE BEARING
5	CHEESE HEAD SCREW
4	GRUB SCREW
3	FEATHER KEY
2	INTERNAL CIRCLIP
1	BALL BEARING

(b)

(i) Material: Cast iron.

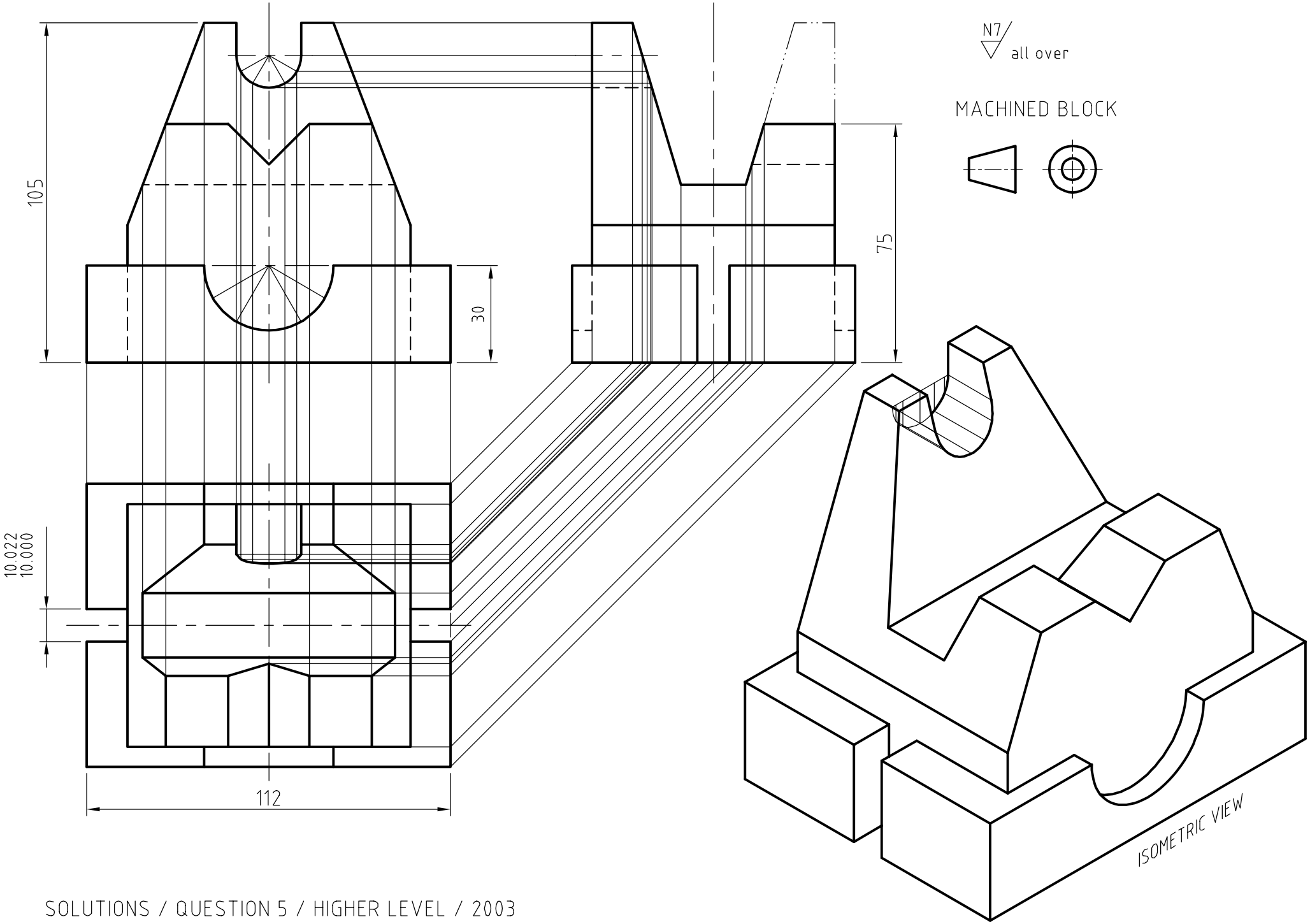
(ii) Speed: 600 RPM

Rotation: Clockwise (the spur and internal gear will rotate in the same direction).

(iii) Spherical Roller Bearing.

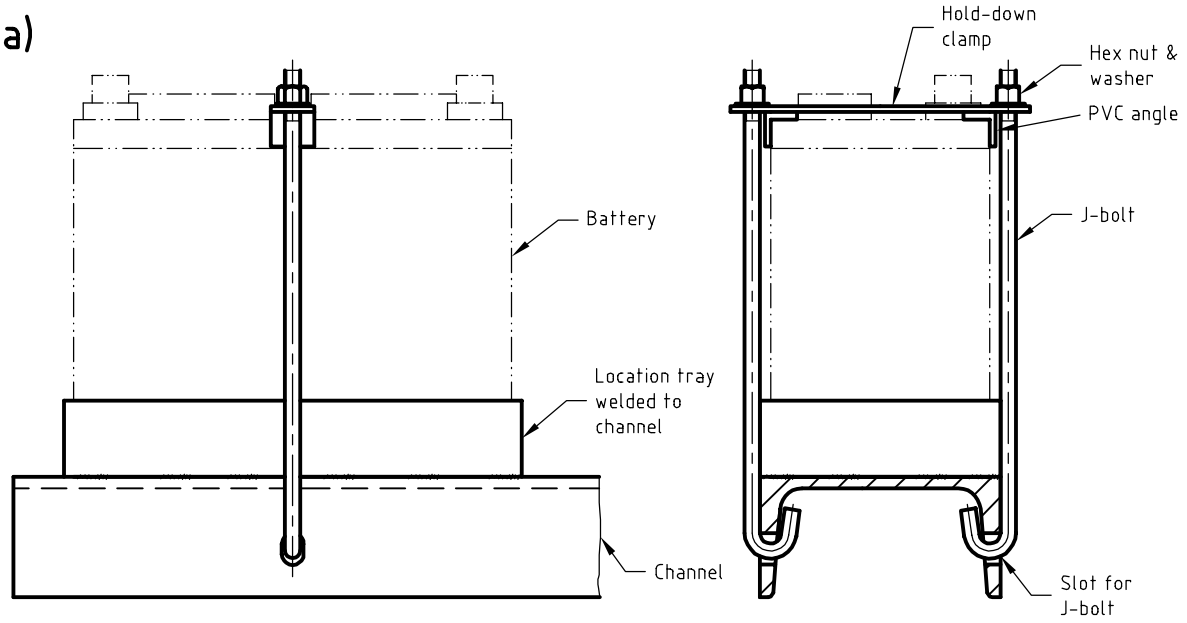
(iv) Part 16 oil fill plug. Part 17 oil drain plug.

(v) Hole 18 allows the circulated splashed oil return to the reservoir.

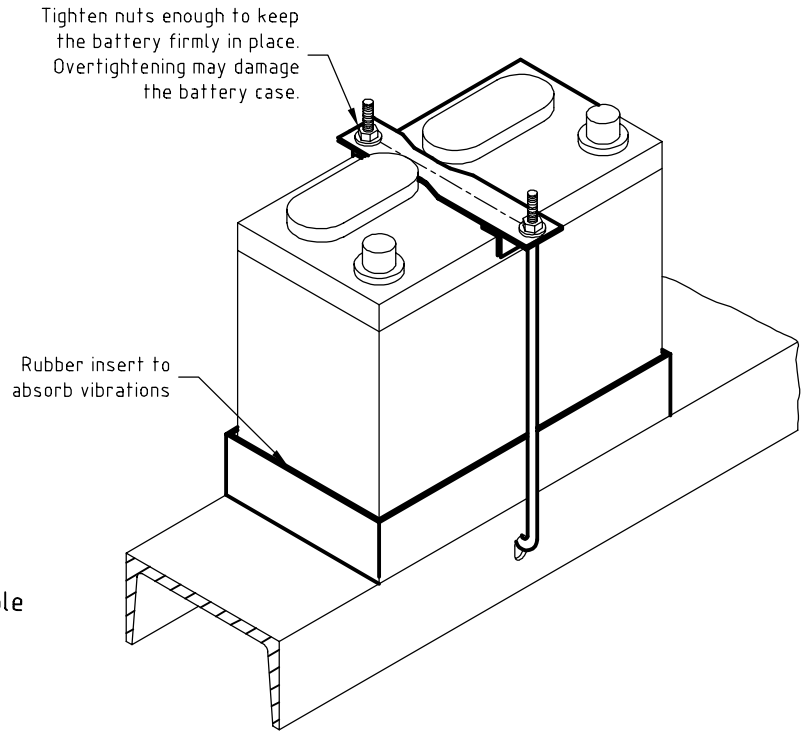


SOLUTIONS / QUESTION 5 / HIGHER LEVEL / 2003

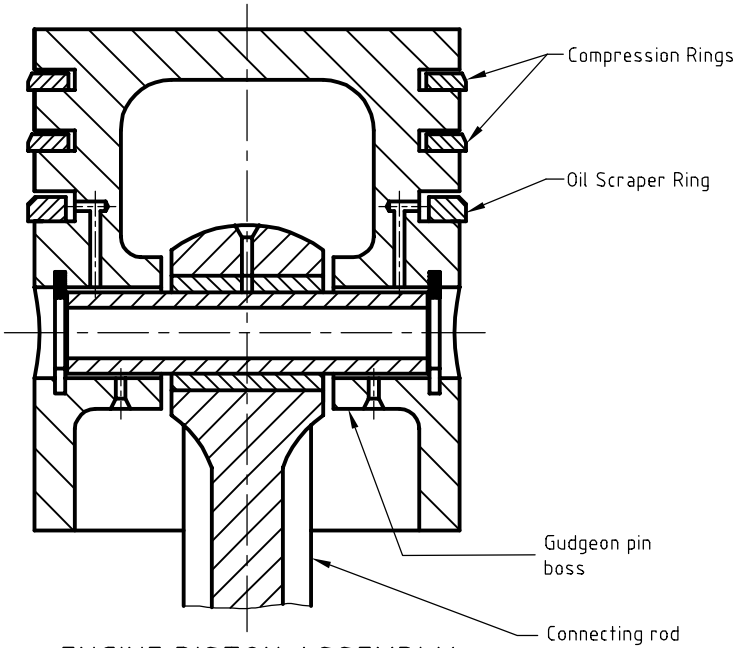
(a)



NOTE: Other solutions are acceptable

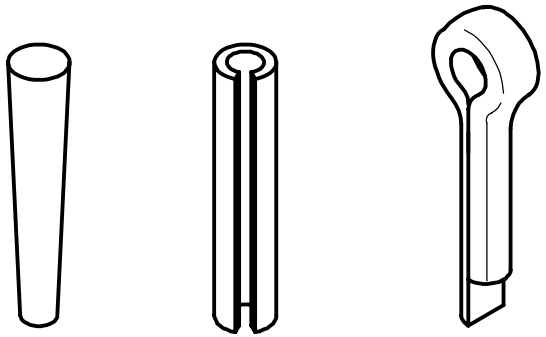


(b)



ENGINE PISTON ASSEMBLY

(c)



(i) Taper pin (ii) Spring pin (iii) Split pin

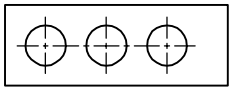
(a) (i) Advantages of CAD:- easier creation and correction of drawings, faster, more accurate, better visulation, improved filing, simulation and testing of designs, database of components and so on.

(ii) 2GHz computer is the fastest. 2GB hard disk stores the most information.

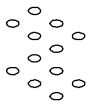
(iii) CD ROM- provided computer has CD burner. CD's hold 700MB of data, cost 3 euro (CD-RW), very reliable and more robust than magnetic storage.
ZIP: 100/250MB, cost 15 euro.
FLOPPY: 1.44 MB, cost 1 euro.

(iv) Aliasing happens when analog data (lines/curves) are represented on a digital system. Diagonal lines appear choppy accross a set of pixels 'staircasing effect'.

(v) Ordinate dimensioning .



(vi) 3D Rectangular Array

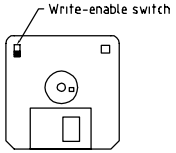


(vii) Absolute cordinates 10,6.

(viii) Text Fonts: Arial, Courier, etc

Oblique angle 45° Oblique angle -15°.

(ix) Write protection is achieved by sliding the switch to the 'write protection' position.

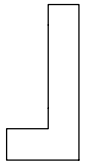


(x) Hyperlink: is a piece of text or an object defined in a web drawing and clicking it performs an action such as moving to a different part of the same drawing or displaying a new page/web site etc.

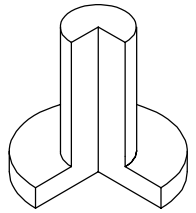
(b)

1 Plot button
2 Close button
3 Help button
4 Scroll box
5 Crosshair cursor
6 Status bar
7 Co-ordinate display
8 Command window
9 Object properties toolbar
10 Pull-down menu bar

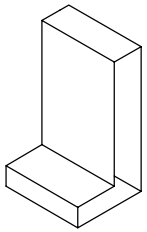
(c)



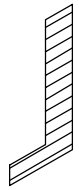
Given profile



(i) Revolved surface



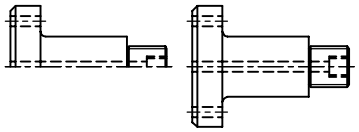
(ii) Extruded surface



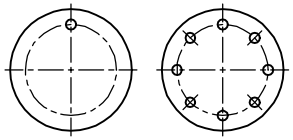
(iii) Ruled surface

(d)

(i) MIRROR
Creates a mirror image copy of objects.

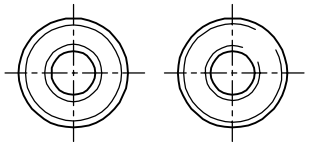


(ii) ARRAY POLAR
Replicates objects about a centre point.

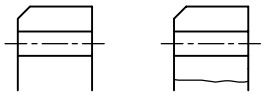


(iii) GEOMETRIC TOLERANCE
Shows the deviations of form, profile, orientation, location of a feature.

(iv) BREAK
Erases a portion of the circle between two specified points.



(v) SPLINE
Fits a smooth curve to a sequence of points.



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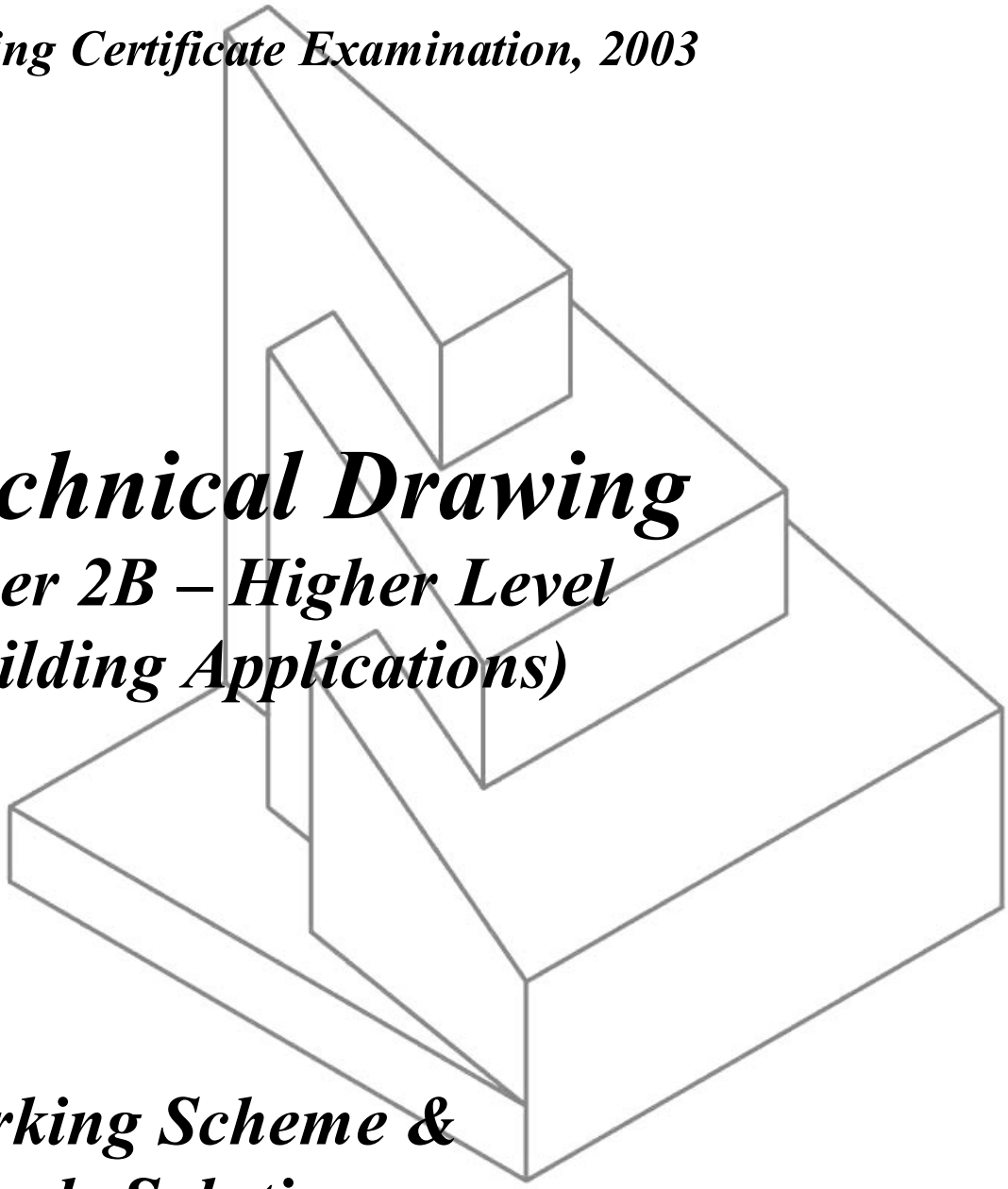
State Examinations Commission

Leaving Certificate Examination, 2003



Technical Drawing

Paper 2B – Higher Level (Building Applications)

Marking Scheme & Sample Solutions

QUESTION 1

MARKS

Perspective of Structure

1.	Draw the given plan	2
2.	Position spectator and plan of picture plane	2
3.	Plan of vanishing points	3
4.	Ground line horion line vanishing points in elevation (112)	4
5.	Projection lines from plan to spectator	1
6.	Perspective of base lines of structure (2 2)	4
7.	Draw lines in perspective vanishing to VP_1	3
8.	Measure heights 1 2 3 4 (1 1 2 2)	6
9.	Determine auxiliary vanishing points 1 and 2	9
10.	Draw lines in perspective vanishing to AVP_1	5
11.	Draw lines in perspective vanishing to AVP_2	3
12.	Complete perspective of blocks A B C D (2 2 2 2)	8

Total ***50***

QUESTION 2

MARKS

(a) Plan & Elevation of Roof Surfaces (40)

1. Draw outline of roof surfaces A B and D in plan 3
2. Determine line of int. between surfaces A and B draw line..... 4
3. Construction to determine ridge height of surface B..... 8
4. Draw surfaces A and B in elevation 4
5. Draw surface D in elevation..... 2
6. Determine point F in plan..... 2
7. Construction to determine trace of surface C in plan 5
8. Complete plan and elevation of surface C (21) 3
9. Construction to determine surface E in plan 7
10. Complete plan of surface E 2

(b) Dihedral angle between surfaces B and C (10)

11. View showing true length of line of intersection between B and C 5
12. Construction to find dihedral angle 4
13. Indicate dihedral angle..... 1

Total ***50***

QUESTION 3

MARKS

Shadow & Shade

1.	Draw the given plan and elevation	6
2.	Draw rays in plan and elevation	2
3.	Determine outline shadow cast by cylindrical portion in plan	4
4.	Determine outline shadow cast by conical portion in plan	6
5.	Complete area of shadow cast by structure on ground	5
6.	Determine area of shade on cylindrical surface in elevation (4 3)	7
7.	Determine area of shade on conical surface in elevation	4
8.	Const. to determine true direction of light for spherical surface	6
9.	Method for determining points on curved shadow	6
10.	Complete shadow cast on spherical surface in plan	4

Total ***50***

QUESTION 4

MARKS

(a) Plan, Elevation & End Elevation (42)

1. Construction for parabola ABC in rectangle 5
2. Draw outline of parabola ABC 2
3. Construction for parabola BE in rectangle 4
4. Draw parabola BE 2
5. Draw vertical divisions in elevation 4
6. Transfer vertical heights to parabola ABC 3
7. Measure widths in plan for curves FC and DA 4
8. Complete plan 4

Curve GB in elevation

9. Measure widths in plan and transfer to parabola ABC (2 2) 4
10. Transfer heights to elevation complete elevation 5

End Elevation

11. Proj. of widths from plan heights from elevation to end view (4 3)... 7
12. Complete end elevation 2

(b) True shape of curve GB (8)

13. Set up XY line projections at right angles 2
14. Select points on line GB in plan measure heights in auxiliary view ... 4
15. Draw true shape of curve GB 2

Total ***50***

QUESTION 5

MARKS

(a) Setup, Dip, Strike & Thickness (33)

1. Outline of bore-holes in plan points A and B in elevation 4
2. Bore-hole A in elevation points 1 and 3 in elev. and plan (322) 7
3. Bore-hole B in elevation points 2 and 4 in elev. and plan (322) 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 elev. (1 1) 2
6. Determine a plane parallel to line in elevation 3
7. Determine the plane in plan 3
8. Determine strike in plan 2
9. Direction of auxiliary elevation dip and thickness (1 1 1) 3

(b) Distance from A to bottom surface along bore-hole (9)

10. Draw the plan of easterly bore-hole 1
11. Determine vertical section through the stratum 3
12. Const. to draw bore-hole from A determine req. distance (4 1) 5

(c) Angle between bore-holes at A (8)

13. Const. to determine true angle between the two bore-holes at A 7
14. Indicating the required angle 1

Total ***50***

QUESTION 6

MARKS

(a) Plan and Elevation (11)

1. Draw the given outline plan 4
2. Project outline elevation 7

(b) Curvature along line CF (17)

3. Draw elements on surfaces ABCD and AFED in plan and elevation 6
4. Draw line CF setup XY line projections at rt. angles to CF (1 1 2) 4
5. Determining height from elevation measure in aux. view (2 2) 4
6. Draw curves (2 1) 3

(c) Traces of Plane Director (13)

7. Plane parallel to element in plan 4
8. Plane parallel to element in elevation 4
9. Determine horiontal trace 3
10. Determine vertical trace 2

(d) Angle between Traces of Plane Director (9)

11. Construction to determine the required angle 8
12. Indicating true angle 1

Total ***50***

QUESTION 7

MARKS

Earthworks between A and C (Level) – Cuttings

1. Parallel lines at 10 m intervals 2
2. Intersections with contours drawing curves 3

Earthworks between C and D – Embankments

3. Determine arcs rad. 15 m at 100 m level draw tangents from C..... 5
4. Drawing parallel lines at 7.5 m intervals 4
5. Intersections with contours drawing curves 2

Earthworks between C and D – Cuttings

6. Determine arcs rad. 20 m at C draw tangents from 100 m level..... 5
7. Drawing parallel lines at 10 m intervals 3
8. Intersections with contours drawing curves 2
9. Constructions to determine intersections of cut and fill curves 3

Earthworks between B and E - Embankments

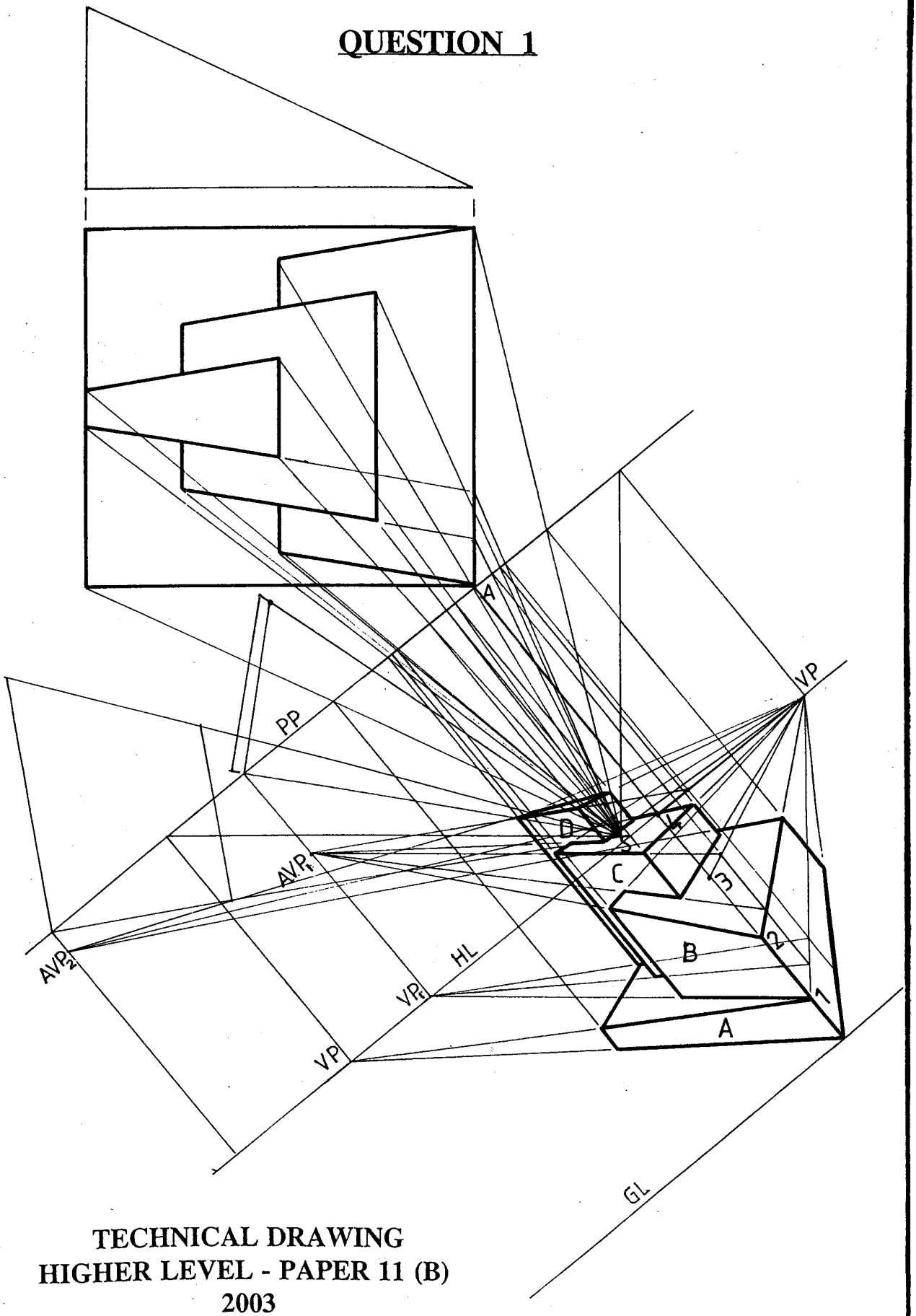
10. Determine arcs rad. 7.5 m at B draw tangents from 85 m level 4
11. Drawing parallel lines at 7.5 m intervals 3
12. Intersections with contours drawing curves 2

Earthworks between B and E - Cuttings

13. Determine arcs rad. 5 m at 85 m level draw tangents from B..... 4
14. Drawing parallel lines at 5 m intervals 3
15. Intersections with contours drawing curves 2
16. Constructions to determine intersections of cut and fill curves 3

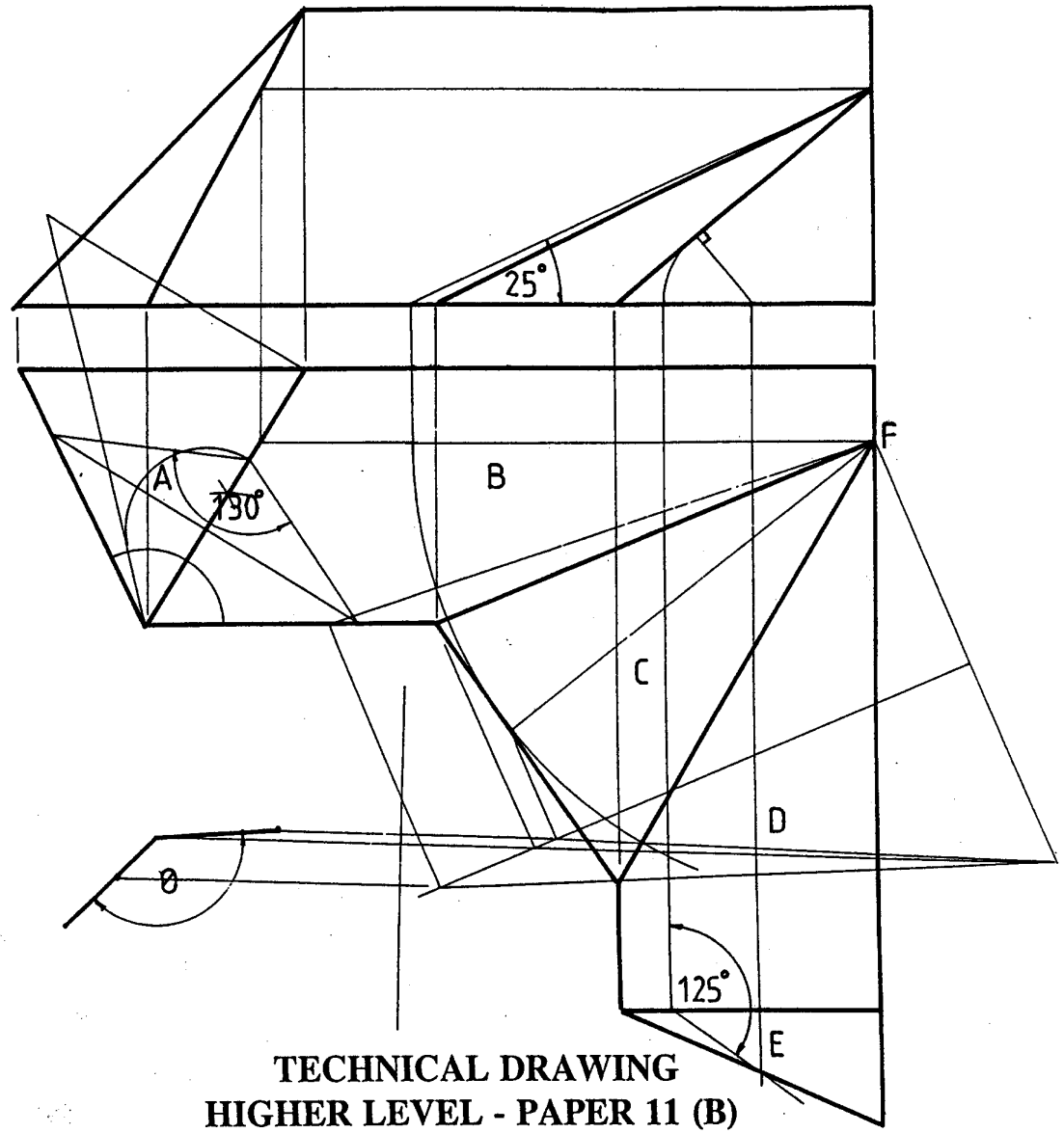
Total ***50***

QUESTION 1



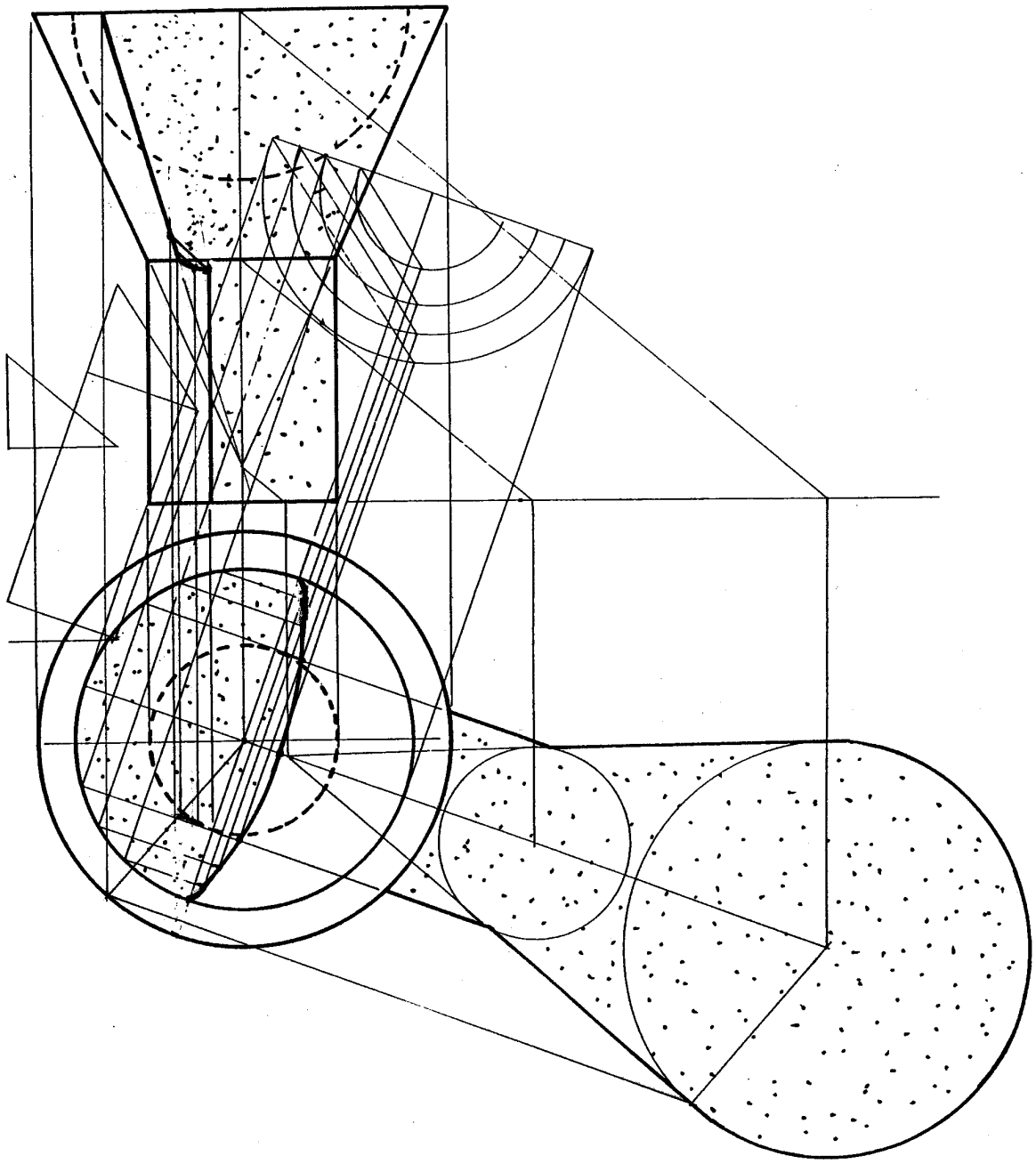
TECHNICAL DRAWING
HIGHER LEVEL - PAPER 11 (B)
2003

QUESTION 2



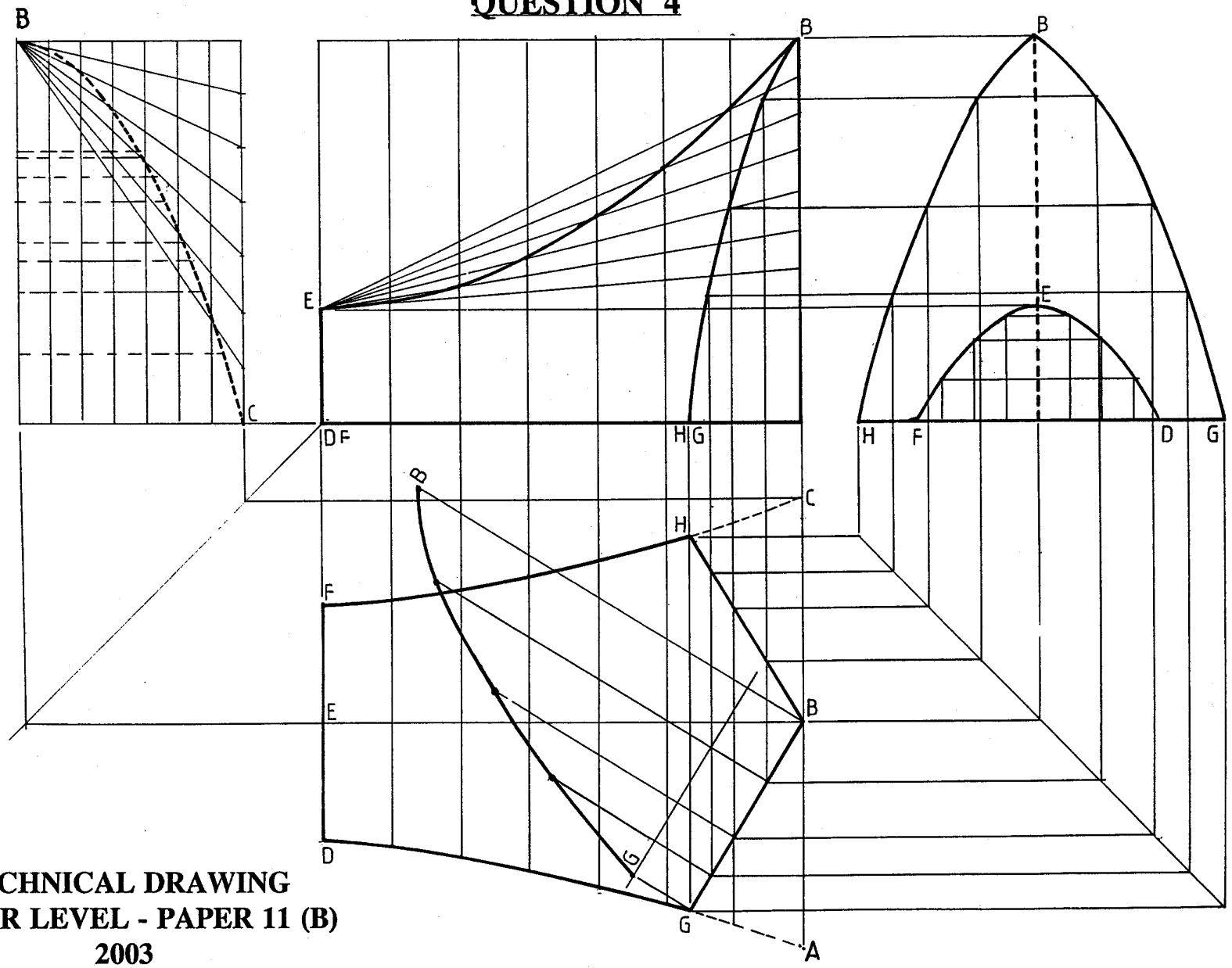
TECHNICAL DRAWING
HIGHER LEVEL - PAPER 11 (B)
2003

QUESTION 3



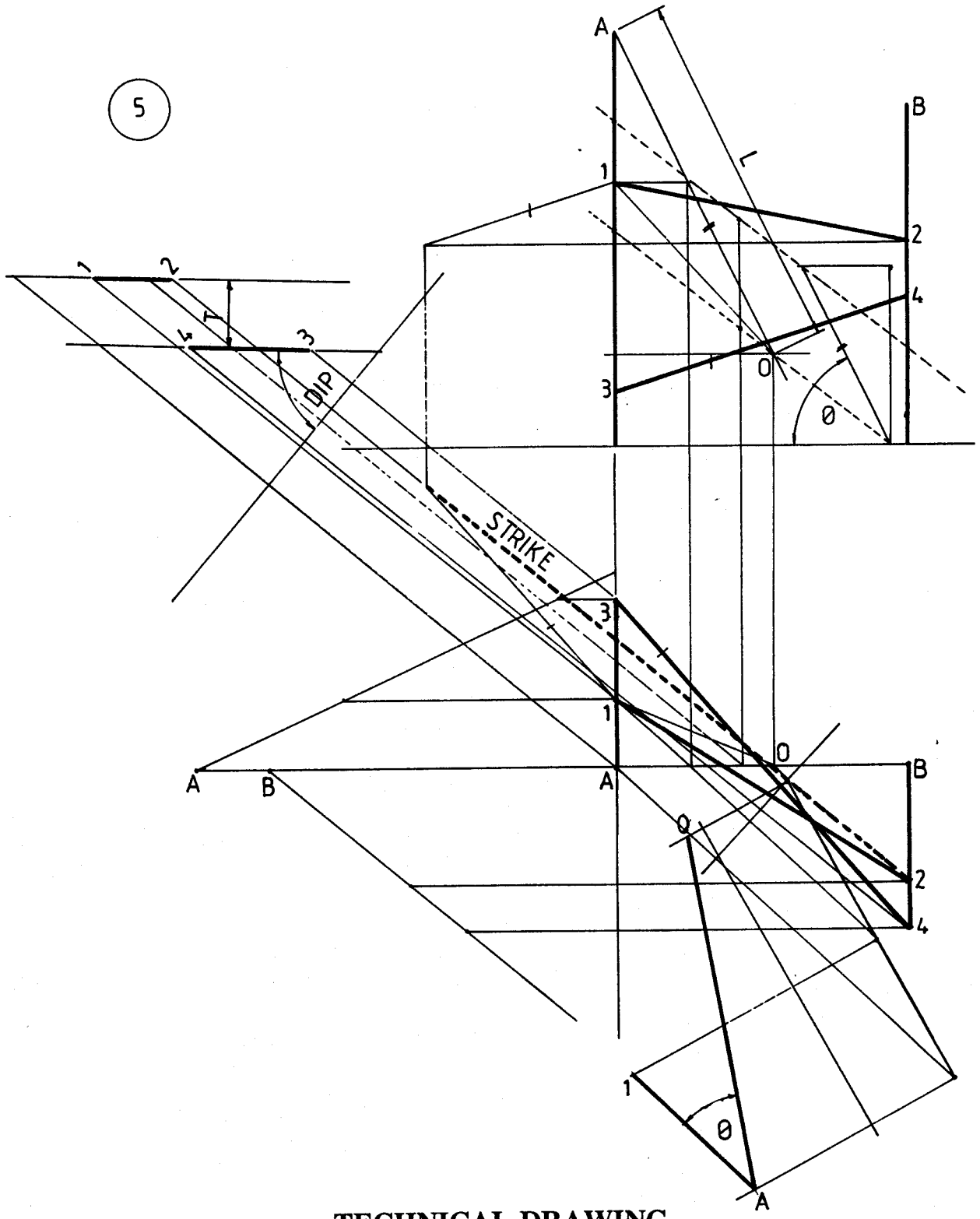
TECHNICAL DRAWING
HIGHER LEVEL - PAPER 11 (B)
2003

QUESTION 4



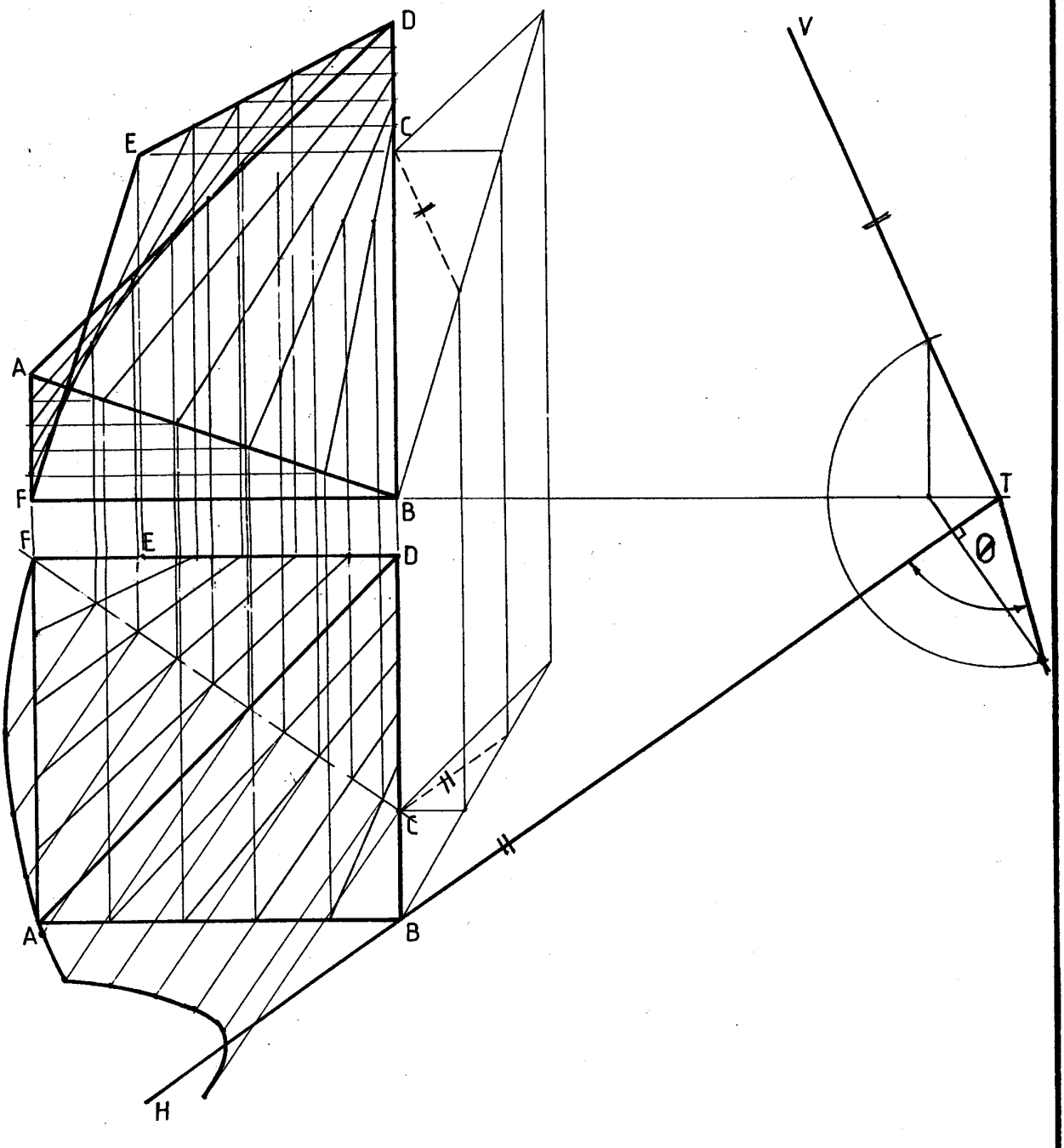
TECHNICAL DRAWING
HIGHER LEVEL - PAPER 11 (B)
2003

QUESTION 5

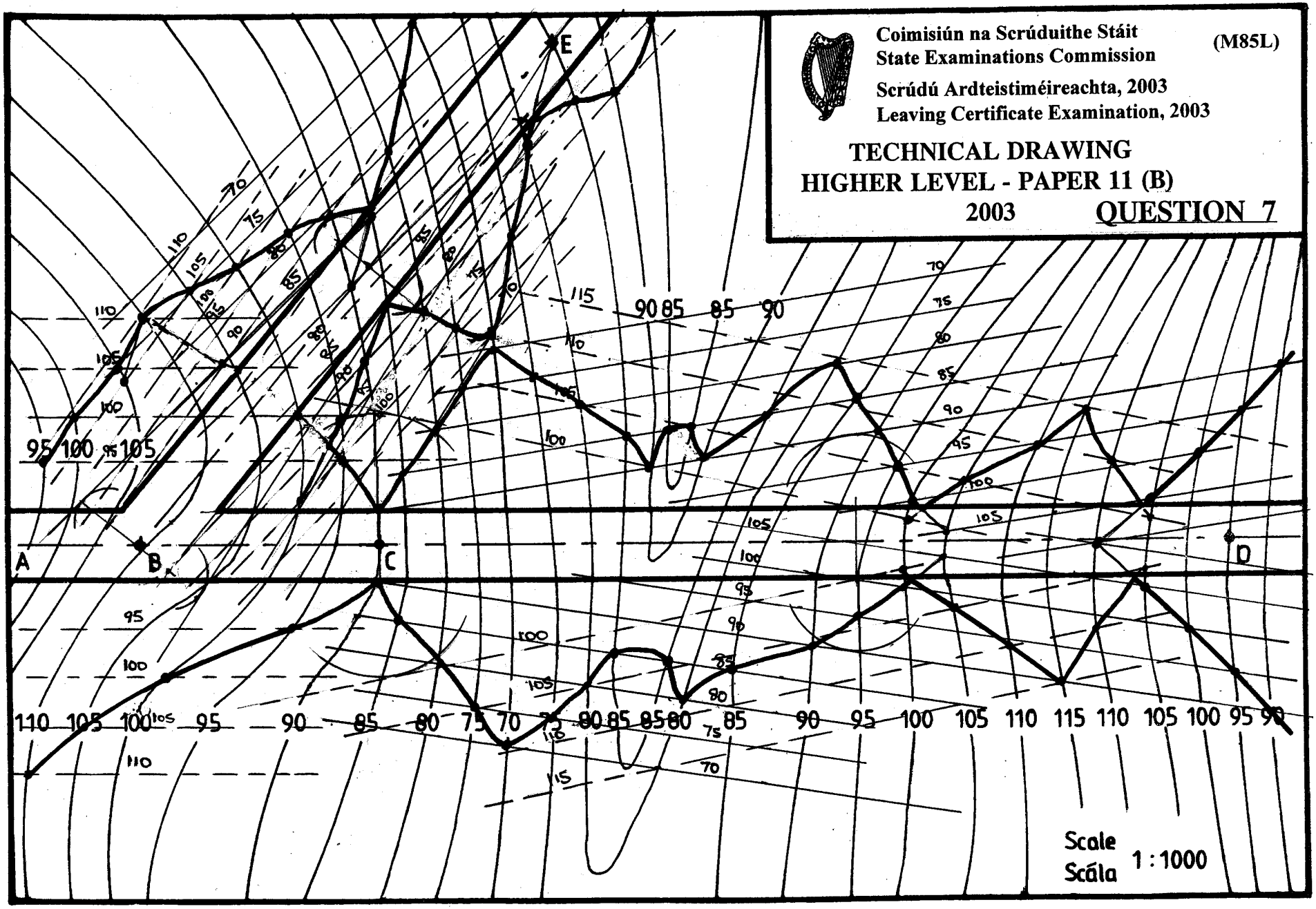


TECHNICAL DRAWING
HIGHER LEVEL - PAPER 11 (B)
2003

QUESTION 6



TECHNICAL DRAWING
HIGHER LEVEL - PAPER 11 (B)
2003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State Examinations Commission
(M85L)
Scrúdú Ardteistiméireachta, 2003
Leaving Certificate Examination, 2003
TECHNICAL DRAWING
HIGHER LEVEL - PAPER 11 (B)
2003
QUESTION 7
A
B
C
D
E
Scale
Scála 1 : 1000