



Scéimeanna Marcála

Scrúduithe Ardteistiméireachta, 2001

Liníocht Theicniúil

Ardleibhéal

Marking Scheme

Leaving Certificate Examination, 2001

Technical Drawing

Higher Level

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

LEAVING CERTIFICATE 2001



**AN ROINN OIDEACHAIS
AGUS EOLAÍOCHTA** | **DEPARTMENT OF
EDUCATION
AND SCIENCE**

TECHNICAL DRAWING

HIGHER LEVEL

PAPER 1

MARKING SCHEME

AND

SOLUTIONS

QUESTION 1**MARKS****Plan and Elevation of planes ABC and ADE**

- (i) Interpretation of co-ordinates..... 5
- (ii) Drawing outline of planes..... 6
- (a) Line of Intersection**
- (iii) Horizontal line in elevation (or line parallel to V.P.) 3
- (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 3
- (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 ADE on new X_1Y_1 3
- (iii) New X_2Y_2 taken perpendicular to line of intersection 4
- (iv) Projection of ABC and ADE on X_2Y_2 and indicating dihedral angle .. 3
- (c) 65mm Line from E**
- (i) 65mm arc about E in elevation 1
- (ii) Line parallel to V.P. on ABC in plan and
projection in elevation.....(2,2)..... 4
- (iii) Drawing correct required line in elevation and plan..... 2
- or**
- (i) 65mm arc about E in elevation 1
- (ii) Line through E parallel to ABC in auxiliary elevation
showing ABC as an edge..... 2
- (iii) Projection of point on required line to plan and elevation (or V.T.).... 2
- (iv) Drawing correct required line in elevation and plan..... 2

or

- (i) 65mm arc about E in elevation 1
- (ii) Line through E parallel to ABC in auxiliary elevation showing
ABC as an edge and projection of 65mm sphere.....(3,1) 2
- (iii) Ellipse in plan..... 2
- (iv) Drawing correct required line in plan and elevation..... 2

(d) Skew lines

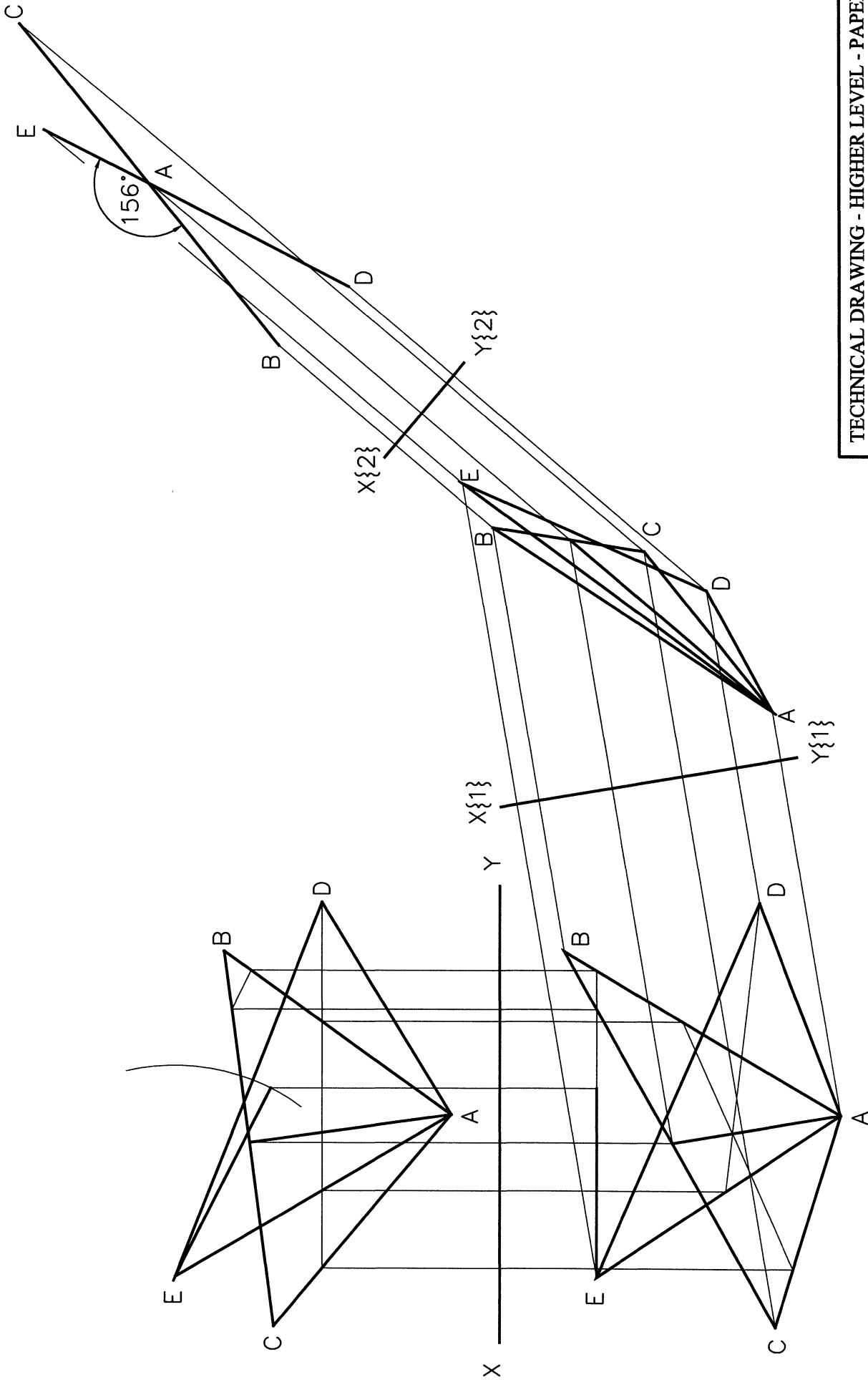
- (i) Creating a plane containing CD (or AE)
and parallel to AE (or CD)..... 3
- (ii) Finding edge view of plane..... 2
- (iii) X_2Y_2 parallel to edge view of plane 2
- (iv) Location of shortest distance and projection to 1st aux..... 2
- (v) Projecting or measuring to plan and elevation 2

or

- (i) Auxiliary view of AE & CD showing true length of one 2
- (ii) Auxiliary view of AE & CD 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 3
- (v) Projecting or measuring to plan and elevation 2

Total

50



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.

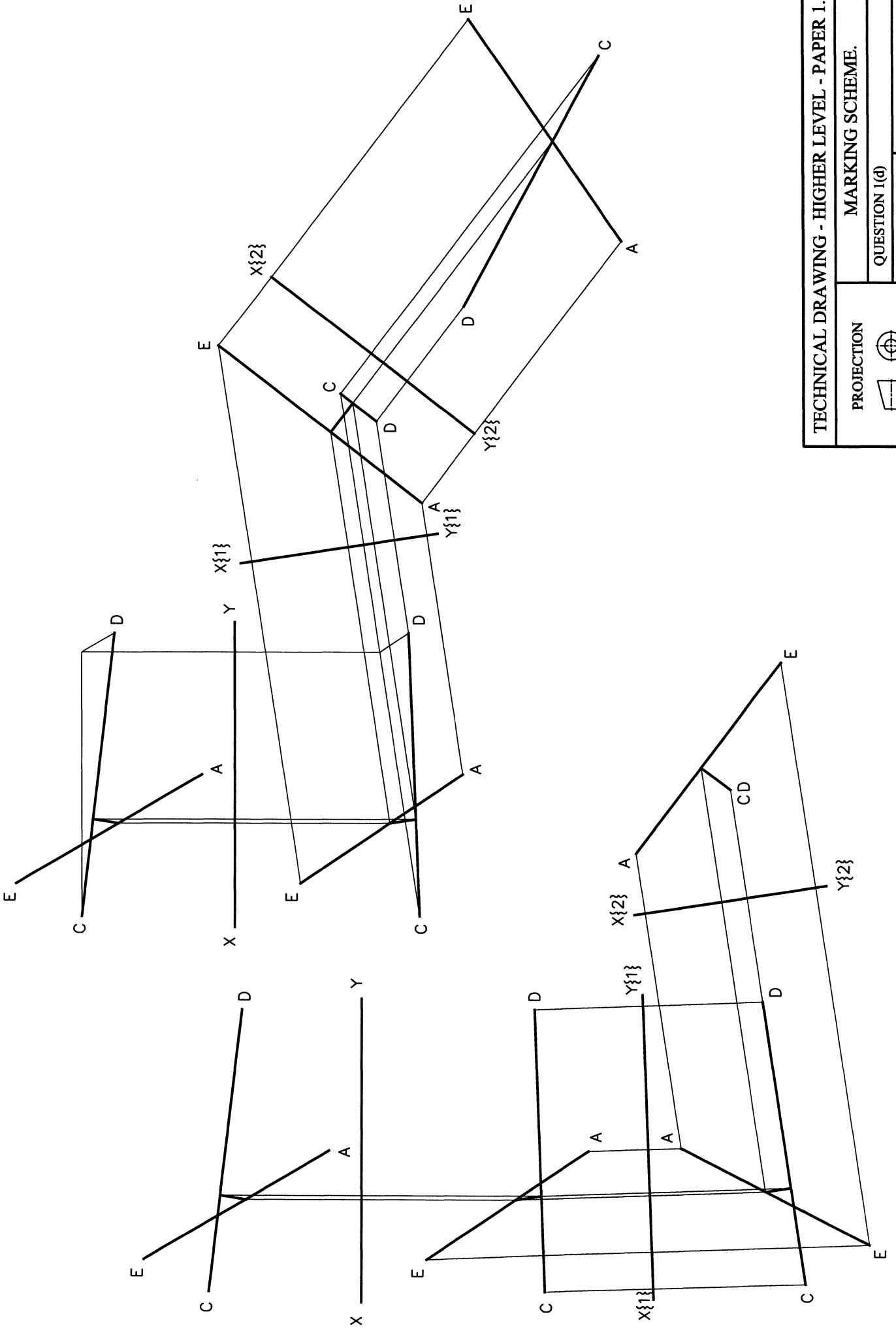
PROJECTION



MARKING SCHEME.

QUESTION 1(a), (b) & (c).

SCALE: N/A. DATE: JUNE 2001.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
PROJECTION	MARKING SCHEME.
QUESTION 1(d)	SCALE: N/A.
DATE: JUNE 2001.	

QUESTION 2

MARKS

(a) Drawing given figure

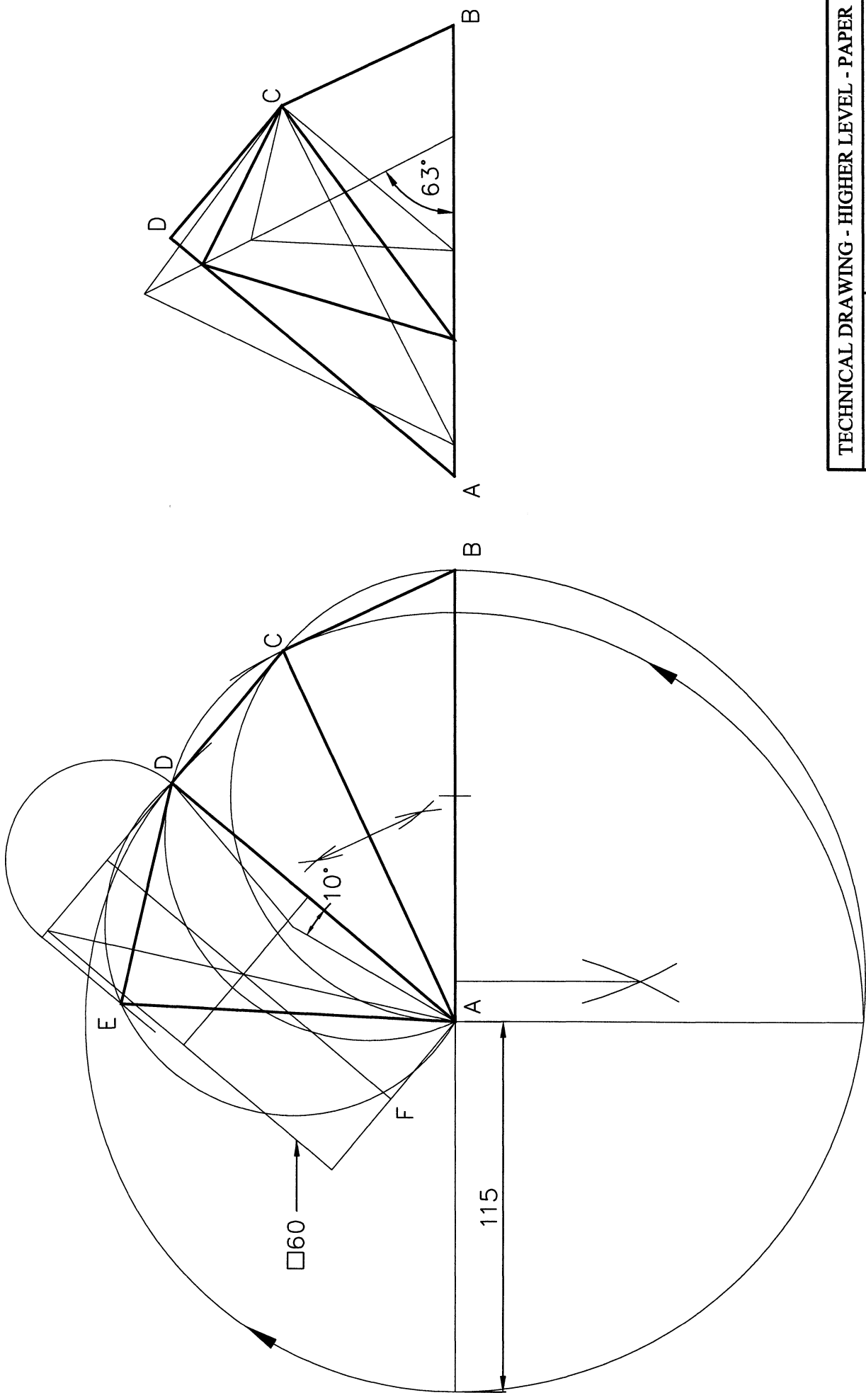
- (i) Drawing of semicircle on AB 5
- (ii) Finding mean proportional between AB and AD to get AC 7
- (iii) Drawing of semicircle on AC 2
- (iv) Location of point D and completion of quadrilateral ABCD 2
- (v) Setting up 10° lines and drawing circle....(3,2) 5
- (vi) Correct determination of distance AF 5
- (vii) Finding perpendicular altitude for ADE 2
- (viii) Completion of pentagon 2

(b) Inscribed similar triangle

- (i) Redrawing of quadrilateral ABCD 1
- (ii) Positioning of vertex 1 at C 2
- (iii) Locating various (2) positions for vertex 2 on AB (or AD) 4
- (iv) Locating positions for third vertex and drawing locus
(or one position and 63° or 80° or 37° line) 8
- (v) Finding position for second vertex and drawing triangle 5

Total

50



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
MARKING SCHEME.	
QUESTION 2.	
SCALE: N/A.	DATE: JUNE 2001.

QUESTION 3**MARKS****(a) Sphere A and Point P**

- (i) Plan and Elevation of sphere A and plan of point P 3
 (ii) Determine elevation of point P 4

(b) Sphere B

- (i) Location of P at edge of sphere in elevation or auxiliary view 3
 (ii) Drawing of normal and tangent at P... (2,2) 4
 (iii) Bisection of angle between tangent and XY line 3
 (iv) Locate centre in plan and elevation and draw projections 5

or

- (i) Location of P at edge of sphere in elevation or auxiliary view 3
 (ii) Drawing of normal at P 2
 (iii) Drawing of locus equidistant between XY line and sphere A
 in elevation.... (2,2,1) 5
 (iv) Locate centre in plan and elevation and draw projections 5

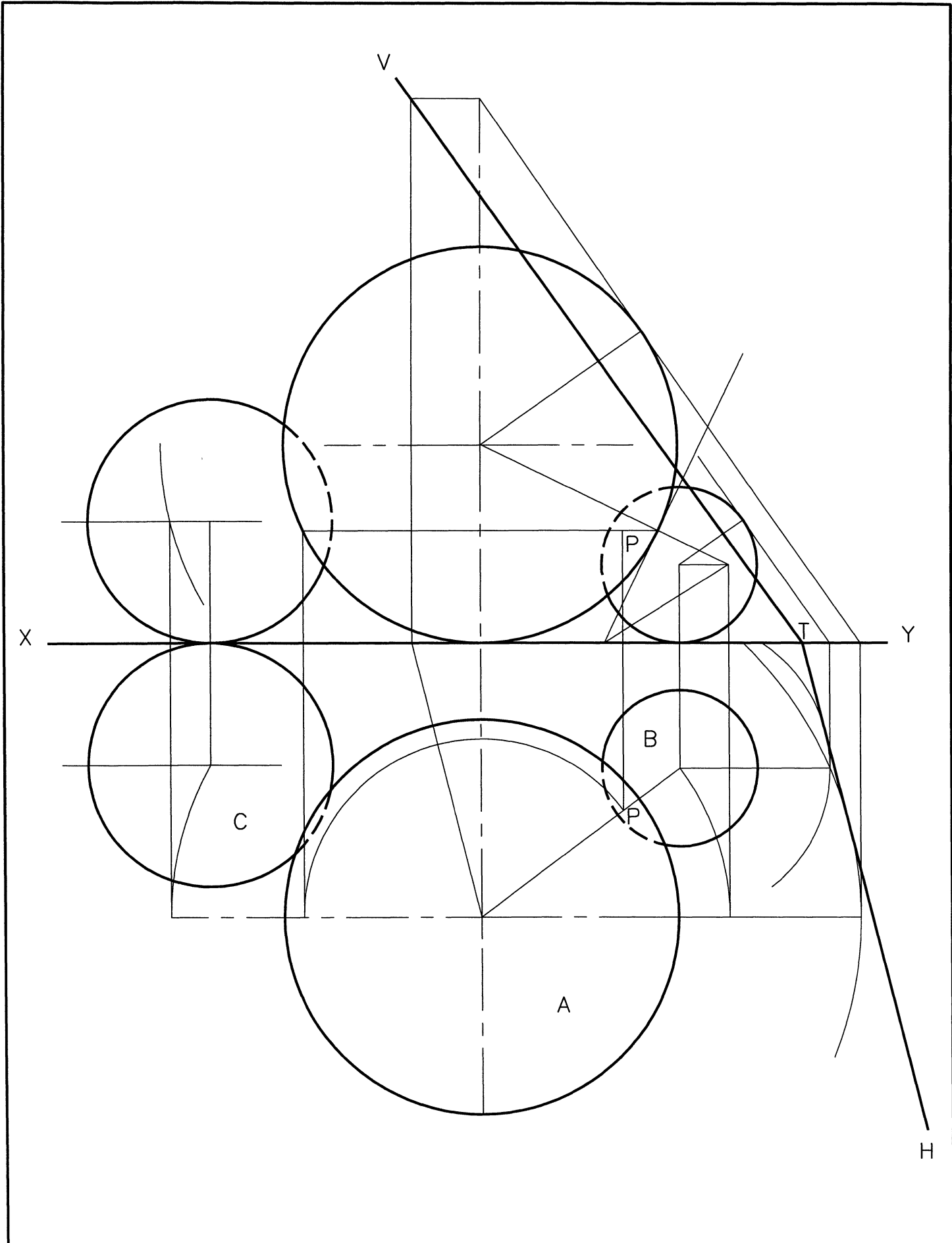
(c) Projections of 40mm Sphere

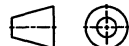
- (i) Draw line 40mm above H.P. and 105mm arc... (2,2) 4
 (ii) Project centre point to plan and rotate about sphere A 2
 (iii) Locate centre in plan and elevation and draw projections.. (2,1,2) 5
Hidden Detail 2

(d) Tangent Plane

- (i) Elevation and plan of circumscribing cone about sphere A or B (3,2).. 5
 (ii) Elevation and plan of circumscribing cone about sphere B or A (2,1).. 3
 (iii) Horizontal trace tangential to both circles..... (2,1) 3
 (iv) Construct and draw vertical trace (3,1) 4

Total**50**



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
PROJECTION	MARKING SCHEME.
	QUESTION 3.
SCALE: N/A.	DATE: JUNE 2001.

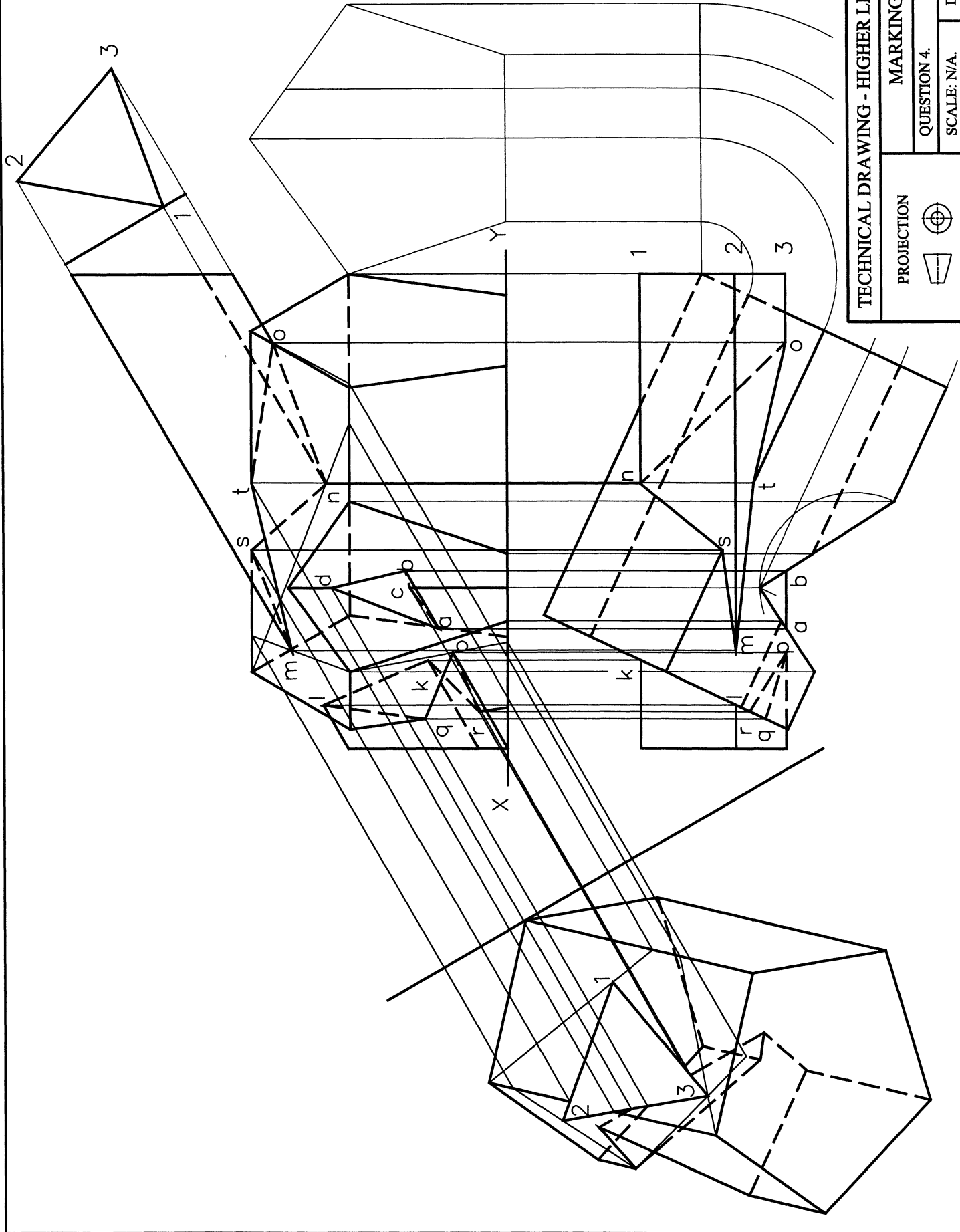
QUESTION 4**MARKS****Outline Plan and Elevation**

- (i) Drawing outline plan of pentagonal prism 4
- (ii) Determination of heights and drawing of outline
elevation (including ends).....(2,2) 4
- (iii) Drawing of “Notch” in plan..... 2
- (iv) Drawing of “Notch” in elevation 5
- (v) Drawing outline elevation of inclined prism.....(3,3)..... 6
- (vi) Transfer of widths to plan and completion of outline plan...(3,3)..... 6

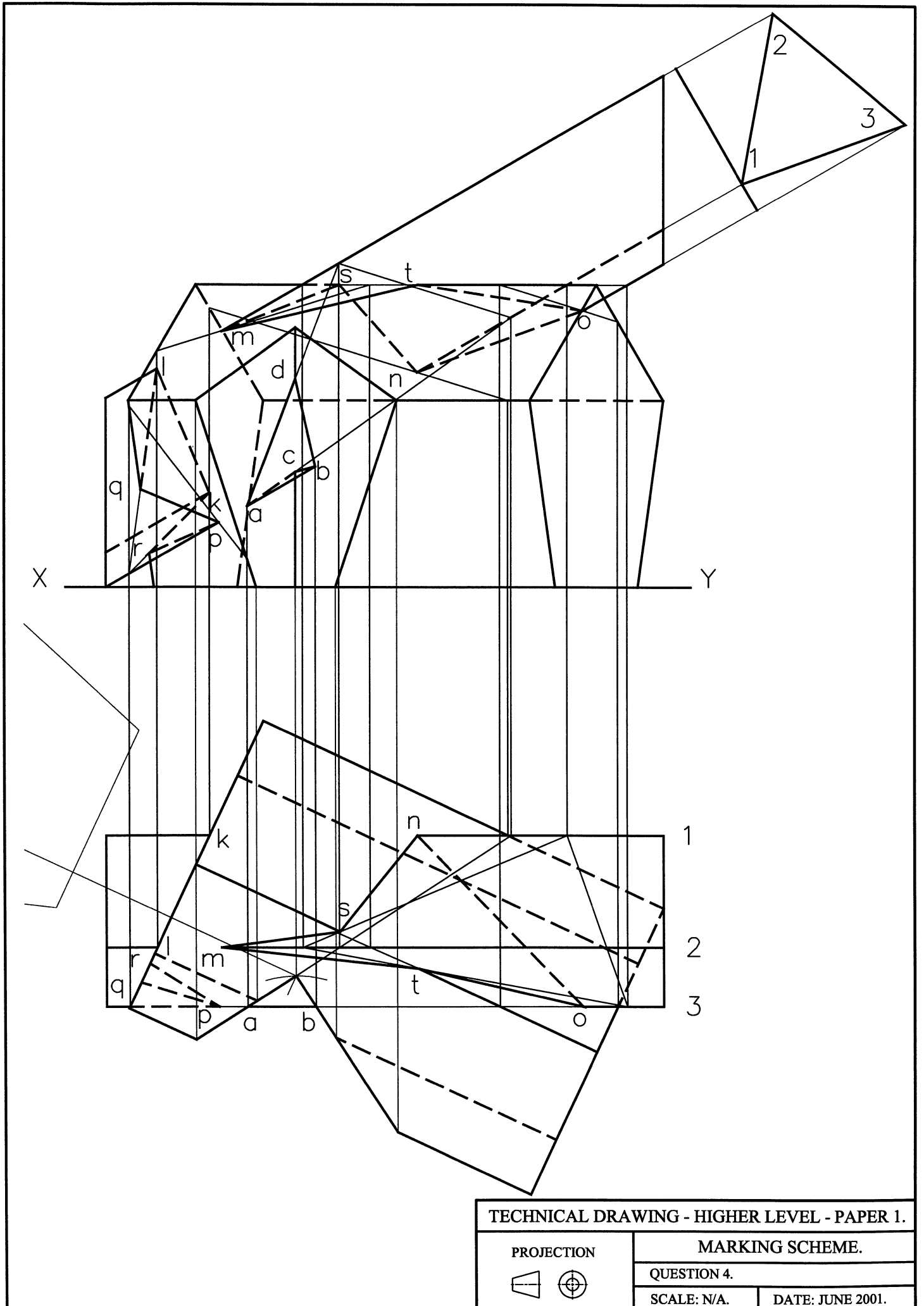
Interpenetration

- (vii) Use of recognised method...(3,4) 7
- (viii) Determining points A and B in plan and elevation..... 2
- (ix) Determining points C and D in elevation..... 2
- (x) Determining points K and L in plan and elevation 2
- (xi) Determining points M, N, O & P in elevation and plan...(4x1) 4
- (xii) Determining points Q & R in elevation and plan...(2x1) 2
- (xiii) Determining points S & T in elevation and plan...(2x1).. 2
- (xiv) Joining points in correct order and completing drawing..... 2

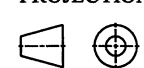
Total**50**



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
PROJECTION	MARKING SCHEME.
QUESTION 4.	SCALE: N/A.
DATE: JUNE 2001.	



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.

PROJECTION 	MARKING SCHEME.	
	QUESTION 4.	
	SCALE: N/A.	DATE: JUNE 2001.

QUESTION 5

MARKS

(a) Plotting of curve

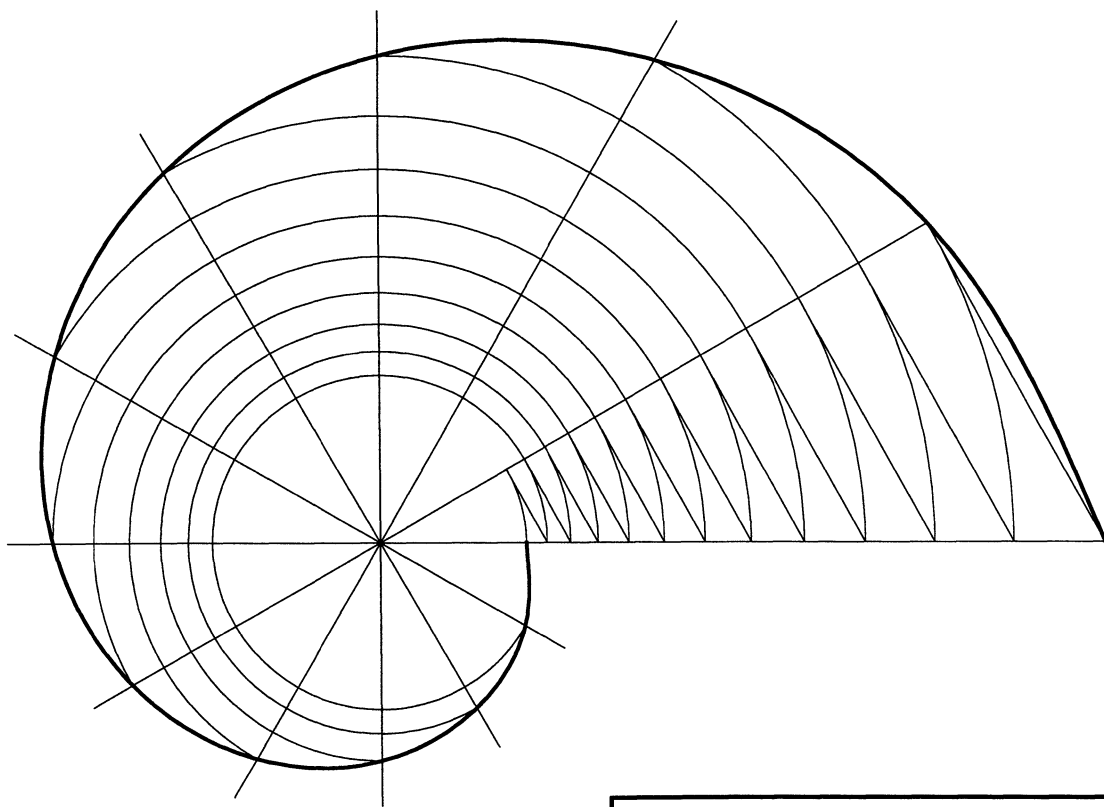
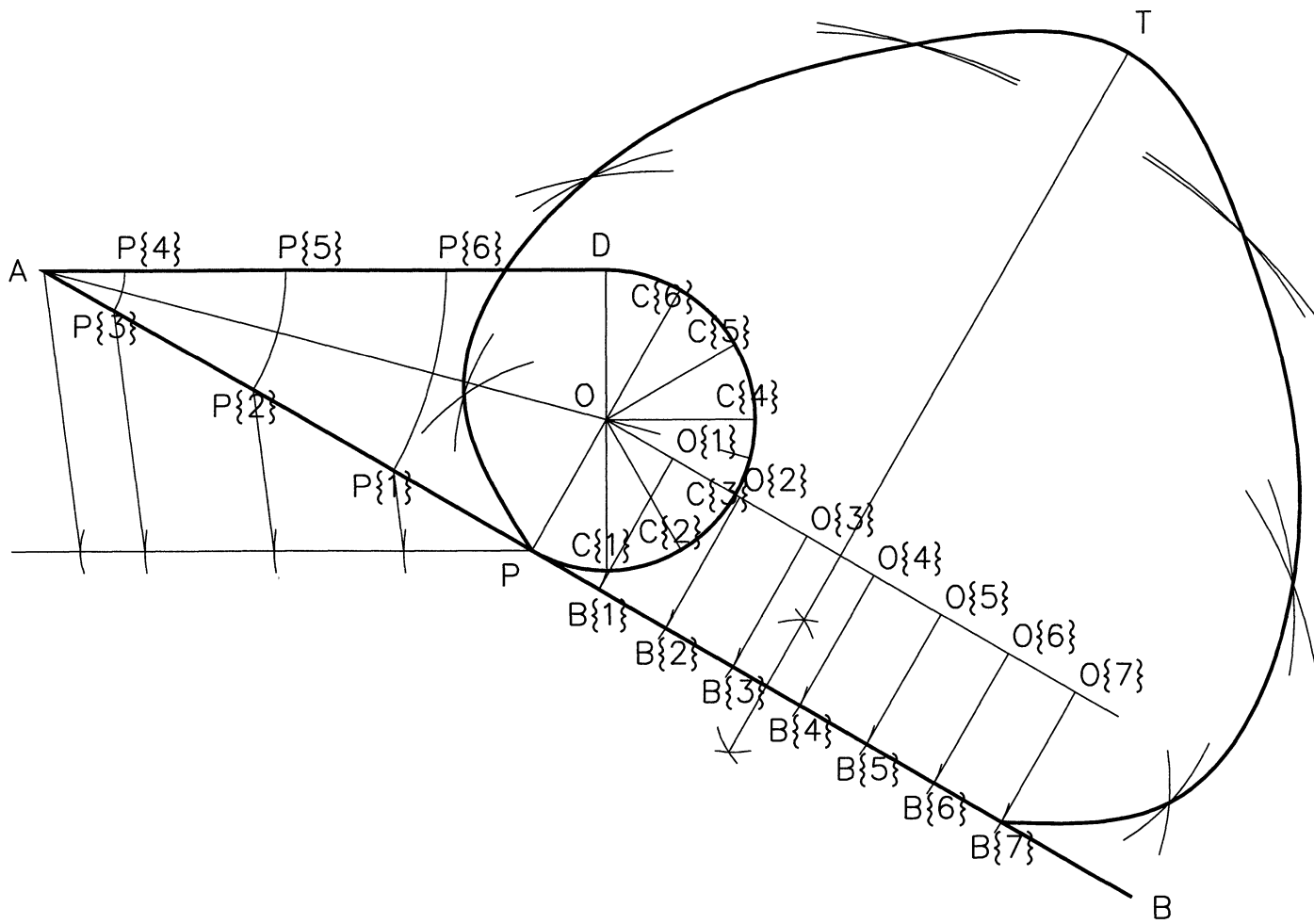
- (i) Drawing figure as given..... 3
- (ii) Dividing arc PD into a number of equal parts (6 min.)..... 3
- (iii) Dividing lines PA and AD into a number of equal parts
corresponding with (ii) above 4
- (iv) Stepping distances to locate B₁, B₂, B₃ etc 3
- (v) Erection of perpendiculars to locate O₁, O₂, O₃ etc 4
- (vi) Drawing arcs C₁-P₁, C₂-P₂ etc from B₁, B₂ etc. respectively 6
- (vii) Drawing arcs O-P₁, O-P₂ etc from O₁, O₂ etc..... 4
- (viii) Location of turning point T for point A 4
- (ix) Plotting of correct curve... 3

(b) Logarithmic Spiral

- (i) Setting up 30° intervals (1 to 12) 4
- (ii) Setting up triangle with sides in ratio of 8:7..... 4
- (iii) Determining successive radii for spiral..... 5
- (iv) Completion of correct spiral..... 3

Total

50



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.

MARKING SCHEME.

QUESTION 5.

SCALE: N/A.

DATE: JUNE 2001.

QUESTION 6**MARKS**

- (a) (i) Drawing lines VF and FD..... 2
(ii) Drawing axis and directrix...(1,2) 3
(iii) Drawing perpendicular at V to locate point on eccentricity line..... 3
(iv) Drawing eccentricity line..... 3
(v) Determining points on curve...(3 min.) 6
(vi) Drawing curve...(Any = 1)..... 3
- (b) (i) Drawing triangle FCP..... 3
(ii) Doubling of angle FPC to locate line through 2nd focus 3
(iii) Drawing line from C perpendicular to FP to give point T 3
(iv) Drawing line from T perpendicular to CP to locate point
on major axis 2
(v) Determining major and minor axes...(2,2) 4
(vi) Locating points on curve 3
(vii) Drawing correct curve 2

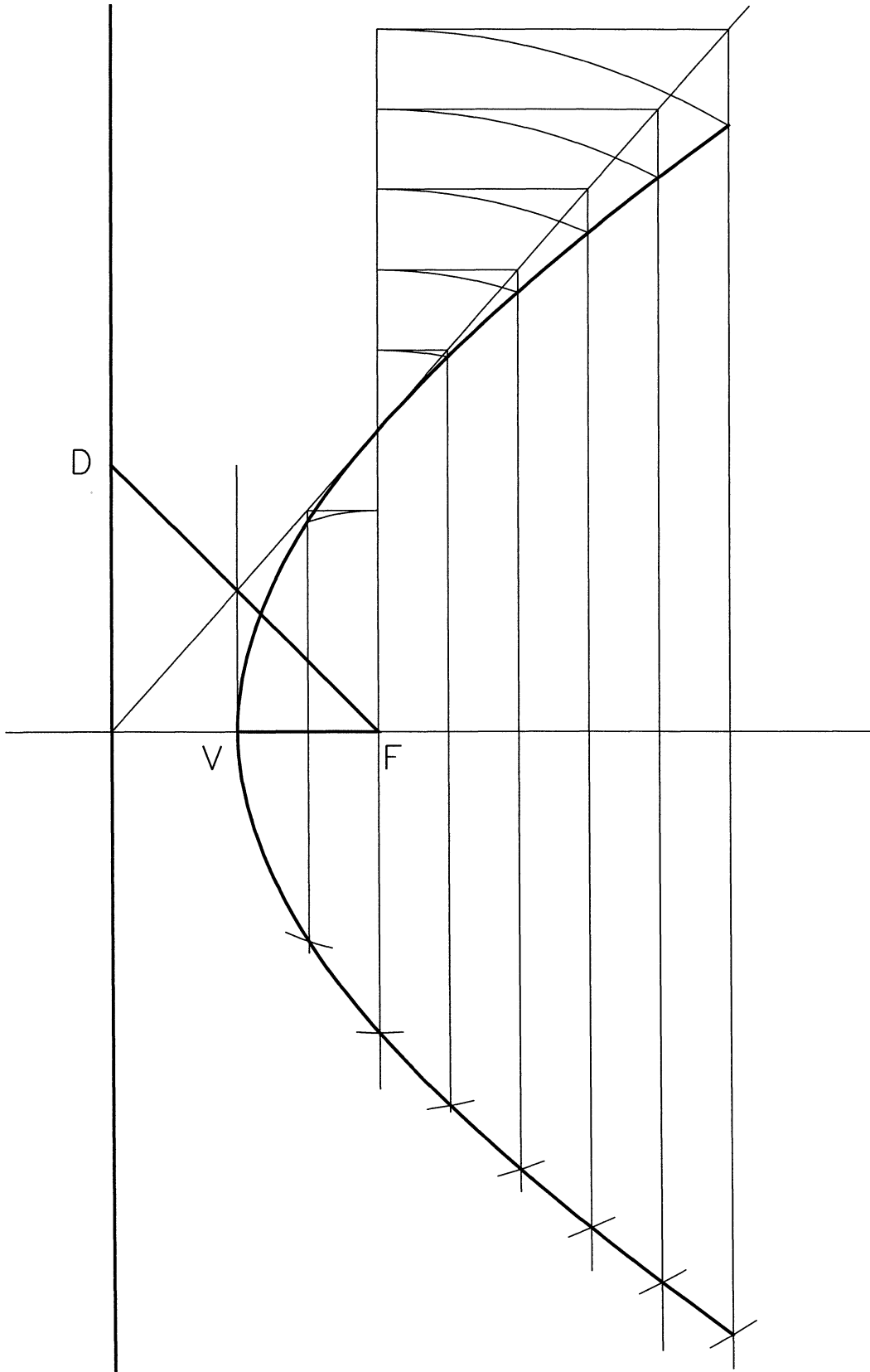
Tangent

- (viii) Drawing chords parallel to FC, bisecting them, joining midpoints
& extending line to establish point of contact...(2,2,2,1)..... 7
(ix) Drawing of required tangent...(Any = 1)..... 3

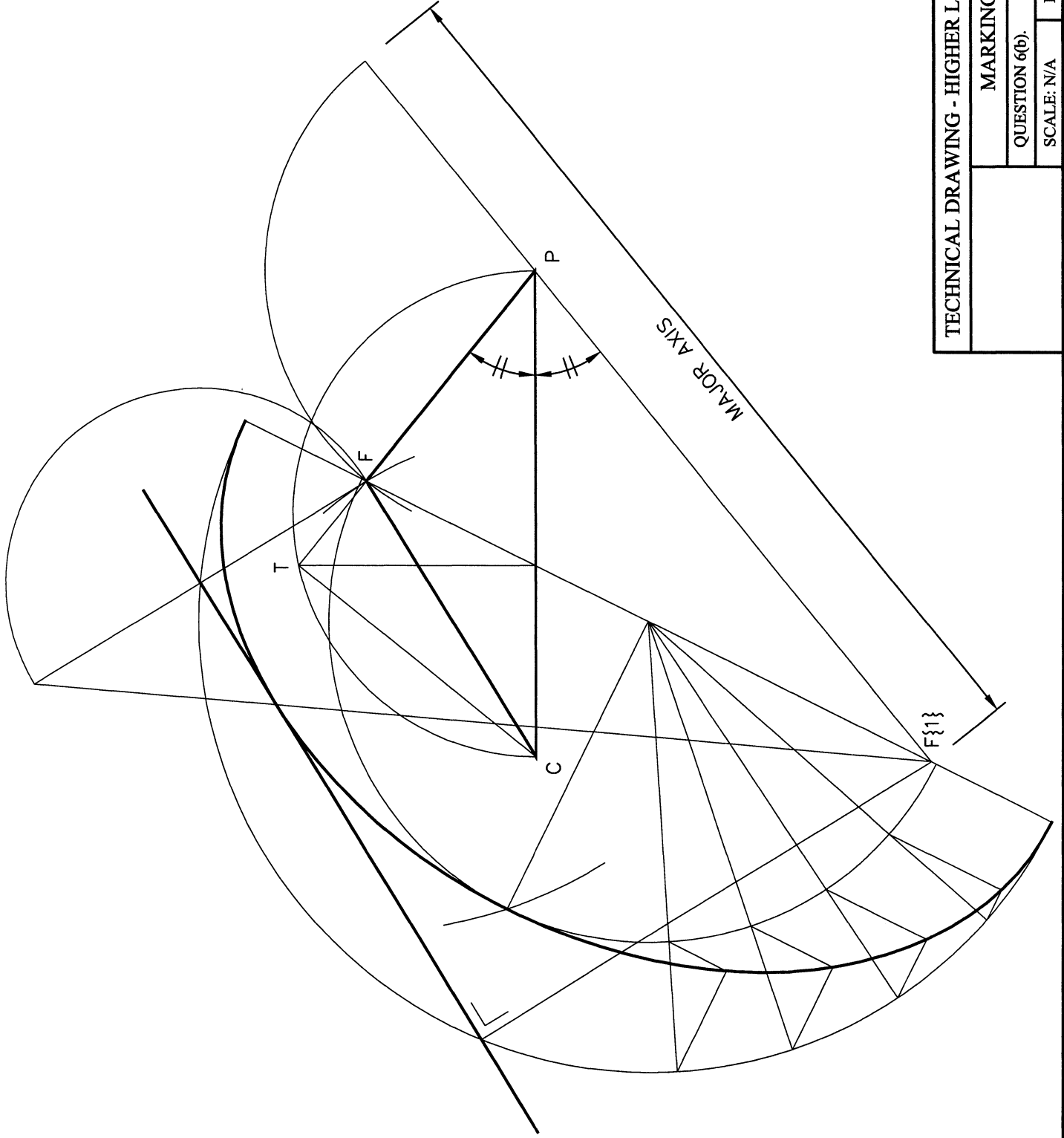
or

- (viii) Drawing line from focus perpendicular to FC to meet major circle..... 4
(ix) Determining point of contact 3
(x) Drawing of required tangent...(Any = 1)..... 3

Total**50**



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
MARKING SCHEME.	
QUESTION 6(a).	
SCALE: N/A.	DATE: JUNE 2001.



TECHNICAL DRAWING - HIGHER LEVEL - PAPER 1.	
MARKING SCHEME.	
QUESTION 6(b).	
SCALE: N/A	DATE: JUNE 2001.

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

- (i) Setting up of VTH and $V_1T_1H_1$ 4
- (ii) Auxiliary direction and X_1Y_1(3,2)..... 5
- (iii) Edge view of plane 4
- (iv) Drawing plan of tetrahedron resting on H.P..... 3
- (v) Tetrahedron in auxiliary view..... 4
- (vi) Locating one corner in V.P..... 2
- (vii) Tetrahedron in plan (3 further points), including hidden detail..(3,1).. 4
- (viii) Tetrahedron in elevation (4 points), including hidden detail..(4,1)..... 5

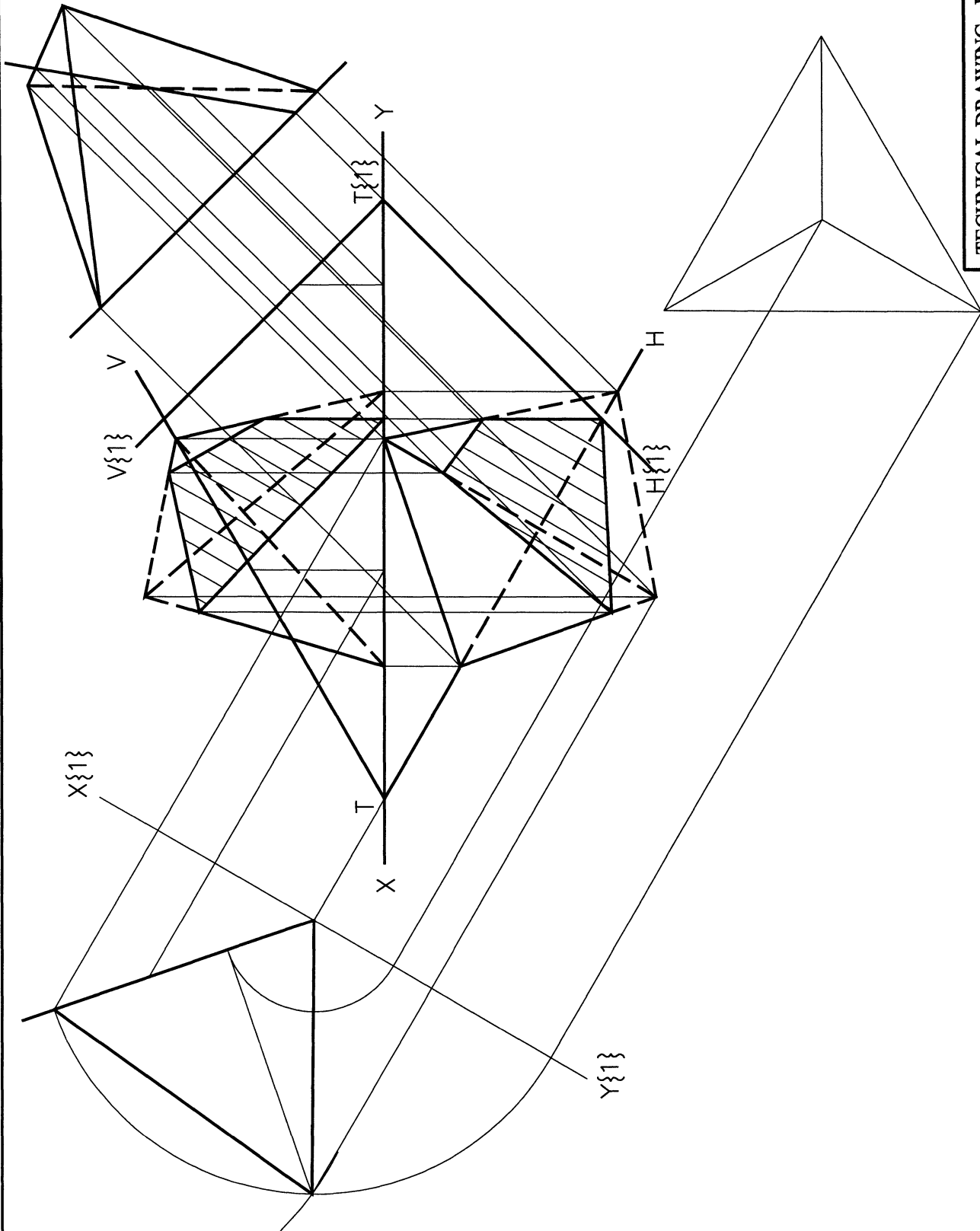
Alternative Solution - to replace (ii) – (viii) above.

- (ii) Rabatment direction 3
- (iii) Rabatted V.T. 4
- (iv) Drawing plan of tetrahedron resting on H.P..... 3
- (v) Tetrahedron base in rabatted position 3
- (vi) Tetrahedron base in plan..... 3
- (vii) Apex in plan, including hidden detail...(5,1) 6
- (viii) Tetrahedron in elevation (4 points), including hidden detail..(4,1)..... 5

(b) Cut surface

- (i) Auxiliary direction and X_1Y_1(2,1)..... 3
- (ii) Edge view of plane 4
- (iii) Tetrahedron in auxiliary view 4
- (iv) Projection to plan and cut surface in plan...(2,2) 4
- (v) Projection to elevation and cut surface in elevation...(2,2) 4

Total**50**



TECHNICAL DRAWING - HIGHER LEVEL - PAPER I.	
PROJECTION	MARKING SCHEME.
	QUESTION 7.
	SCALE: N/A.
	DATE: JUNE 2001.

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

LEAVING CERTIFICATE EXAMINATION

2001

TECHNICAL DRAWING

HIGHER LEVEL

PAPER IIA

ENGINEERING APPLICATIONS

MARKING SCHEME

MARKING SCHEME: QUESTION 1

(a)	ASSEMBLY		4
(b)	SECTIONAL ELEVATION		30
(c)	ADDITIONAL REQUIREMENTS		10
(d)	DRAWING ANALYSIS		<u>6</u>
		TOTAL	50 Marks

ASSEMBLY	(4)	GASKET	3
Valve seat in body	1	Diameter 80mm x 10mm	1
Valve in valve seat & closed	1	Diameter 54mm lines/clearance	1
Gasket in position	1	Correct area hatched & neat	1
Cover screwed into body	1		

SECTIONAL ELEVATION (30)

BODY 10

Bottom flange	1
Drilled holes	1
Diameter 60mm area	1
M52 threads	1
Wall thickness	1
Left flange	1
Diameter 50mm areas	1
Fillets	1
Outline	1
Correct areas hatched & neat	1

VALVE SEAT 4

Flange	1
Chamfer	1
Shank	1
Correct area hatched & neat	1

VALVE 6

Spigot/head	1
Chamfer	1
Vanes	1
Undercuts	1
Chamfers	1
Part unsectioned	1

COVER 8

Hexagonal faces correct size	1
Appropriate chamfers & curves	1
Diameter 80mm x 10mm area	1
M52 mm threaded body	1
Thread convention lines	1
Chamfers	1
Spigot	1
Part not sectioned	1

ADDITIONAL REQUIREMENTS (10)

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

DRAWING ANALYSIS 6

Suitable metal suggested	2
Flow direction	2
Lift dimension	2

MARKING SCHEME: QUESTION 2

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

CAM	(30)	MECHANISM	(20)
DISPLACEMENT DIAGRAM	13	LAYOUT	6
0 ⁰ to 360 ⁰ divisions	1	Centre lines drawn	1
Appropriate divisions	1	Circle and crank AB	1
Correct height	1	Circle and crank CD	1
U.A.R construction	1	Link BE	1
U.A.R additional points plotted	1	Link DE	1
U.A.R curve drawn	1	Link EF	1
U.A.R curve neat	1		
Dwell	1		
S.H.M construction	1	LOCUS	14
S.H.M curves drawn	1	Circles divided into 12 parts	1
S.H.M curve neat	1	Correct starting positions	1
Dwell	1	Correct direction of rotation AB	1
Overall presentation	1	Correct direction of rotation CD	1
		Location of points E	3
CAM PROFILE	17	Locus drawn and neat	1
Centre lines drawn	1	Location of points F	1
Minimum circle	1	Max & Min points obtained	1
Maximum circle	1	Stroke F= 63.58mm ± 1mm	1
Angular divisions 0 ⁰ to 90 ⁰	1	Dimension	1
U.A.R rads projected and swung	1	Identification system	1
U.A.R cam curve drawn	1	Presentation	1
U.A.R cam curve neat	1		
Dwell 90 ⁰ to 150 ⁰ correct	1		
Angular divisions 150 ⁰ to 330 ⁰	1		
S.H.M rads projected and swung	1		
S.H.M curve drawn	1		
S.H.M curve neat	1		
Dwell 330 ⁰ to 360 ⁰ correct	1		
Dwell arcs neat	1		
Rotation correct	1		
Identification system	1		
Overall presentation	1		

MARKING SCHEME: QUESTION 3

(a)	ELEVATION	12
(b)	SECTIONAL SIDE ELEVATION A-A	12
(c)	SECTIONAL PLAN B-B	12
(d)	ADDITIONAL REQUIREMENTS	12
(e)	OVERALL PRESENTATION	<u>2</u>
	TOTAL	50 Marks

ELEVATION	(12)	SECTION B-B	(12)
Diameter 90mm & 50mm circles	1	Projected correctly	1
Radius 65mm semi-circle & lines	1	M24 hole	1
M24 hole	1	Thread convention	1
Thread convention correct	1	Diameter 50mm c'bore hole	1
Top slot 16mm wide	1	Diameter 90mm c'bore hole	1
Vertical slots top and bottom	1	Centre slot	1
RH slot	1	Right slot	1
End & two inclined surfaces	1	Edges behind cutting plane drawn	1
Left top and bottom portions	1	Correct area hatched & neat	2
Fillets	1	Centre lines	1
Centre lines	1	Full shape description	1
Cutting planes indicated	1		
		ADDITIONAL REQUIREMENTS (12)	
		• Four dimensions (½ mark each)	2
		• Appropriate projection symbol	2
		(Provided 1)	
		(Correct 1)	
		• Title: Control Bracket	2
		(G=1; Ex=2)	
		• Machining Symbol	3
		(Symbol 1)	
		(Grind 1)	
		(N5 1)	
		• LIMITS	3
		(Upper correct 1)	
		(Lower correct 1)	
		(Positioning 1)	
		PRESENTATION	(2)
		Overall presentation	2
		(G=1; Ex=2)	

MARKING SCHEME: QUESTION 4

(a)	GIVEN VIEWS	6
(b)	TRUE LENGTHS	12
(c)	DEVELOPMENT	22
(d)	SHEETMETAL JOINTS	<u>10</u>
	TOTAL	50 Marks

GIVEN VIEWS	(6)	SHEETMETAL JOINTS	(10)
PLAN	3	DOUBLE GROOVED SEAM	3
Circle correct size	1	Correct joint provided	1
Rectangle correct size	1	Sketch detail correct	1
Outline & centrelines	1	Sketch presentation/neatness	1
ELEVATION	3	RIVETED LAPPED SEAM	4
Base	1	Correct joint provided	1
Top	1	Sketch detail correct	1
Side, inclined side & centre line	1	Rivet named	1
		Sketch presentation/neatness	1
TRUE LENGTHS	(12)	DOUBLE HEMMED EDGE	3
Parallel lines on cylinder	1	Correct edge provided	1
Surface divided into triangles	2	Sketch detail correct	1
Layout of true lengths	2	Sketch presentation/neatness	1
4 true lengths	6		
Identification system	1		
DEVELOPMENT	(22)		
One piece development	2		
Transition piece area correct (9 triangles x 1 mark)	9		
Cylinder area correct (6 rectangles x 1 mark)	6		
Seam on SS	1		
Identification system	1		
Outline of development neat	2		
Curve neatly drawn	1		

MARKING SCHEME: QUESTION 5

(a)	PARTS LIST	15
(b)	SPUR GEAR DRAWING	25
(c)	BEVEL GEAR	<u>10</u>
	TOTAL	50 Marks

PARTS LIST	(15)	BEVEL GEAR	(10)
Parts list table drawn	1	Centre lines at 90 ⁰	1
12 parts identified (1mark each)	12	Pinion PCD drawn	1
Lettering neat	1	Wheel PCD calculation	1
Presentation	1	Wheel PCD drawn	1
		Pinion & wheel pitch cones drawn	1
		Dimension pinion PCD	1
		Dimension pinion pitch cone angle	1
SPUR GEAR DRAWING	(25)	Dimension wheel PCD	1
		Dimension wheel pitch cone angle	1
		Presentation	1
SPUR GEAR ELEVATION	7		
Centre lines	1		
PCD	1		
Addendum circle	1		
Bore	1		
Keyway	1		
Correct gear convention	1		
Presentation	1		
SPUR GEAR SECTION	8		
Face width	1		
Tip diameter	1		
PCD centre lines	1		
Root diameter	1		
Hub	1		
Keyway	1		
Correct area hatched & neat	1		
Presentation	1		
TABLE OF GEAR DATA	10		
Gear calculations	4		
Table drawn	1		
Required list supplied	1		
Data (6 off x ½ mark each)	3		
Lettering neat	1		

MARKING SCHEME: QUESTION 6A

(a)	ISOMETRIC DRAWING	30
(b)	FOUR STROKE COMPRESSION ENGINE	<u>20</u>
		Total 50 Marks

ISOMETRIC DRAWING (30)

COMPONENT FEATURES (20)

Cylinder	4
Diameter 38mm isometric circle	1
Diameter 56mm isometric circle	1
Diameter 56mm isometric arc rear	1
Tangents	1

Boss	5
Centres correctly located	1
Diameter 14mm isometric circle	1
Diameter 26mm isometric circle	1
Diameter 26mm isometric arc	1
Tangents	1

Fork	7
Centres correctly located	1
Diameter 10mm isometric circle	1
Radius 13mm isometric circle	1
Fork front area complete	1
Front fork thickness	1
Rear fork drawn	1
Fork base	1

Web	4
Top surface	1
Left area at fork end	1
Diameter 56mm isometric arc	1
Bottom of web at boss end	1

VIEW DETAILS 10

Drawn in isometric projection	1
Correct viewpoint	2
Construction for circles and curves	4
Presentation	3

(F=1; G=2; Ex=3)

FOUR STROKE ENGINE (20)

INTAKE STROKE	5
Intake & exhaust valves drawn	1
Piston & connecting rod drawn	1
Engine details (head, walls etc)	1
Sketch details correct & neat	1
Operation correctly explained	1

COMPRESSION STROKE	5
Intake & exhaust valves drawn	1
Piston & connecting rod drawn	1
Engine details (head, walls etc)	1
Sketch details correct & neat	1
Operation correctly explained	1

POWER STROKE	5
Intake & exhaust valves drawn	1
Piston & connecting rod drawn	1
Engine details (head, walls etc)	1
Sketch detail correct & neat	1
Operation correctly explained	1

EXHAUST STROKE	5
Intake & exhaust valves drawn	1
Piston & connecting rod drawn	1
Engine details (head, walls etc)	1
Sketch detail correct & neat	1
Operation correctly explained	1

MARKING SCHEME: QUESTION 6B

(a)	CAD WINDOW / INTERFACE	10
(b)	CAD PROFILE	10
(c)	CAD HARDWARE	10
(d)	SOLID MODELLING OPERATIONS	10
(e)	COMMANDS	10
	Total	50 Marks

CAD WINDOW / INTERFACE (10)
1 mark for each correct answer 10

CAD PROFILE (10)
VDU/ Sheet border drawn 1
3 lines drawn and correct 3
Lines mirrored 1
3 point arc drawn and correct 1
Circle drawn and correct 1
Text correctly centered 1
Accurate full shape description 1
Linework & presentation 1

CAD HARDWARE (10)
• RAM 1
 Hard disk 1
 VDU 1
 Processor speed 1
• Scanner 2
• Modem 1
 Modem speed 1
Overall neatness of lettering 1

SOLID MODELLING (10)
Union operation 3
Subtraction operation 3
Intersection operation 3
Neatness of lettering & sketches 1

COMMANDS (10)
1 mark per appropriate command 8
Correct sequence 2

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

LEAVING CERTIFICATE 2001

TECHNICAL DRAWING

HIGHER LEVEL

PAPER II B

MARKING SCHEME

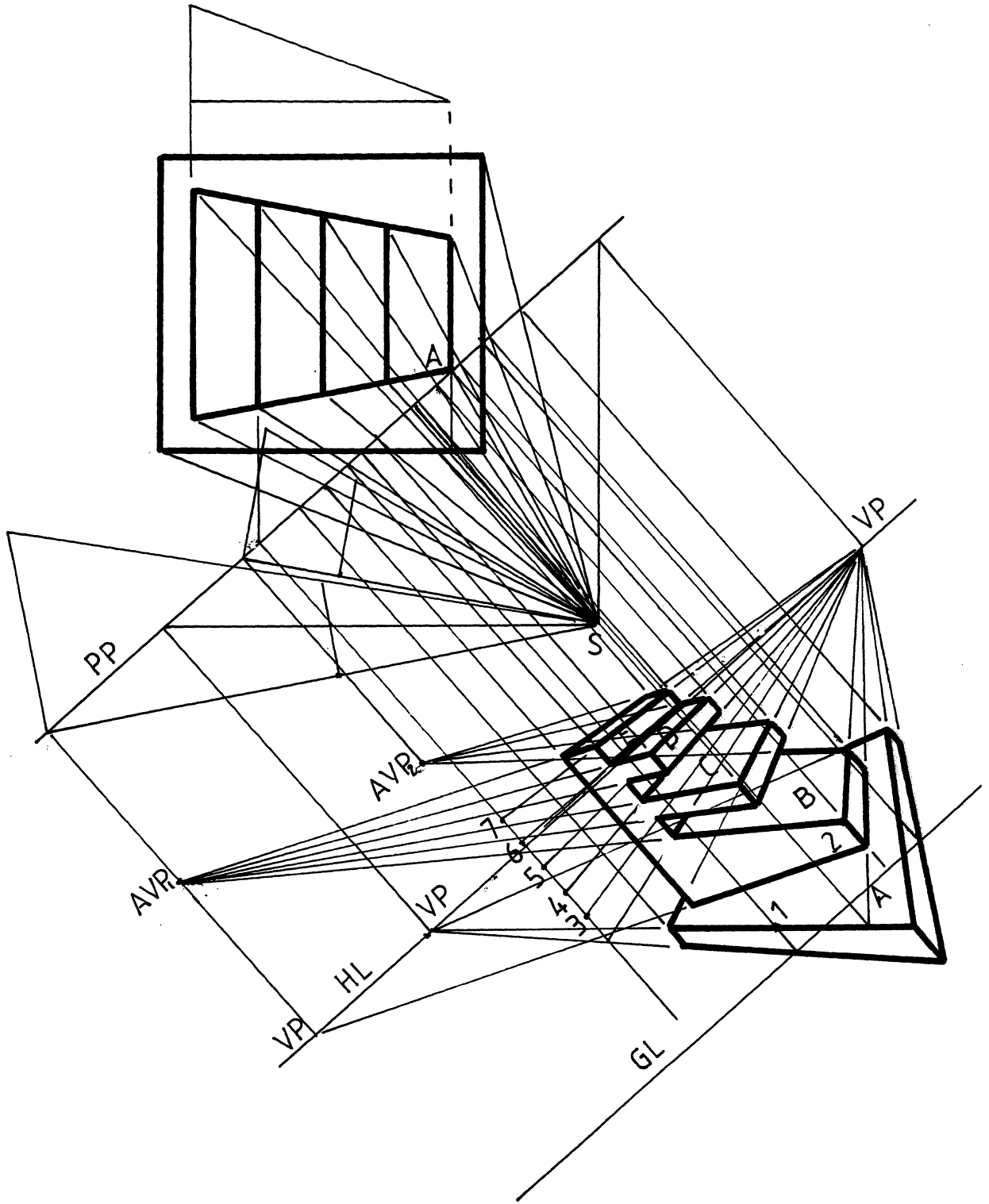
QUESTION 1

Marks

- (1) 2 ---- Draw the given plan
- (2) 2 ---- Position spectator and plan of picture plane
- (3) 2 ---- Plan of vanishing points
- (4) 4 ---- Ground line, horizon line, vanishing points in elevation (1, 1, 2)
- (5) 2 ---- Projection lines from plan to spectator
- (6) 4 ---- Perspective of base lines of structure
- (7) 4 ---- Measure height 1, and complete perspective of block A (1, 3)
- (8) 3 ---- Determine base lines of block B, and measure height 2 (2, 1)
- (9) 6 ---- Determine auxiliary vanishing points 1 and 2 (or alternative)
- (10) 4 ---- Measure height 3, other heights (2, 2)
- (11) 6 ---- Draw lines in perspective vanishing to AVP1
- (12) 4 ---- Draw lines in perspective vanishing to AVP2
- (13) 7 ---- Complete perspective of blocks B, C, D, E (2, 2, 2, 1)

Total 50

QUESTION 1



TECHNICAL DRAWING
HIGHER LEVEL -- PAPER II(B)

QUESTION 2

Marks

Roof surfaces B and E

- (1) 2 ---- Outline of surfaces A and B in plan
- (2) 5 ---- Edge view of surface B, draw outline elevation of surface B (3, 2)
- (3) 4 ---- Construction to determine surface E in plan
- (4) 2 ---- Complete plan and elevation of surface E

Surfaces C and D

- (5) 4 ---- Draw surfaces C and D in plan, determine outline in elevation (2, 2)
- (6) 3 ---- Aux. elevation showing true length of line of int. between B and C
- (7) 2 ---- Aux. elevation of part of surface B
- (8) 2 ---- Edge view of part of surface B
- (9) 1 ---- Set up angle of 140°
- (10) 2 ---- Determine required height of surfaces C and D in elevation
- (11) 4 ---- Complete elevation of surfaces C and D, draw end elevation (1, 3)

Surface A

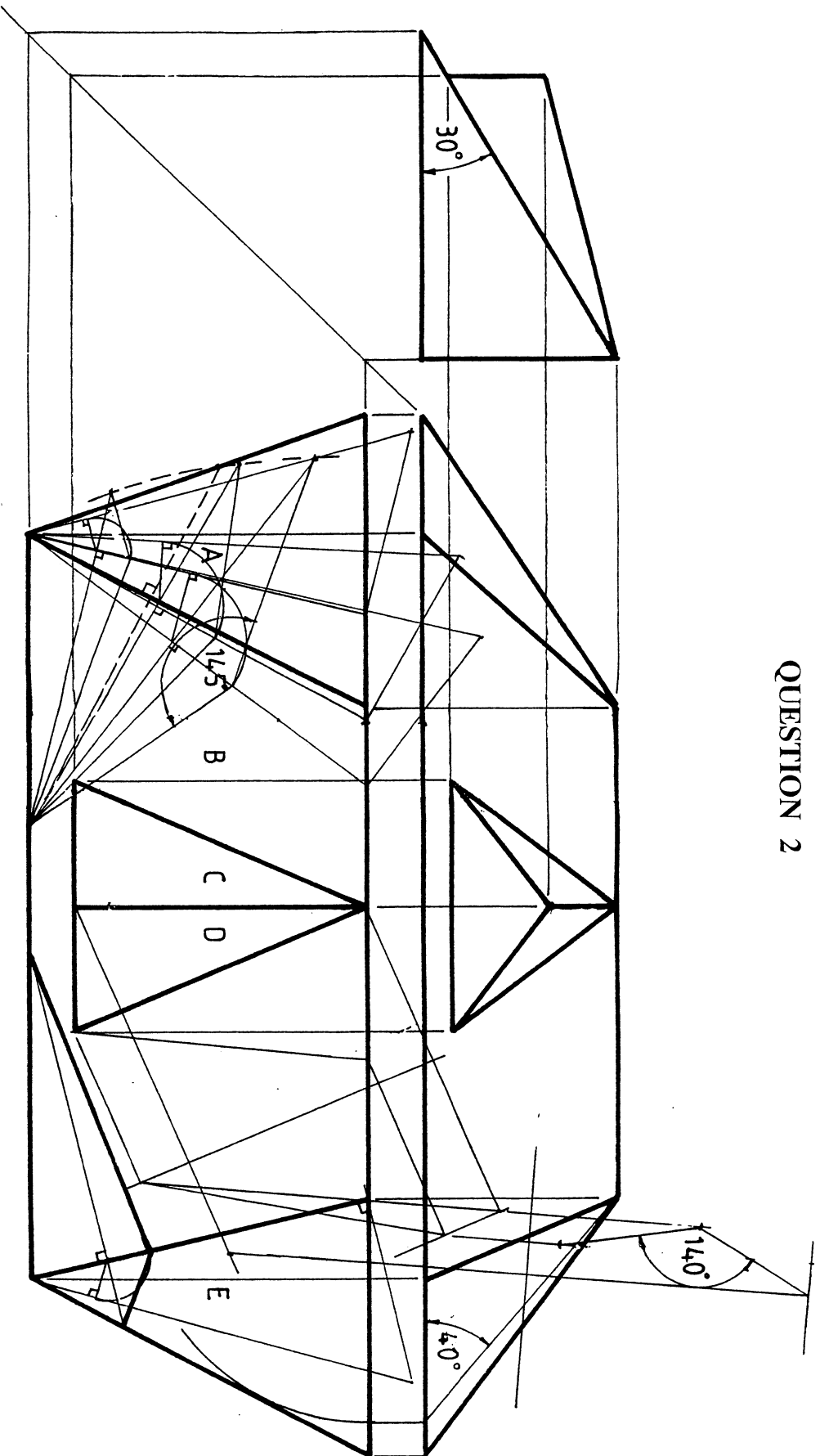
- (12) 5 ---- Construction to determine line of intersection between surfaces A and B
- (13) 2 ---- Complete plan and elevation of surface A

Dihedral angle between surfaces B and E

- (14) 6 ---- View showing true length of line of intersection
- (15) 5 ---- Construction to determine dihedral angle
- (16) 1 ---- Indicating dihedral angle

Total 50

QUESTION 2

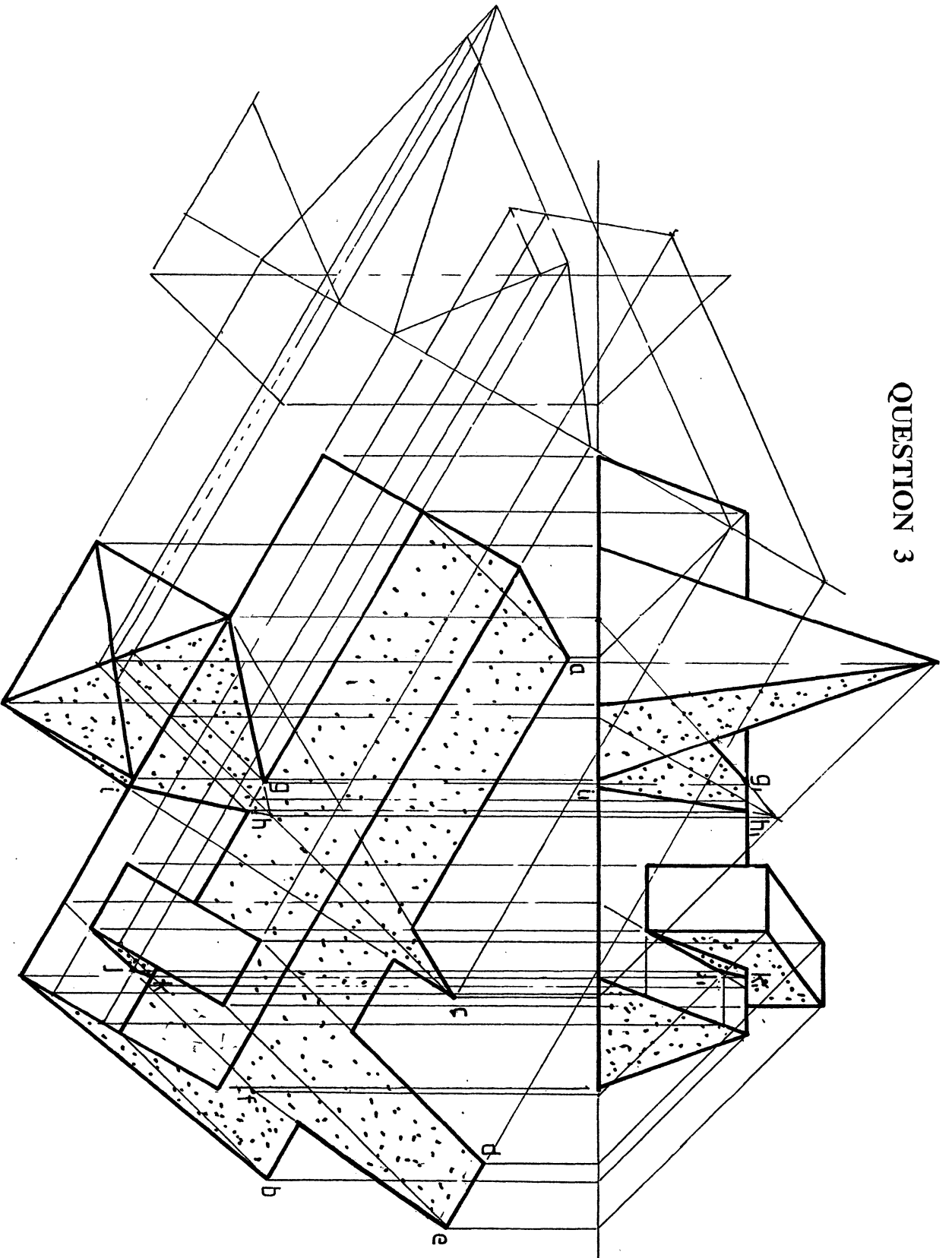


TECHNICAL DRAWING
HIGHER LEVEL -- PAPER II(B)

QUESTION 3

- (1) 4 ---- Draw the given plan and elevation
 - (2) 2 ---- Draw rays in plan and elevation
 - (3) 4 ---- Determine points a and b on ground in plan
 - (4) 3 ---- Draw outline shadow cast on ground by main building
 - (5) 3 ---- Determine points d, e, f on ground
 - (6) 3 ---- Complete shadow cast by rectangular chimney on ground
 - (7) 3 ---- Determine points j and k in plan (1, 2)
 - (8) 2 ---- Determine points j and k in elevation (1, 1)
 - (9) 4 ---- Complete shadows cast by chimney on roof in plan and elev. (2, 2)
 - (10) 4 ---- Determine points c and i in plan (2, 2)
 - (11) 3 ---- Complete shadow cast by pyramid on ground
 - (12) 6 ---- Construction to determine points g and h in plan and elevation (3, 3)
 - (13) 4 ---- Complete shadow cast by tower on roof in plan and elevation (2, 2)
 - (14) 5 ---- Indicate areas of shade in elevation and plan
- Total 50**

QUESTION 3



TECHNICAL DRAWING
HIGHER LEVEL -- PAPER II(B)

QUESTION 4

Marks

Plan and elevation

- (1) 4 ---- Construction for parabola GBH in rectangle
- (2) 2 ---- Draw parabola GBH
- (3) 4 ---- Set up parabola ABC, construction to determine height (1, 3)
- (4) 2 ---- Draw parabola ABC
- (5) 2 ---- Set up outline plan and elevation (1, 1)
- (6) 3 ---- Construction for parabola BF in elevation
- (7) 2 ---- Draw parabola BF in elevation
- (8) 4 ---- Draw vertical sections in elevation, measure on parabola ABC
- (9) 4 ---- Widths transferred to plan, draw outline of hyperbolic curves in plan (2, 2)
- (10) 2 ---- Draw lines DF, EF in plan; BE in elevation (1, 1)
- (11) 3 ---- Construction to determine curve EBD in plan
- (12) 3 ---- Construction to determine curve DF in elevation
- (13) 2 ---- Complete plan and elevation (1, 1)

End Elevation

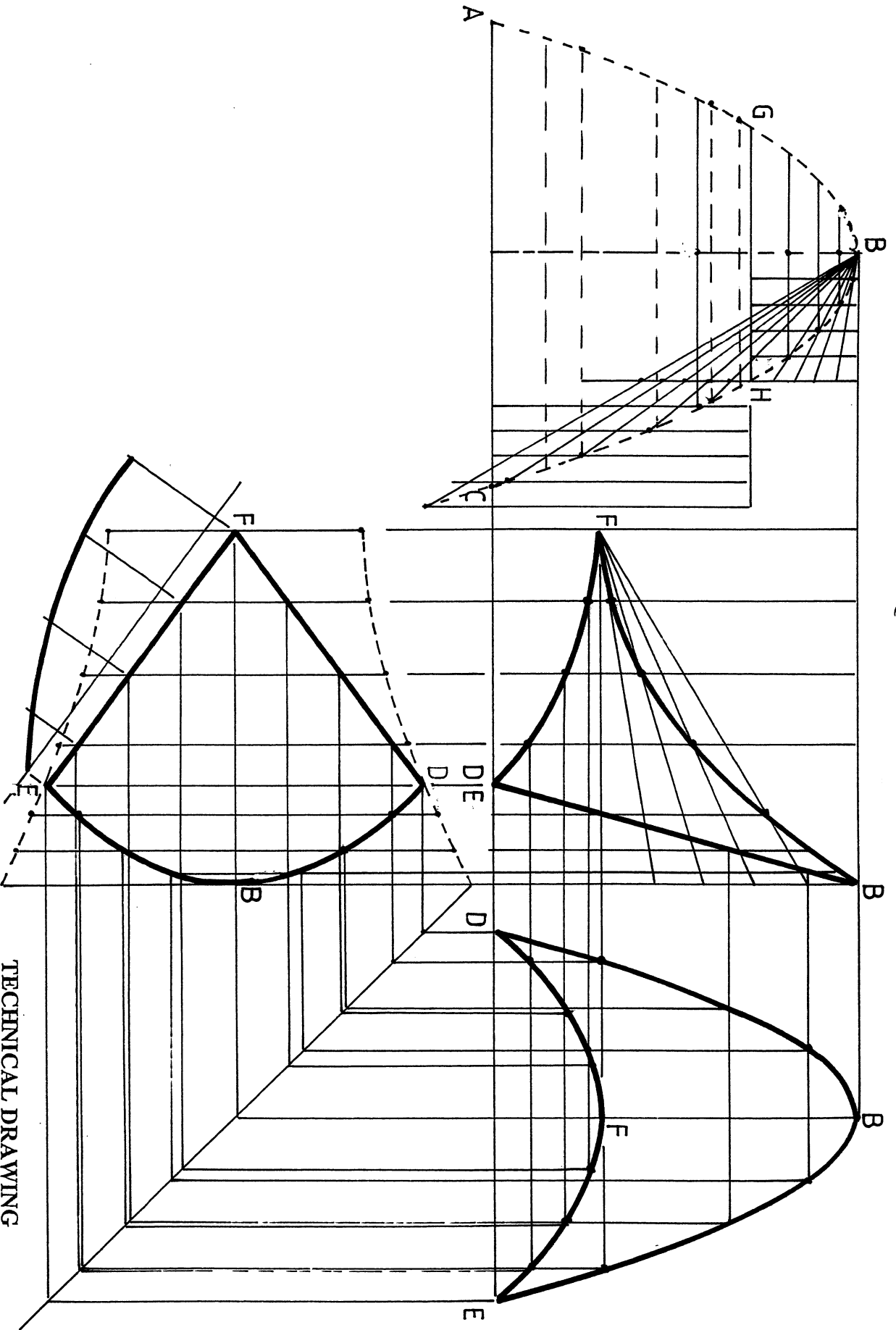
- (14) 4 ---- Projections of widths from plan, heights from elevation to end view
- (15) 3 ---- Complete end view (2, 1)

True shape of curve DF

- (16) 4 ---- Set up XY line, projections at right angles, heights from elevation (1, 1, 2)
- (17) 2 ---- Draw true shape of curve DF

Total 50

QUESTION 4



QUESTION 5

Marks

(a)

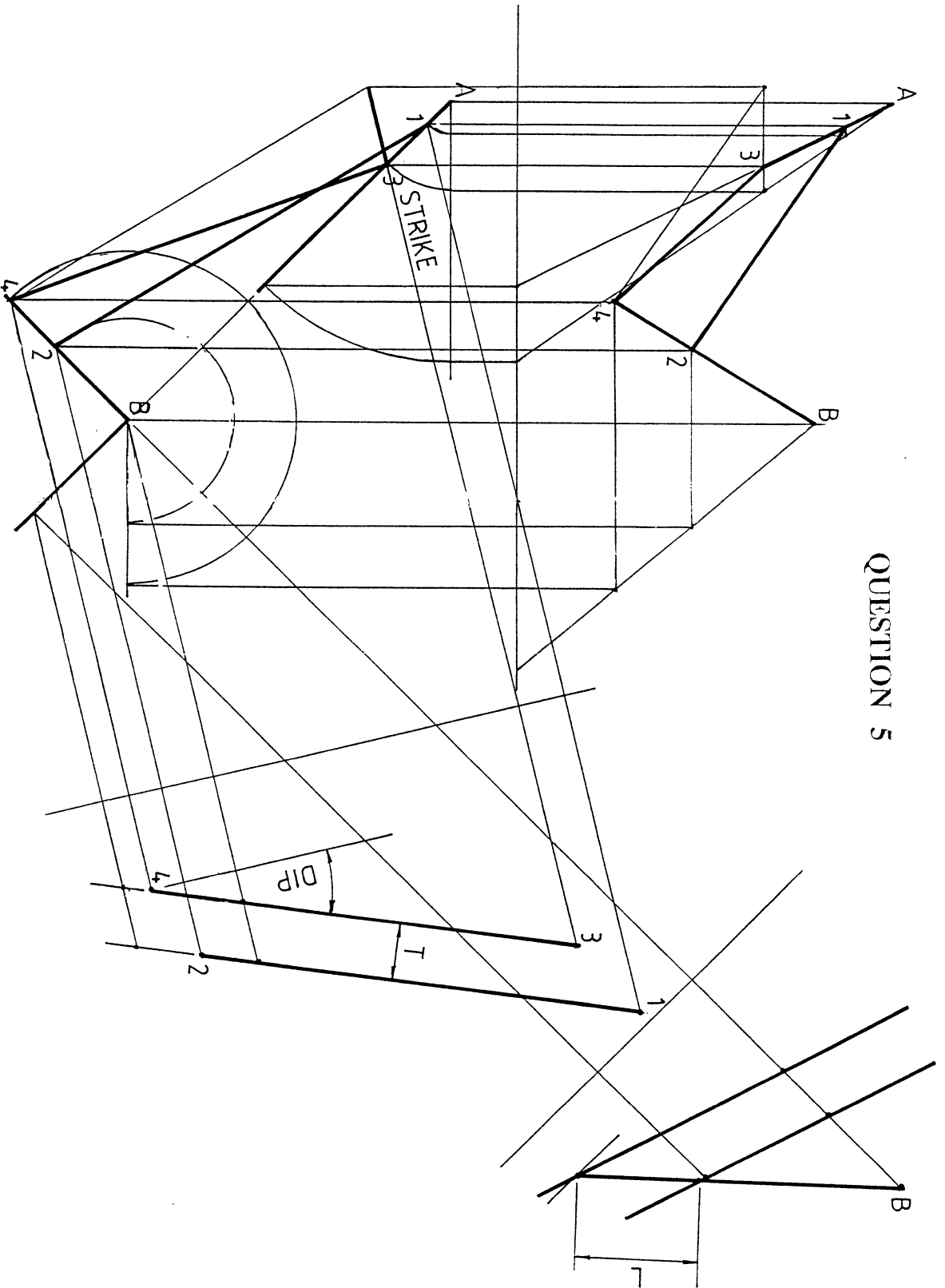
- (1) 4 ---- Outline of bore-holes A and B in plan, points A and B in elevation
- (2) 7 ---- Bore-hole A in elevation, points 1 and 3 in elevation and plan (3, 2, 2)
- (3) 7 ---- Bore-hole B in elevation, points 2 and 4 in elevation and plan (3, 2, 2)
- (4) 2 ---- Draw lines 1,2 and 3,4 on headwall and footwall in elevation (1, 1)
- (5) 2 ---- Draw lines 1,2 and 3,4 on headwall and footwall in plan (1, 1)
- (6) 4 ---- Determine a plane parallel to line in elevation
- (7) 4 ---- Determine the plane in plan
- (8) 2 ---- Determine strike in plan
- (9) 7 ---- Direction of auxiliary elevation, dip and thickness (2, 3, 2)

(b)

- (10) 1 ---- Draw plan of south-easterly bore-hole
- (11) 5 ---- Determine vertical section through the stratum
- (12) 4 ---- Measure given height on section, draw bore-hole from B (2, 2)
- (13) 1 ---- Indicate required length of bore-hole through the stratum

Total 50

QUESTION 5



QUESTION 6

Marks

Plan and Elevation

- (1) 4 ---- Draw the given outline plan
- (2) 3 ---- Project outline elevation
- (3) 9 ---- Method (elements) for determining curves in elevation (5, 4)
- (4) 6 ---- Complete elevation (3, 3)

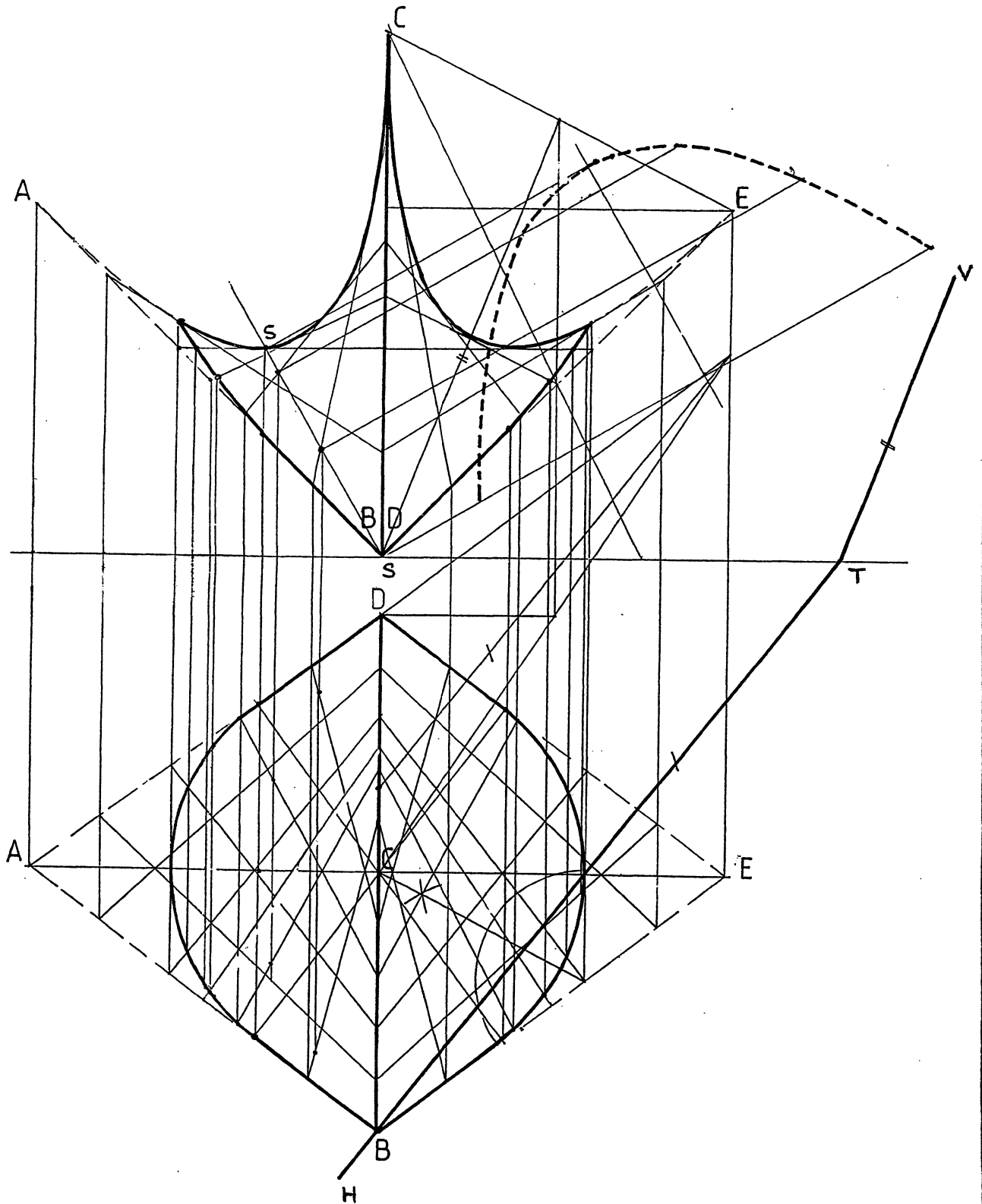
True shape of section S-S

- (5) 2 ---- Projections at right angles to S-S, set up XY line
- (6) 6 ---- Determine widths from plan, measure in auxiliary view (4, 2)
- (7) 4 ---- Draw curve

Traces of Plane Director

- (8) 5 ---- Plane parallel to element in plan
 - (9) 4 ---- Plane parallel to element in elevation
 - (10) 4 ---- Determine horizontal trace
 - (11) 3 ---- Determine vertical trace
- Total 50

QUESTION 6



TECHNICAL DRAWING
HIGHER LEVEL -- PAPER II(B)

QUESTION 7

Marks

Main roadworks between A and B (embankments)

- (1) 5 ---- Determine arcs rad. 20 m at A, draw tangents from 25 m level
- (2) 4 ---- Drawing parallel lines at 10 m intervals
- (3) 6 ---- Intersections with contours, drawing curves

Main roadworks between A and B (cuttings)

- (4) 5 ---- Determine arcs rad. 15 m at 25 m level, draw tangents from A
- (5) 4 ---- Drawing parallel lines at 7.5 m intervals
- (6) 4 ---- Intersection with contours, drawing curves

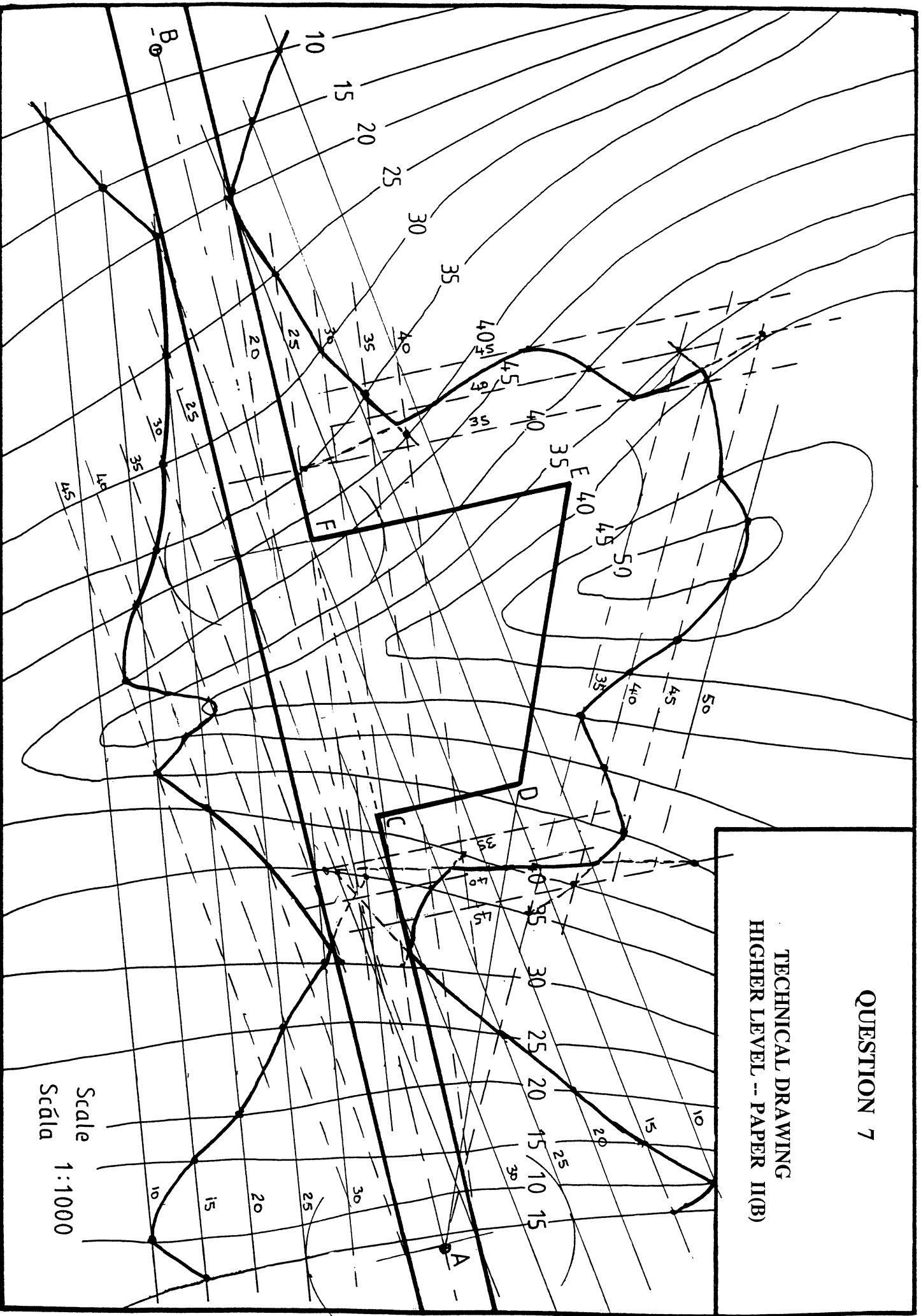
Parking area

- (7) 5 ---- SIDE ED -- Determine arc rad. 15 m and draw tangent from A
- (8) 2 ---- Drawing parallel lines at 7.5 m intervals
- (9) 3 ---- Intersections with contours, drawing curve
- (10) 3 ---- SIDE CD -- Establish 35 m level, parallel lines to CD at 7.5 m intervals
- (11) 3 ---- Intersections with contours, drawing curve
- (12) 3 ---- SIDE EF -- Establish 35 m level, parallel lines at 7.5 m intervals
- (13) 3 ---- Intersections with contours, drawing curve

Total 50

QUESTION 7

TECHNICAL DRAWING
HIGHER LEVEL -- PAPER II(B)



Scale
Scala
1:1000