

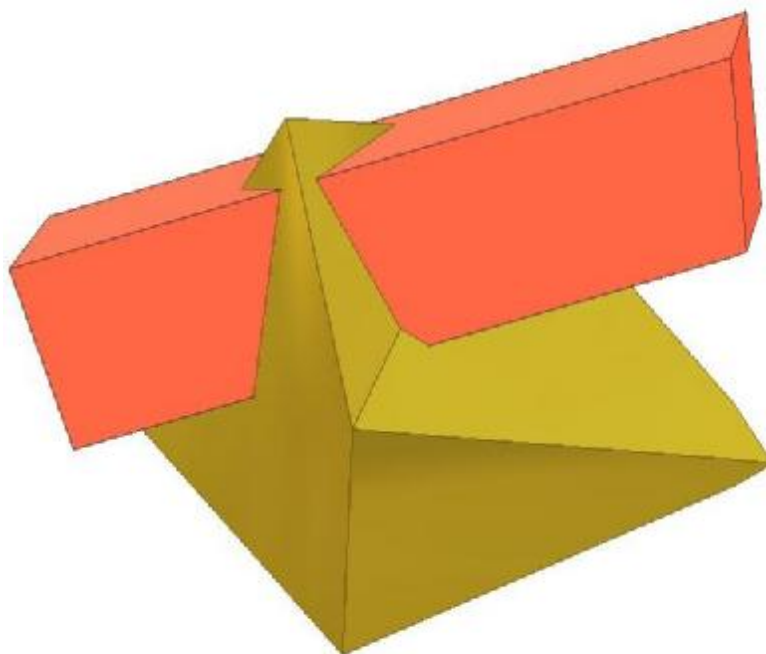
**AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA**

**LEAVING CERTIFICATE 2002**

**TECHNICAL DRAWING**

**HIGHER LEVEL**

**PAPER 1**



**MARKING SCHEME  
AND  
SAMPLE SOLUTIONS**

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

- (i) Interpretation of co-ordinates ..... 4
- (ii) Drawing outline of planes ..... 4

**(a) Line of Intersection**

- (iii) Horizontal lines in elevation (or lines parallel to V.P.)..... 4
- (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...(2,1,1) ..... 4
- (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 ..... 3
- (ii) Projection of ABC and DEF on new  $X_1Y_1$  ..... 3
- (iii) New  $X_2Y_2$  taken perpendicular to line of intersection ..... 3
- (iv) Projection of ABC and DEF on  $X_2Y_2$  and indicating dihedral angle .. 3

**(c) Determining line from E**

- (i) Drawing 60mm cone of base angle  $40^\circ$  in an elevation..... 4
- (ii) Drawing plan of cone ..... 2
- (iii) Establish plane parallel to ABC at E..... 2
- (iv) Drawing correct required line in plan and elevation...(2,1).. 3

**(d) Skew lines**

- (i) Creating a plane containing AB (or DE)  
and parallel to DE (or AB) ..... 3
- (ii) Finding edge view of plane ..... 2
- (iii) Projection plane perpendicular to  $X_1Y_1$  line ..... 2
- (iv) Locating shortest horizontal line and projection to 1<sup>st</sup> aux. .... 2
- (v) Projecting or measuring to plan and elevation..... 2

**or**

- (i) Creating a plane containing AB (or DE)  
and parallel to DE (or AB) ..... 3
- (ii) New  $X_1Y_1$  taken parallel to plan of level line ..... 2
- (iii) Projection of AB and DE on new  $X_1Y_1$  ..... 4
- (iv) Projecting to plan and elevation..... 2

**Total** **50**

**QUESTION 2****MARKS****(a) Drawing given figure**

- |       |   |   |
|-------|---|---|
| (i)   | Drawing line AE 125mm long .....                      | 4 |
| (ii)  | Correct determination of distance ED....(2,3,2) ..... | 7 |
| (iii) | Finding diameter of circle .....                      | 2 |
| (iv)  | Location of O and drawing of circle....(1,1,1).....   | 3 |
| (v)   | Location of points B and D .....                      | 2 |
| (vi)  | Plotting of locus between B and D....(1,3,2,1) .....  | 7 |
| (vii) | Completion of quadrilateral .....                     | 4 |

**(b) Division of Area**

- |       |  |   |
|-------|--|---|
| (i)   | Redrawing of quadrilateral ABCD and joining DO...(3,1).....            | 4 |
| (ii)  | Conversion of ABCD into triangle leaving D &(AB or BC)<br>intact... .. | 4 |
| (iii) | Division of base in the ratio of 2:3 .....                             | 4 |
| (iv)  | Joining O to division point and drawing parallel from D...(3,4).....   | 7 |
| (v)   | Completion of division .....   | 2 |

*or*

- |       |   |   |
|-------|---|---|
| (i)   | Redrawing of quadrilateral ABCD and joining DO...(3,1).....                               | 4 |
| (ii)  | Division of AC in the ratio of 2:3 .....  | 4 |
| (iii) | Drawing line parallel to DB through division point to locate<br>point on AB (or BC) ..... | 5 |
| (iv)  | Joining O to point on AB (or BC) and drawing parallel from D(2,4)..                       | 6 |
| (v)   | Completion of division .....  | 2 |

**Total****50**

**QUESTION 3****MARKS****(a) Cone A and 1<sup>st</sup> sphere**

- (i) Plan and Elevation of cone and plan of point P ..... 6
- (ii) Location of P at edge of cone in elevation or auxiliary view..... 4
- (iii) Drawing of perpendicular at P..... 3
- (iv) Bisection of angle between cone edge and XY line..... 4
- (v) Locate centre in plan and elevation and draw projections ..... 4

**(b) Tangent Plane**

- (i) Elevation and plan of circumscribing cone about 1<sup>st</sup> sphere (3,2).. ..... 5
- (ii) Horizontal trace tangential to both circles.....(1,1)..... 2
- (iii) Construct and draw vertical trace .....(1,1)..... 2

**(c) Projections of 2<sup>nd</sup> sphere**

- (i) Draw and extend line OQ in plan..... 2
- (ii) Location of Q at edge of cone in elevation or auxiliary view ..... 2
- (iii) Drawing of perpendicular at Q in elevation or auxiliary view..... 1
- (iv) Drawing lines parallel to VP in plan(or other set of valid lines/arcs).. 3
- (v) Drawing second set of corresponding lines/arcs ..... 5
- (vi) Drawing of correct locus and location of centre in elevation..(1,2).... 3
- (vii) Drawing required projections of correct sphere (incl. hidden detail) .. 4

**Total****50**

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

- |       |  |   |
|-------|--|---|
| (i)   | Drawing outline plan of square based pyramid.....                  | 3 |
| (ii)  | Drawing outline elevation of cut pyramid.....                      | 5 |
| (iii) | Drawing of cut surface in plan.....                                | 2 |
| (iv)  | Drawing outline elevation of inclined prism...(3,1).....           | 4 |
| (v)   | Transfer of widths to plan.....                                    | 3 |
| (vi)  | Completion of outline plan (including ends and hidden detail)..... | 4 |

**Interpenetration**

- |        |   |    |
|--------|---|----|
| (vii)  | Drawing edge 1 unbroken in elevation and plan.....                  | 2  |
| (viii) | Determining points A, B, C, D & E in elevation and plan...(5x2) ... | 10 |
| (ix)   | Determining points P, Q & R in elevation and plan...(3x1).....      | 3  |
| (x)    | Determining points S & T in elevation and plan...(2x2)..            | 4  |
| (xi)   | Joining points in correct order.....                                | 4  |
| (xii)  | Completion of drawing (hidden detail).....                          | 6  |

<b>Total</b>	<b>50</b>
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**QUESTION 5**

**MARKS**

**(a) Plotting of curve**

- (i) Drawing figure as given ..... 3
- (ii) Dividing arc PCA into a number of equal parts (9 min)..... 3
- (iii) Dividing semi-circle POA into a number of equal parts (9 min)..... 3
- (iv) Stepping distances to locate B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub> etc ..... 2
- (v) Erection of perpendiculars to locate O<sub>1</sub>, O<sub>2</sub>, O<sub>3</sub> etc..... 2
- (vi) Drawing arcs C<sub>1</sub>-P<sub>1</sub>, C<sub>2</sub>-P<sub>2</sub> etc from B<sub>1</sub>, B<sub>2</sub> etc. respectively ..... 9
- (vii) Drawing arcs O-P<sub>1</sub>, O-P<sub>2</sub> etc from O<sub>1</sub>, O<sub>2</sub> etc..... 9
- (viii) Location of turning point T on horizontal line from O ..... 4
- (ix) Plotting of correct curve....(Any = 1) ..... 3

**(b) Semi-circle and Involute**

- (i) Redrawing of semi-circle POA ..... 1
- (ii) Dividing semi-circle POA into a number of equal parts (6 min)..... 1
- (iii) Drawing of tangents at ends of dividing lines..... 3
- (iv) Completion of involute locating P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub> etc ..... 6
- (v) Plotting of correct curve ..... 1

**Total** **50**

**QUESTION 6**

**MARKS**

- (a) (i) Drawing straight line AFB ..... 3  
 (ii) Drawing arcs from A and B equal to AF and BF resp ..... 4  
 (iii) Drawing directrix tangential to both arcs...(2,1) ..... 3  
 (iv) Drawing axis and locating points on curve...(min 2 + vertex)..... 6  
 (v) Drawing curve...(Any = 1) ..... 3

**Centre of Curvature**

- (vi) Drawing of normal at point A...(2,2)..... 4  
 (vii) Determining centre of curvature...(2,2)..... 4

- (b) (i) Drawing lines AD and AB and locating point C..... 3  
 (ii) Drawing perpendicular from C or D to AB..... 5  
 (iii) Locating centre of ellipse ..... 2  
 (iv) Locating points on curve... ..... 4  
 (v) Drawing portion of the curve...(Any = 1) ..... 2

**Point of Contact**

- (vi) Construction for determining point of contact between tangent and curve ..... 7

**Total** **50**



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

- (i) Drawing plan of pyramid resting on H.P ..... 4
- (ii) Auxiliary direction and  $X_1Y_1$ .....(2,1)..... 3
- (iii) Rotated pyramid in auxiliary elevation ..... 4
- (iv) Required plan of pyramid (2 further points and apex)..... 3
- (v) Drawing elevation of pyramid including hidden detail...(4,1)..... 5

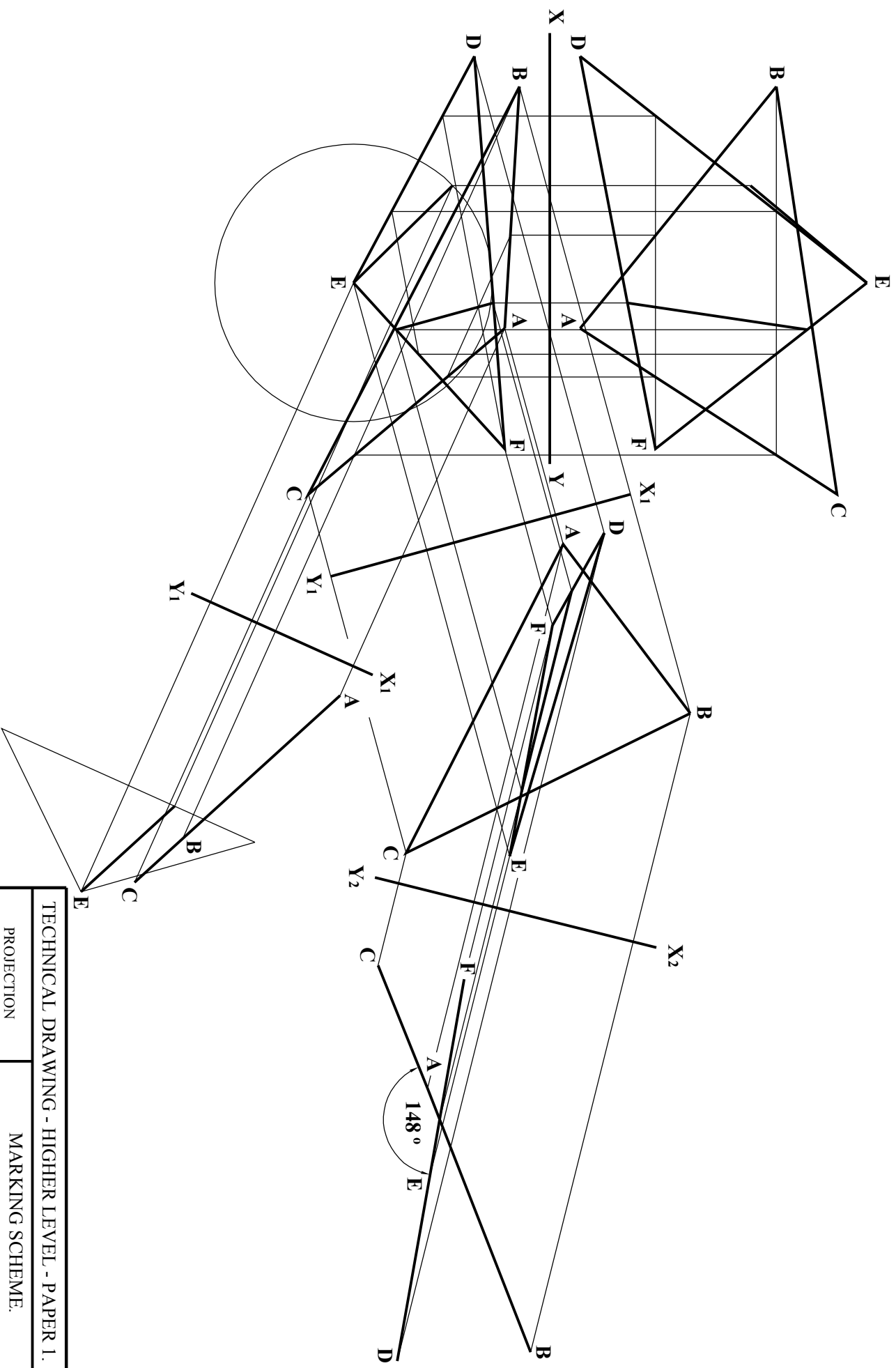
**(b) Cut surface**

- (i) Setting up of VTH..... 2
- (ii) Auxiliary direction and  $X_1Y_1$ .....(2,1)..... 3
- (iii) Edge view of plane ..... 3
- (iv) Identification of cut surface in auxiliary view...(5x1)..... 5
- (v) Cut surface in plan and elevation ..... 5
- (vi) Completion of plan and elevation ..... 5

**(c) Angle of inclination**

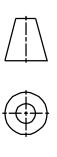
- (i) Horizontal line in elevation (or h.t. of OB)..... 2
- (ii) Auxiliary direction and  $X_1Y_1$ .....(2,1)..... 3
- (iii) Projection of ABO on  $X_1Y_1$  and indicating angle...(2,1) ..... 3

**Total****50**



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PROJECTION

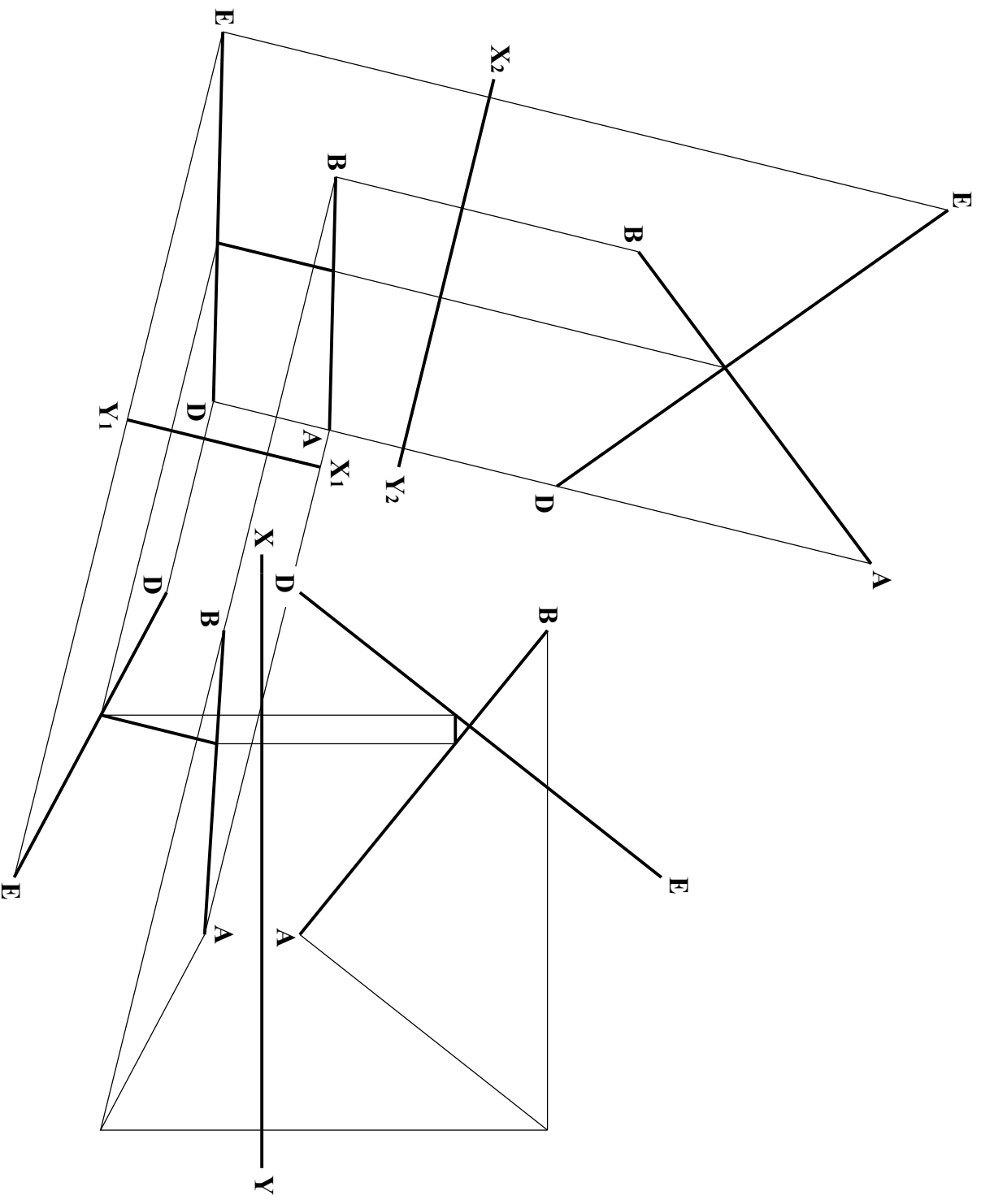


MARKING SCHEME.

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

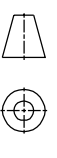
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PROJECTION

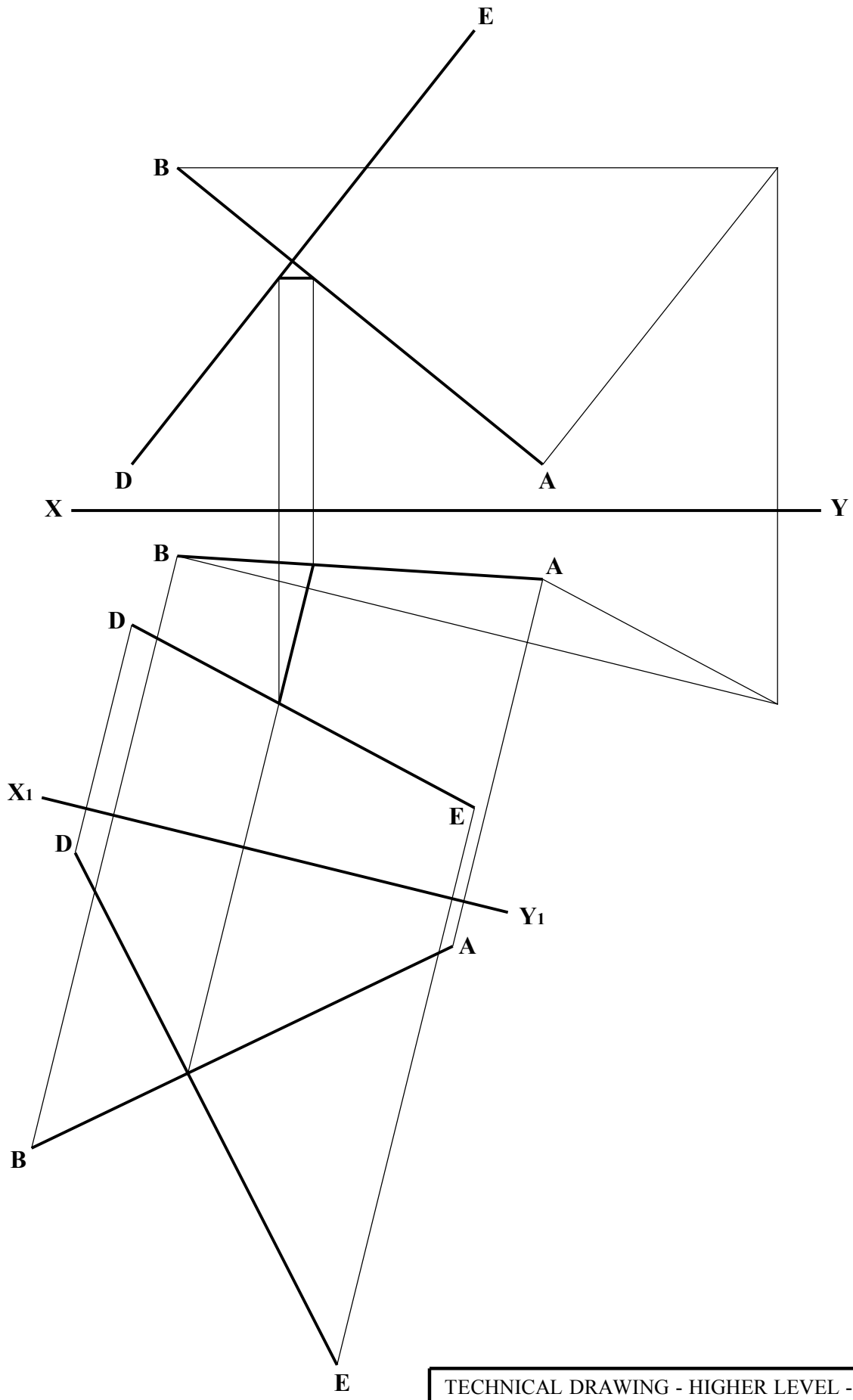


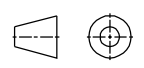
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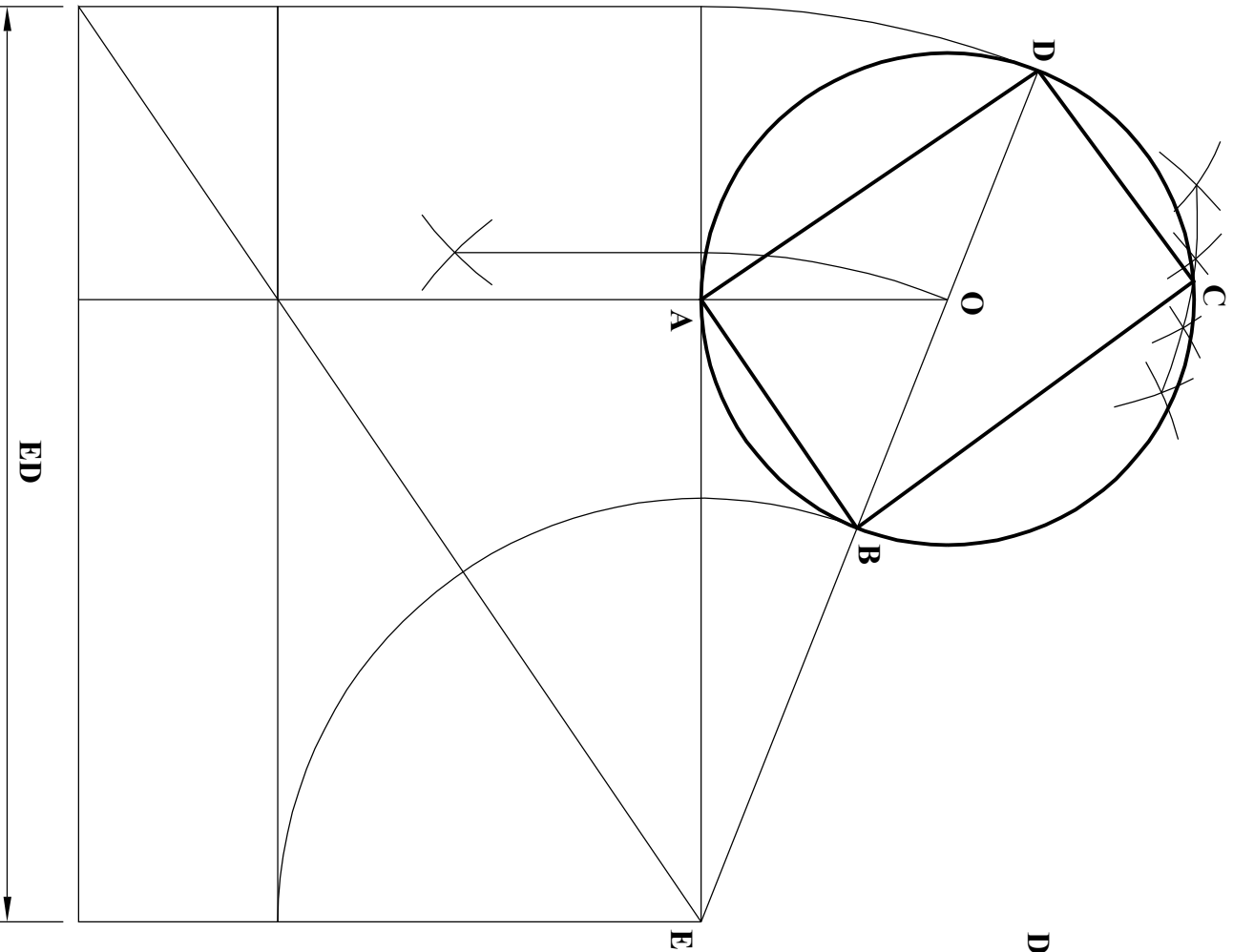
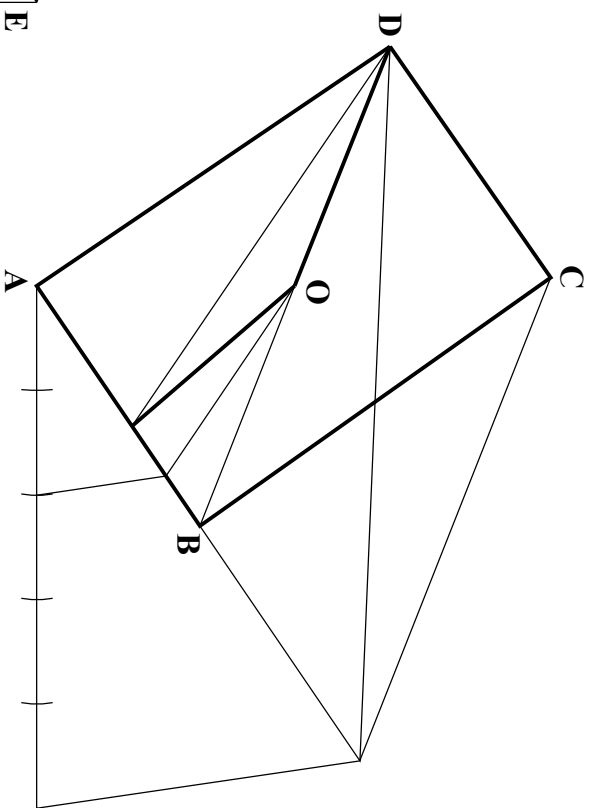
QUESTION 1(d)

SCALE: N/A.

DATE: JUNE 2002.



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PROJECTION	MARKING SCHEME.
	QUESTION 1(d).
SCALE: N/A.	DATE: JUNE 2002.

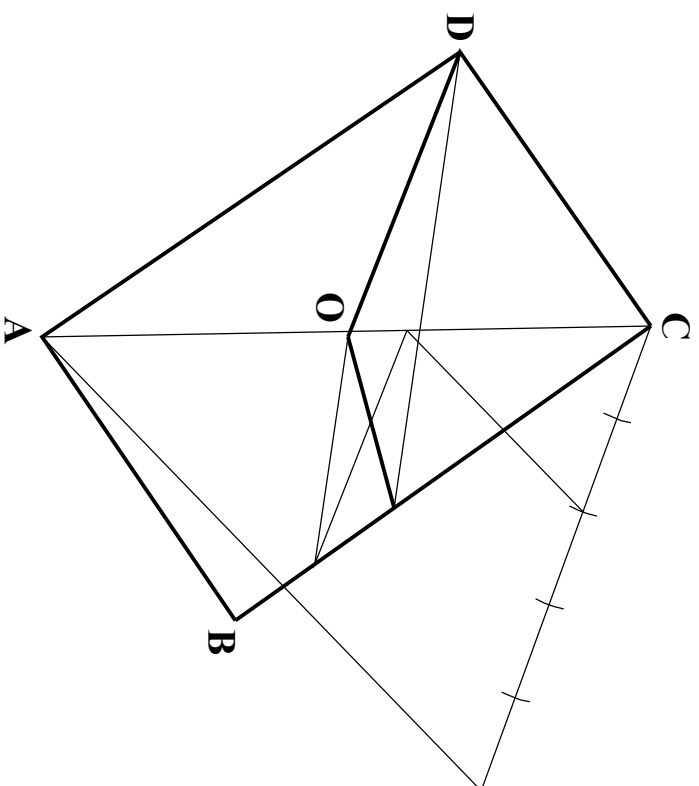
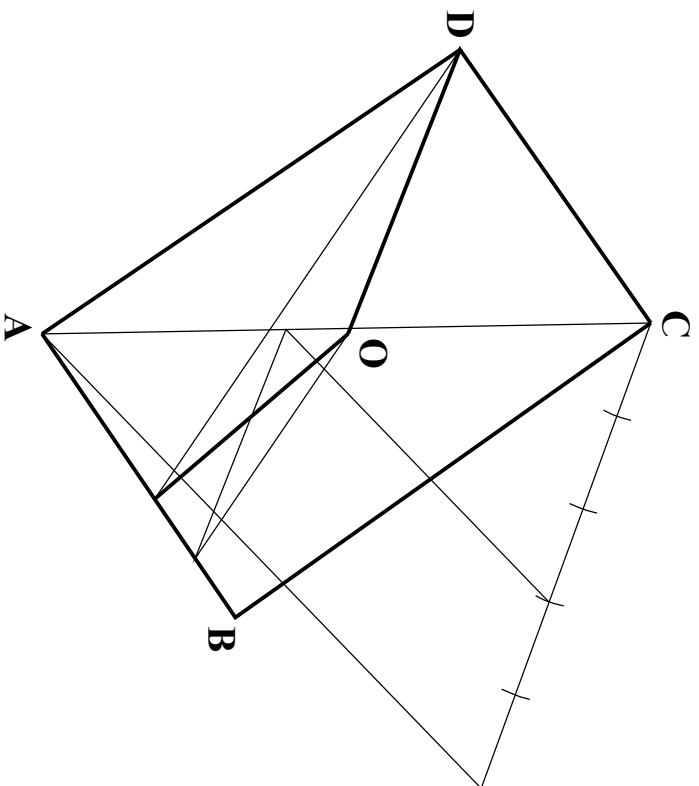


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MARKING SCHEME.

QUESTION 2.

SCALE: N/A. DATE: JUNE 2002.



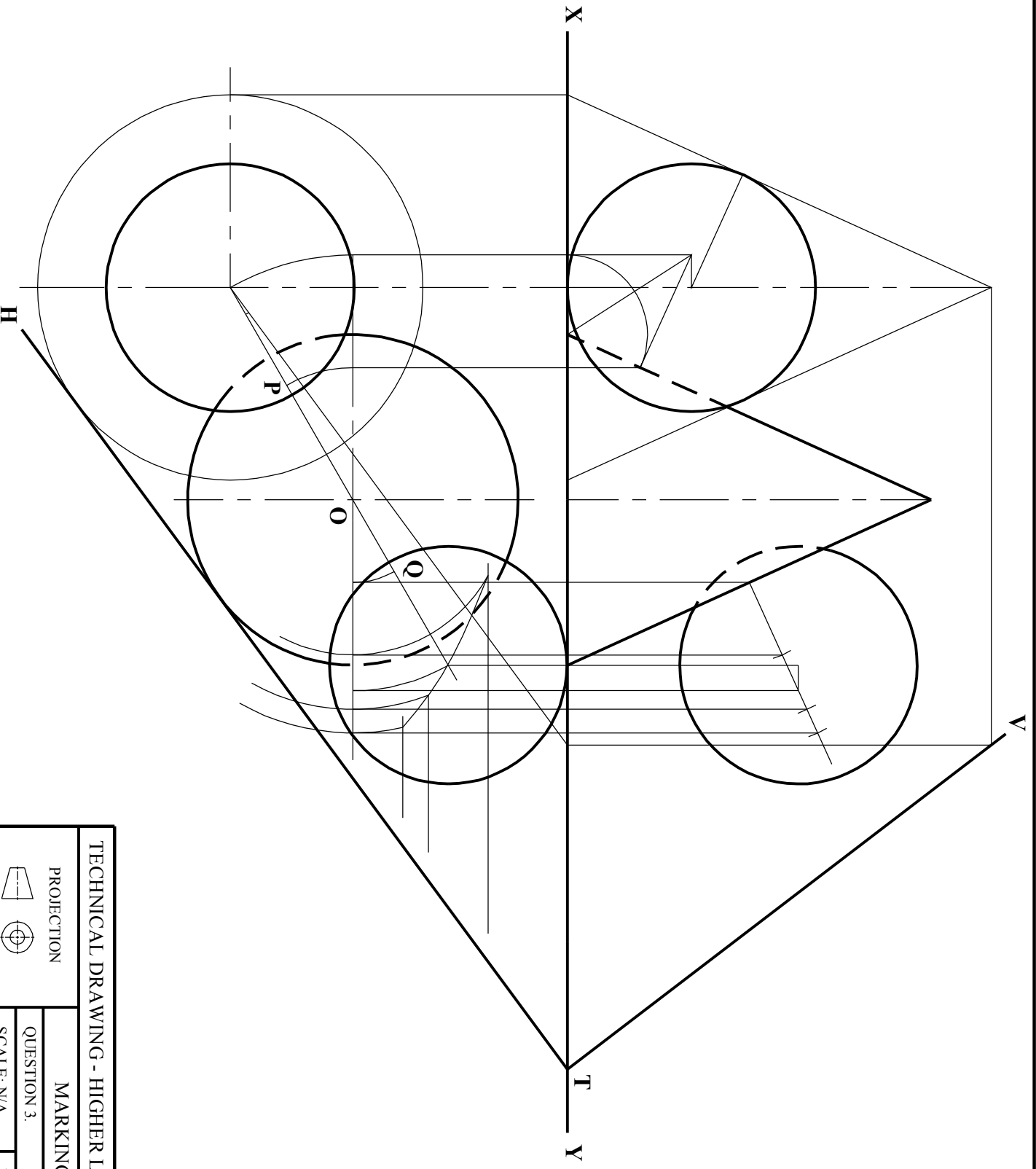
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MARKING SCHEME.

QUESTION 2.

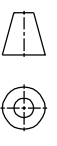
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PROJECTION

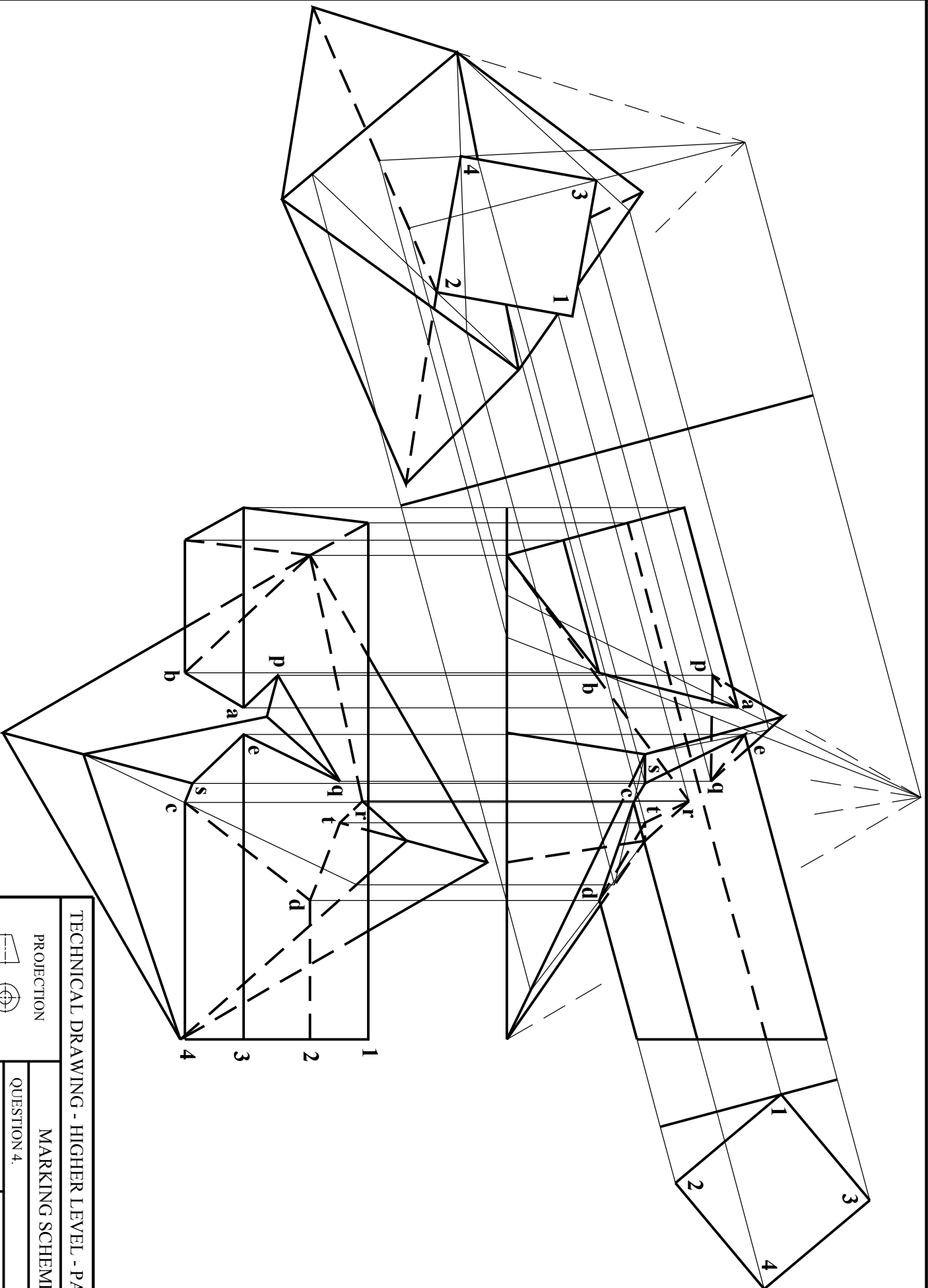


MARKING SCHEME.

QUESTION 3.

SCALE: N/A.

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PROJECTION



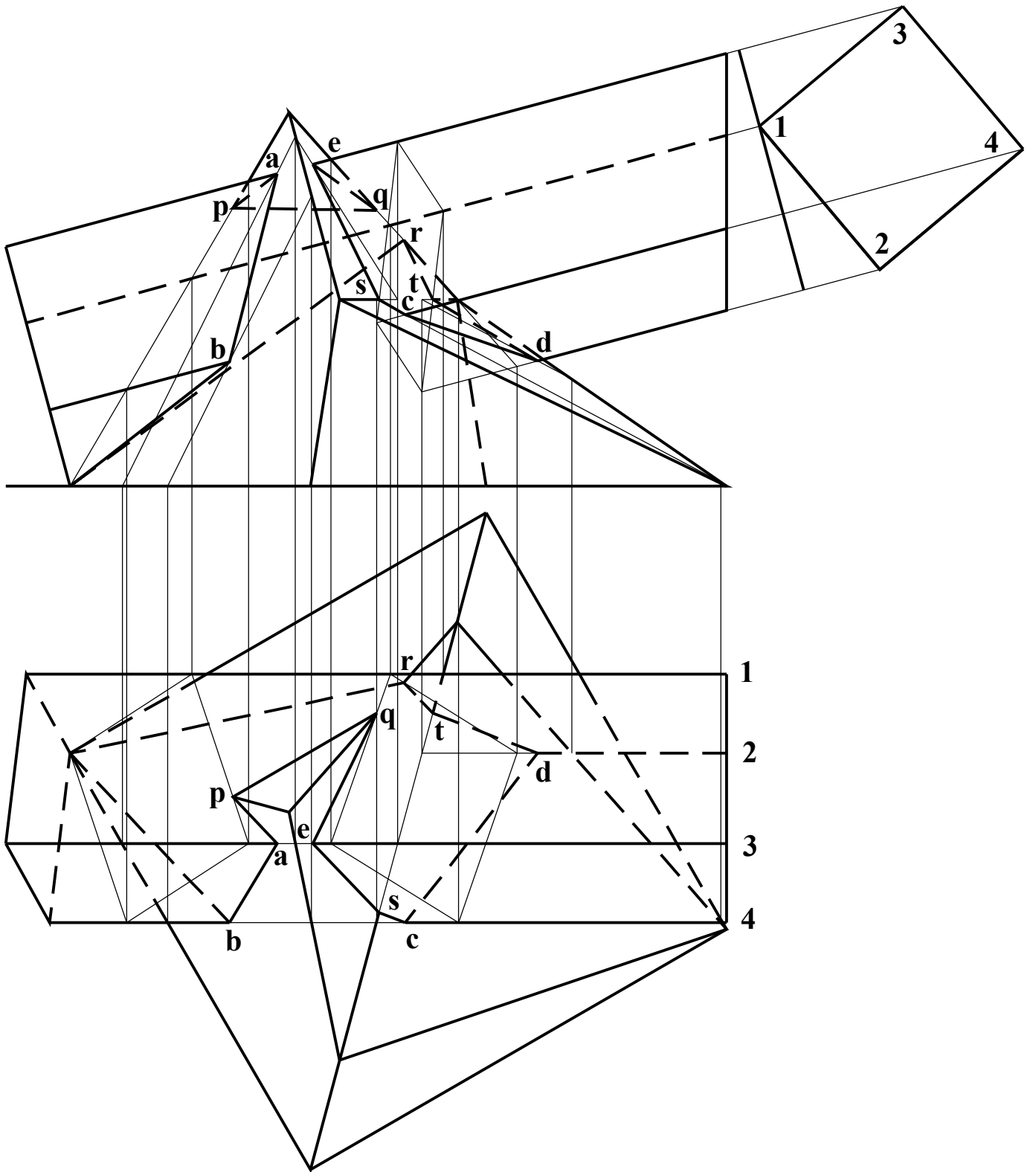
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QUESTION 4.

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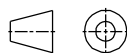
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PROJECTION

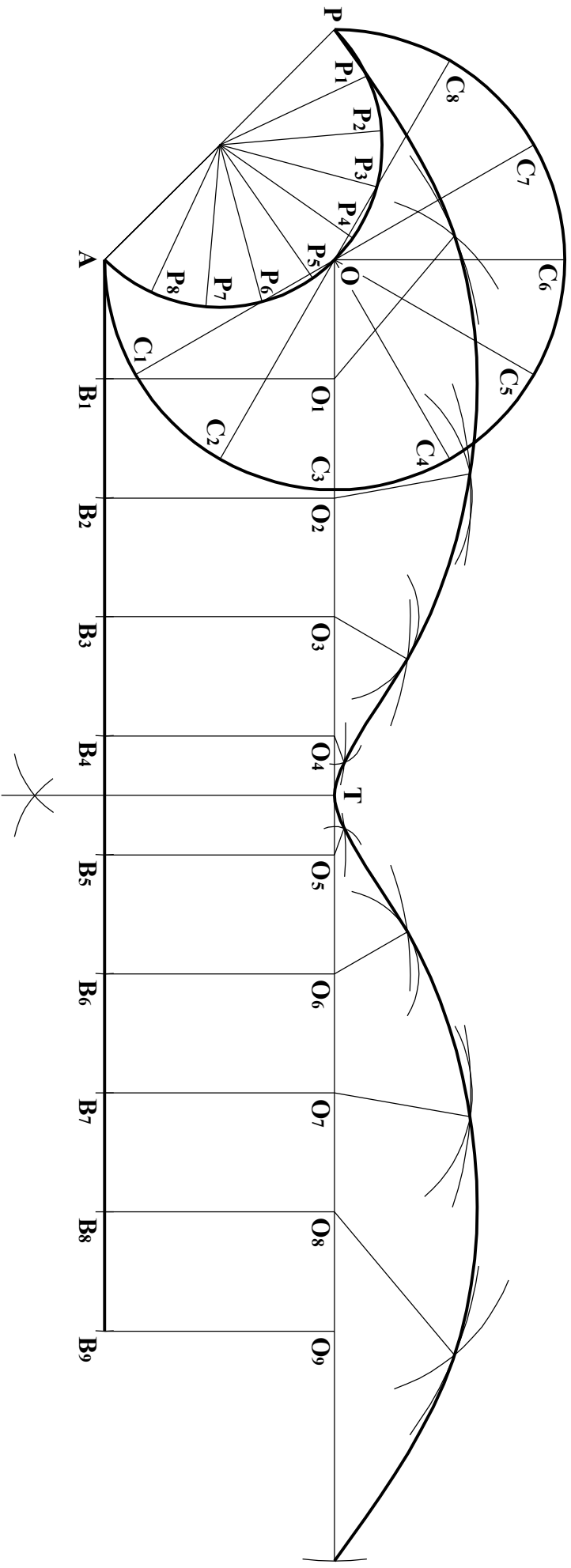


MARKING SCHEME.

QUESTION 4.

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DATE: JUNE 2002.



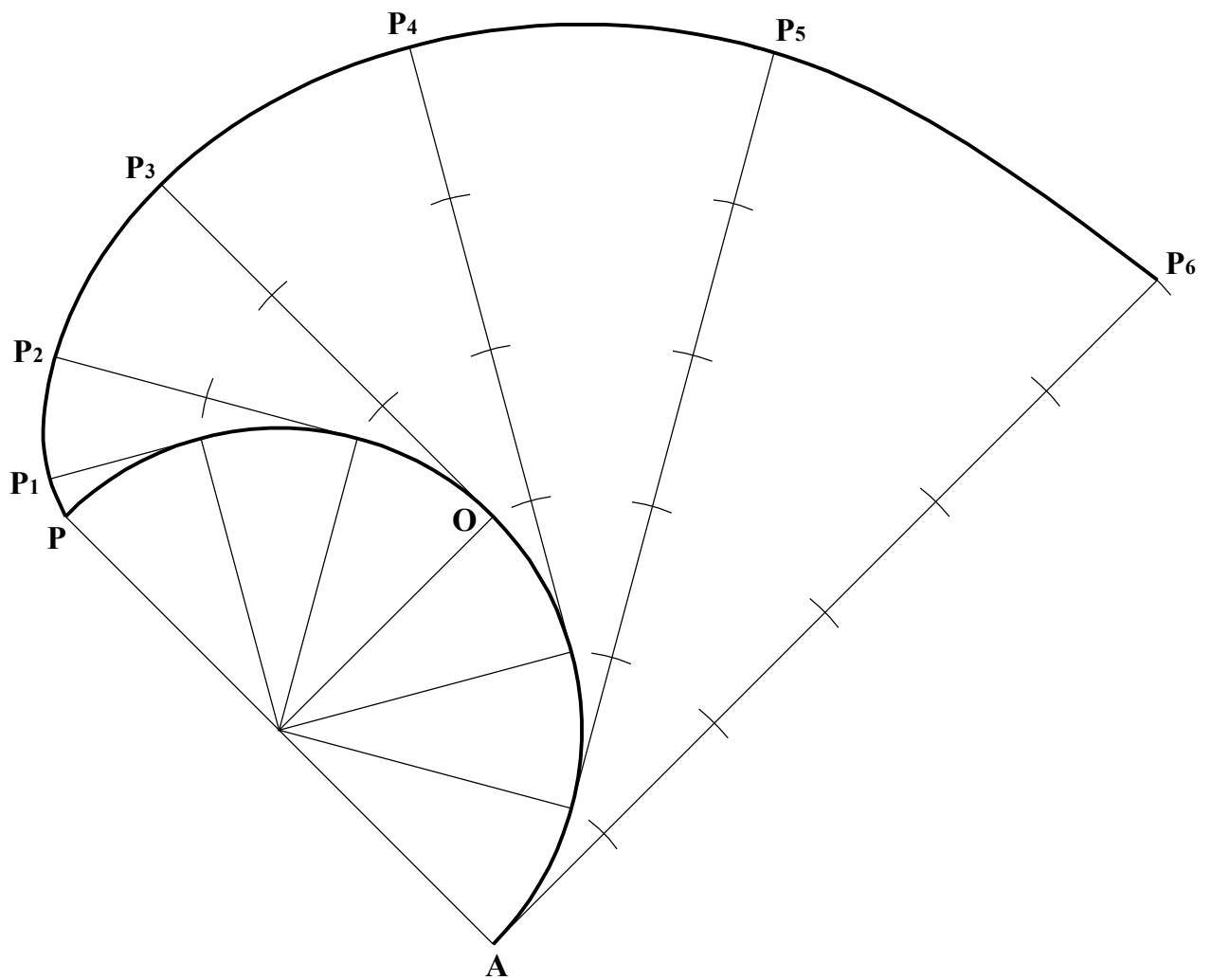
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MARKING SCHEME.

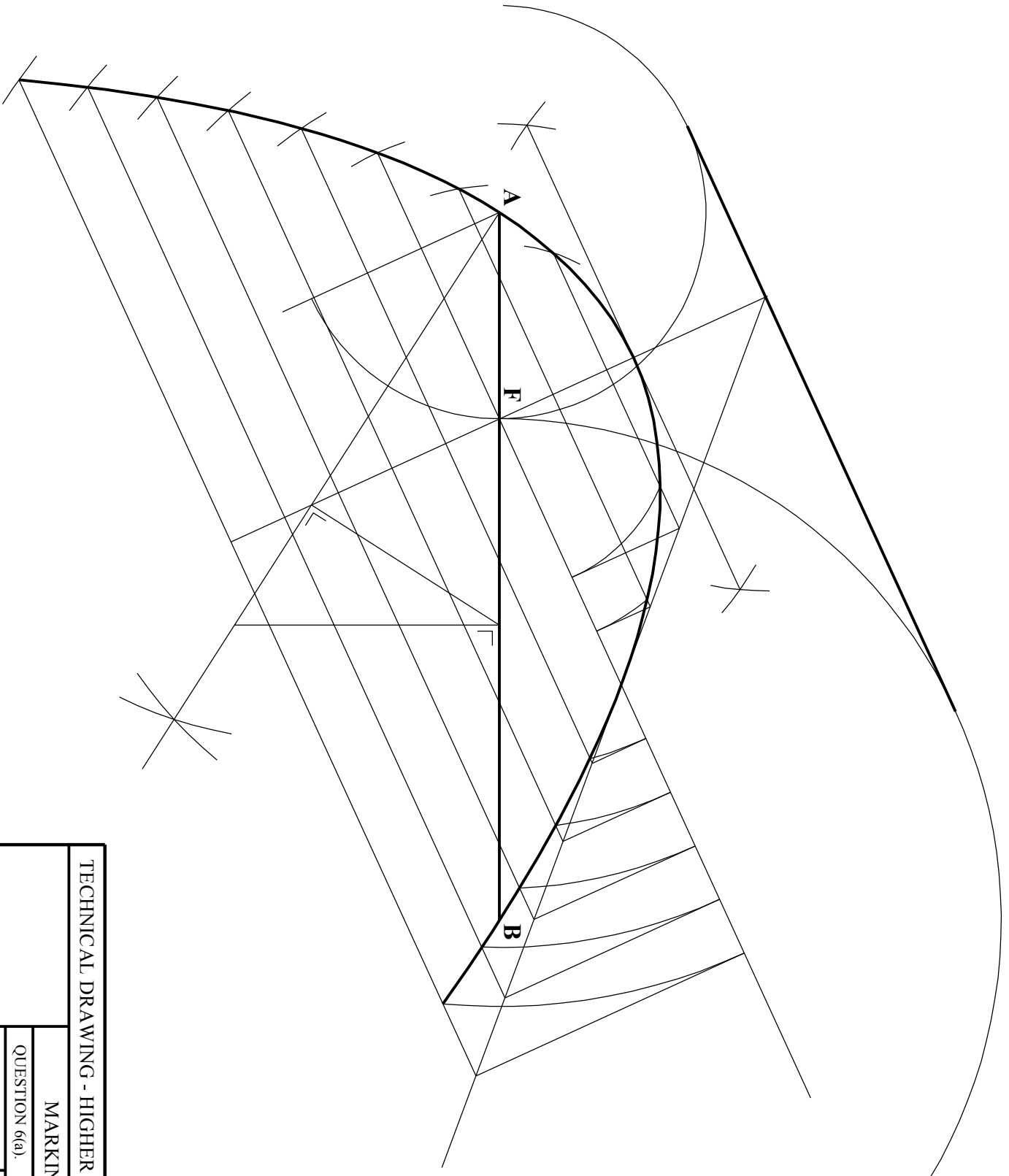
QUESTION 5(a).

SCALE: N/A.

DATE: JUNE 2002.



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	QUESTION 5(b).	
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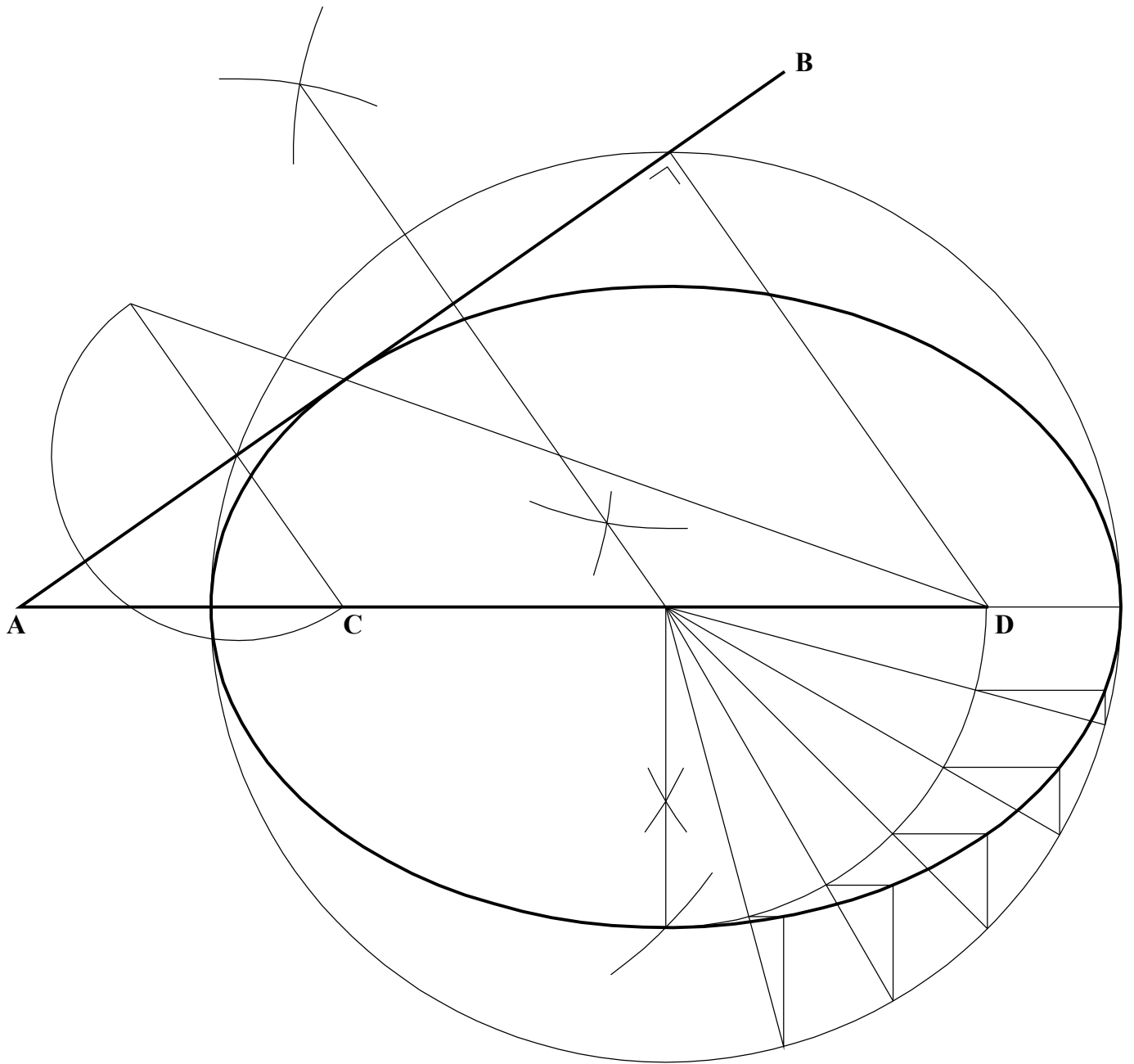


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MARKING SCHEME.

QUESTION 6(a).

SCALE: N/A DATE: JUNE 2002.



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	MARKING SCHEME.	
	QUESTION 6(b).	
	SCALE: N/A.	DATE: JUNE 2002.

