JUNIOR CERTIFICATE EXAMINATION

2002

TECHNICAL GRAPHICS — HIGHER LEVEL

MARKING SCHEME
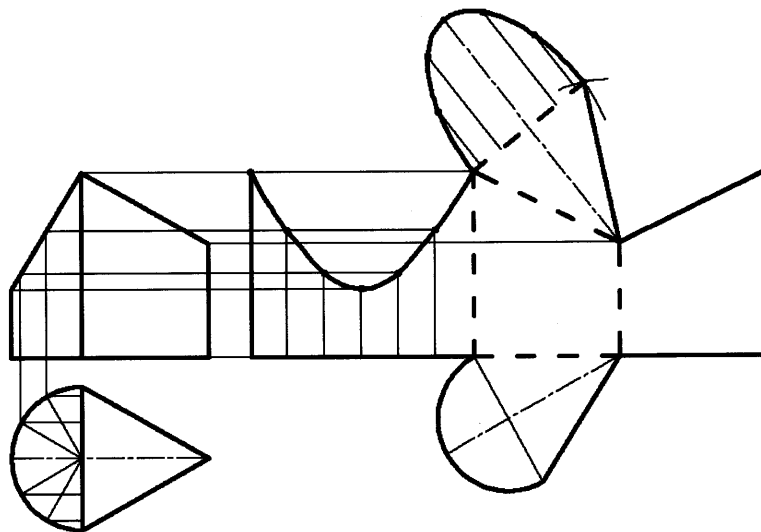
Section A

| Q1.	12	Four diagrams, 3 marks for each correct label
Q2.	4	Bisect any two angles
	4	Locate centre and draw circle (deduct 1 mark for poor contact with sides).
	4	Determine the three points of contact by drawing normals (2,1,1)
Q3.	6	Extend command
	6	Chamfer command
Q4.	4	Elevation (Deduct 1 mark if internal lines are omitted) N.B. <u>Position</u>.
	4	Plan (Deduct 1 mark if internal lines are omitted) N.B. <u>Position</u>.
	4	End View (Deduct 1 mark if internal lines are omitted) N.B. <u>Position</u>.
Q5.	4	Use of relevant angle (36° or 54° or 72°)
	4	Fixing position and length for one edge of pentagon
	4	Drawing the remaining four edges
Q6.	12	Twelve lines required, 1 marks each
Q7.	4	Locus of points 10mm from circumference of circle
	4	Locus of points 15mm from line L.
	4	Fixing and indicating the required point P. (-2 marks if not indicated)
Q8.	6	Projections required to complete end view. (From plan and elevation)
	6	Completion of end view. N.B. <u>Hidden detail</u>.
Q9.	4	Constructing a dividing line (connected to one end of the given line L).
	4	Setting out the required number of parts on the dividing line (Nine in total).
	4	Locating the required divisions on the given line L.
Q10.	4	Locating centre of major axis and drawing major circle. (2 marks each).
	4	Construction to determine a point on the auxiliary minor circle.
	4	Drawing of minor axis showing correct position and length (2 marks each).
Q11.	12	Model plane correctly depicted in a <u>good quality</u> freehand pictorial sketch
Q12.	12	Shading used appropriately and <u>effectively</u> to enhance the given sketch.
Q13.	4	Rotating side length in line with base line.
	4	Determining centre and drawing the required semi-circle.
	4	Fixing the mean proportional length and drawing the resultant square.
Q14.	4	Three arcs drawn in an <u>anti-clockwise</u> direction with centre P.
	4	Locating the six image points. (Deduct 1 mark if 60° angle is not used).
	4	Drawing of the image figure.
Q15.	12	If lower case letters <u>or</u> sub-numbering is not used deduct 2 marks.

Section B

Q.1 Section B — Orthographic Projection
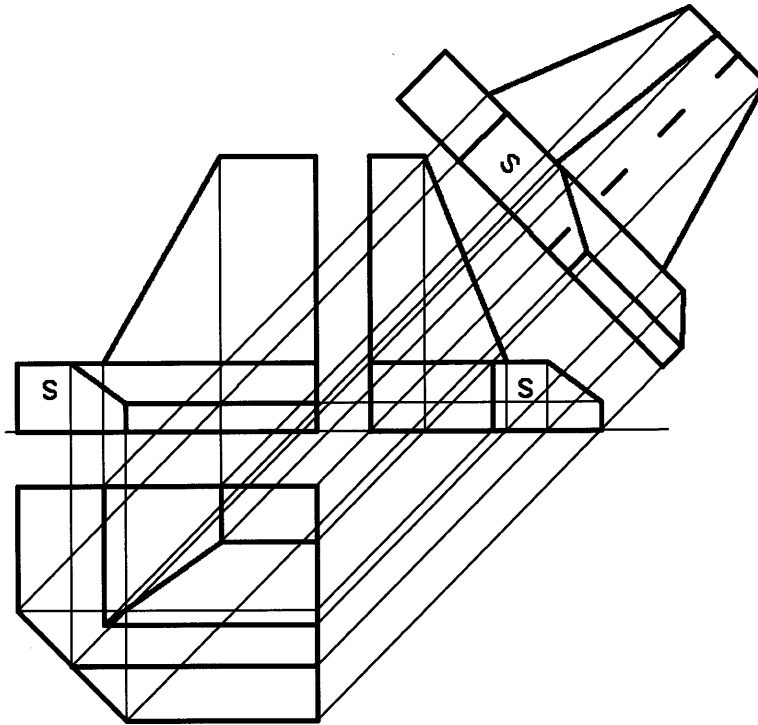
|	
11	**Elevation (11)** Seven orthogonal lines @ 1 mark each, two sloping lines @ 2 marks each.
10	**End View (10)** Six orthogonal lines @ 1 mark each, two sloping lines @ 2 marks each.
13	**Plan (13)** Nine orthogonal lines @ 1 mark each, two sloping lines @ 2 marks each.
	Auxiliary Elevation (28)
2	X1—Y1 (deduct 2 marks for incorrect angle)
3	Projections from plan (Deduct 2 marks if not perpendicular to X1—Y1)
3	Applying three heights, taken from elevation.
6	Surface S in auxiliary elevation (2 marks for sloping line).
14	Remainder of auxiliary elevation (broken line & sloping lines @ 2 marks each).
8	**Draughtsmanship**

Total marks = 70

Q.2 Section B — Solids in Contact
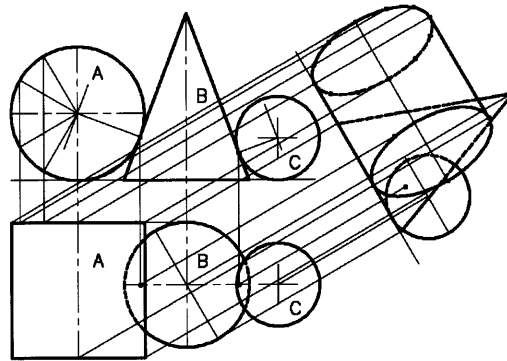
|	Cone B in elevation and plan as given (5)
2	Plan of Cone B
3	Elevation of Cone B
	Cylinder A in elevation and plan as given (11)
4	Location of centre in elevation. (2 marks for each locus required).
2	Elevation of Cylinder A.
5	Plan of Cylinder A (1 mark for position and 1 mark per line)
	Sphere C in elevation and plan as given (9)
4	Location of centre in elevation. (2 marks for each locus required).
2	Elevation of Sphere C
3	Plan of Sphere C (1 mark for position and 2 marks for drawing).
	Auxiliary Elevation of Solids (25)
3	X1—Y1 (deduct 2 marks for incorrect angle)
3	Projections from plan (deduct 2 marks if not perpendicular to X1—Y1)
3	Auxiliary elevation of Cone B.
10	Auxiliary elevation of Cylinder A. (2 marks for outline, 8 marks for ends).
2	Auxiliary elevation of Sphere C.
4	Hidden detail in Auxiliary Elevation. (1 mark each).
	Points of Contact (12)
4	Points of contact in elevation. (2 marks for normals, 2 marks for location).
4	Points of contact in plan. (2 marks for projections, 2 marks for location).
4	Points of contact in auxiliary. (2 marks for projections, 2 marks for heights).
8	**Draughtsmanship**

Total marks = 70

Q.3 (a) Section B — Isometric Projection (Axonometric Axes Method)
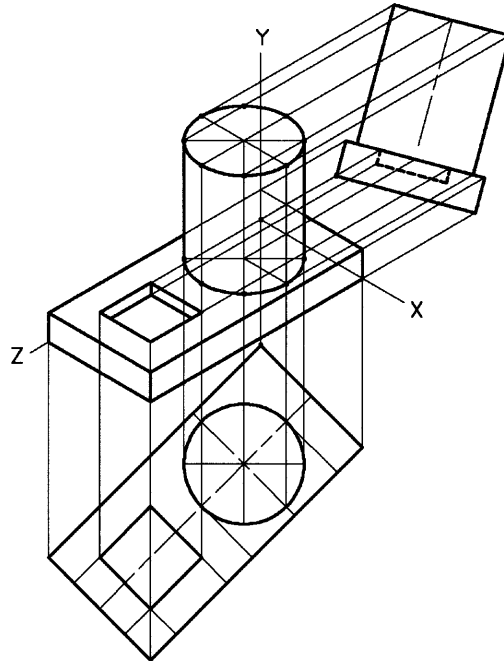
|	Axonometric Axes Method
3	Axes (1,1,1)
	Plan (12)
2	Setting-up (position and orientation at 45°).
10	Completion of plan (8 for lines, 2 for circle).
	Side Elevation (12)
2	Setting-up (position and orientation at 15°).
10	Completion of side elevation (1 mark per line).
	Completion of Isometric Projection (35)
9	Outline of base block excluding recess. (1 mark per line).
7	Recess in base block. (1 mark per line).
4	Outline of cylinder (2 marks for fixing projections in plan, 1 mark per side).
8	Fixing an adequate number of points for the top and bottom of the cylinder.
4	Drawing the top curve on cylinder (smooth, accurate curve required).
3	Drawing the bottom curve on cylinder (smooth, accurate curve required).
8	**Draughtsmanship**

Total marks = 70

Q.3 (b) Section B — Isometric Projection (Isometric Scale Method)
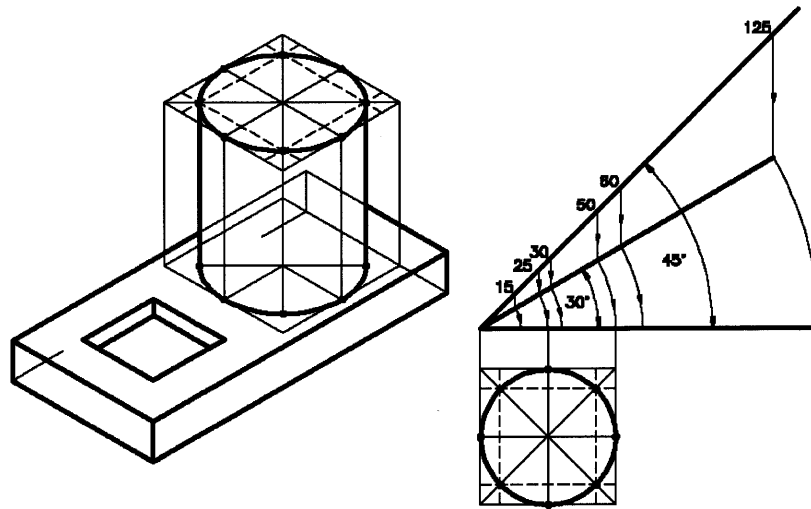
Isometric Scale Method	
Isometric Scale (12)	
4	Setting up isometric scale (2 marks for 30° line and 2 marks for 45° line)
4	Applying dimensions on 45° line
4	Projecting from 45° line onto 30° line
Projection of Cylinder (6)	
2	Drawing base circle of cylinder as a separate diagram.
4	Division of base circle in order to assist in the location of points.
Isometric Projection (9)	
3	Direction of axes (1,1,1)
6	Axes lengths applied from isometric scale (2,2,2). Deduct 3 marks if full size.
Completion of Isometric Projection (35)	
9	Outline of base block excluding recess. (1 mark per line).
7	Recess in base block. (1 mark per line).
4	Outline of cylinder (2 marks for fixing projections in plan, 1 mark per side).
8	Fixing an adequate number of points for the top and bottom of the cylinder.
4	Drawing the top curve on cylinder (smooth, accurate curve required).
3	Drawing the bottom curve on cylinder (smooth, accurate curve required).
8	**Draughtsmanship**

Total marks = 70

Q.4 Section B — Development
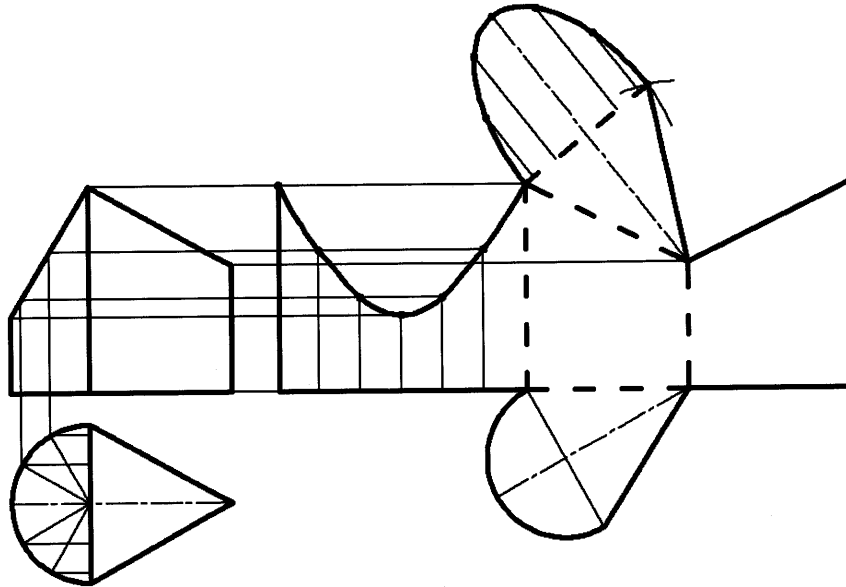
	Given views (15)
5	Plan (1 mark per line, 2 marks for semi-circle).
6	Elevation (1 mark per line).
4	Division of curved side in the given views to facilitate development.
	Development (47)
10	Flat sides (2 marks for determining width, 4 marks for drawing each side).
13	Development of curved side. (4 for heights, 4 for widths, 5 for drawing side).
4	Base of container. (1 mark per line, 2 marks for semi-circle).
5	Triangular top surface. (2 marks for required true length, 1 mark per line).
11	Semi-elliptical top surface. (4 for widths, 4 for lengths, 3 for drawing surface).
2	Indicating fold lines (Use of broken lines).
2	Layout of development (Zero if all surfaces are drawn separately).
8	**Draughtsmanship**

Total marks = 70

Q.5 Section B — Transformation Geometry
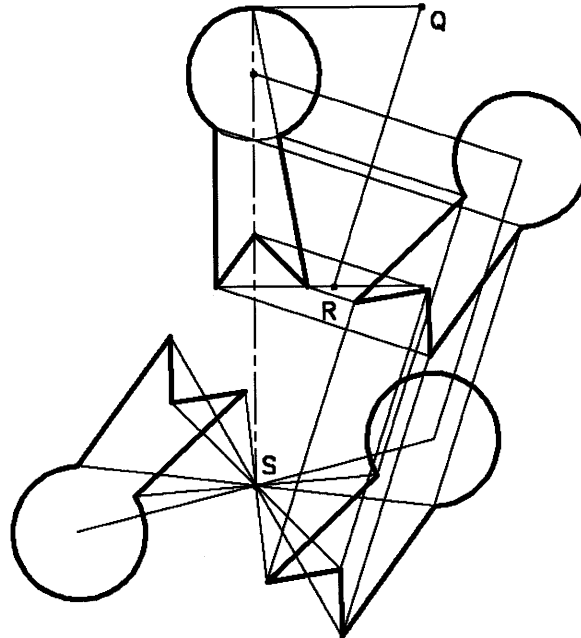
	Setting up (8)
6	Drawing the given figure of the rosette. (1 mark per line, 2 marks for circle).
2	Fixing the line QR and point S.
	Axial Symmetry (18)
6	Projecting perpendicular to line QR. (Deduct 2 marks if not perpendicular)
6	Locating six key image points. (1 mark per point).
6	Drawing the image figure accurately (1 mark per line, 2 marks for circle).
	Translation (18)
6	Lines projected parallel to QR. (1 mark per line).
6	Locating six key image points.
6	Drawing the image figure accurately (1 mark per line, 2 marks for circle).
	Central Symmetry (18)
6	Lines projected through point S.
6	Locating six key image points. (1 mark per point).
6	Drawing the image figure accurately (1 mark per line, 2 marks for circle).
8	**Draughtsmanship**

Total marks = 70

Q.6 Section B — Ellipse and Parabola
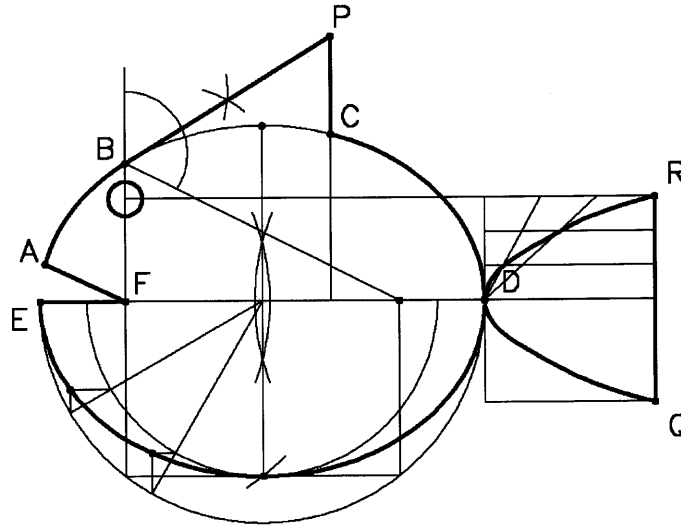
	Setting-up (6)
6	Setting-out six lengths as given.
	Ellipse (25)
9	Fixing minor axis. (8 marks for construction, 1 mark for drawing minor axis).
10	Locating points on the ellipse. (2,2,2,2,2 if concentric circles method is used).
6	Drawing the elliptical curve ABCDE (smooth, accurate curve required).
	Tangent BP (12)
2	Location of second focal point.
8	Construction of tangent at point B. (4 marks for angle, 4 marks for bisecting).
2	Drawing of tangent BP.
	Parabola (14)
8	Construction to determine points on the parabola. (2,2,2,2).
6	Drawing of parabola QDR and the line QR (smooth, accurate curve required).
	Completion (5)
5	Circle Ø10mm (2 marks) line AF at 25° (2 marks) and line CP (1 mark).
8	**Draughtsmanship**

Total marks = 70

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA   S61A

A JUNIOR CERTIFICATE EXAMINATION, 2002

TECHNICAL GRAPHICS — HIGHER LEVEL

SOLUTIONS

Examination Number	Centre Stamp
☞	☞

For Examiner's Use Only	
QUESTION	MARK
Section A (Total)	
Section B Q1	
Q2	
Q3	
Q4	
Q5	
Q6	
TOTAL ⮕	
GRADE ⮕	

1. Correctly fill in the labels for each of the diagrams by selecting from the table shown.

TABLE			
Nonagon	Square	Heptagon	Rhombus
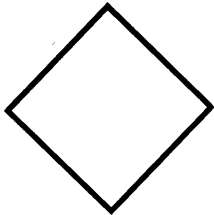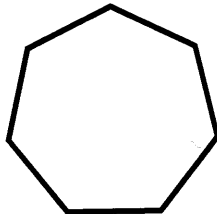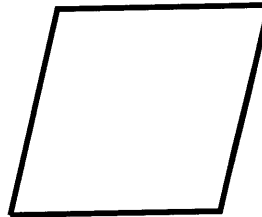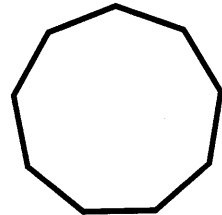
Square   Heptagon   Rhombus   Nonagon

2. Inscribe a circle in the triangle shown. Determine the points of contact.
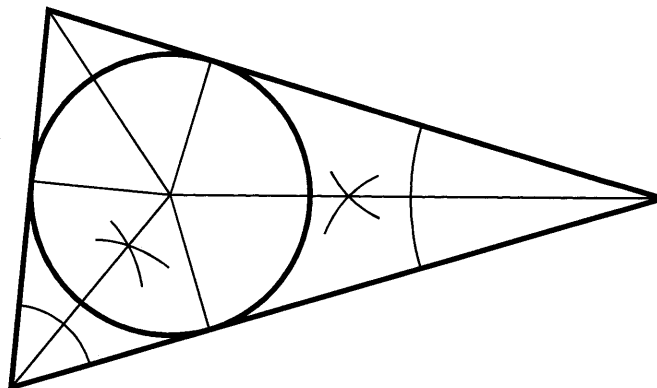
3. List the CAD commands used to edit the figure as shown in the sequence below.
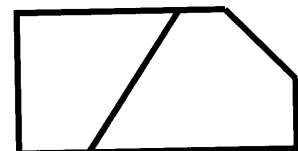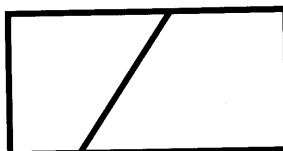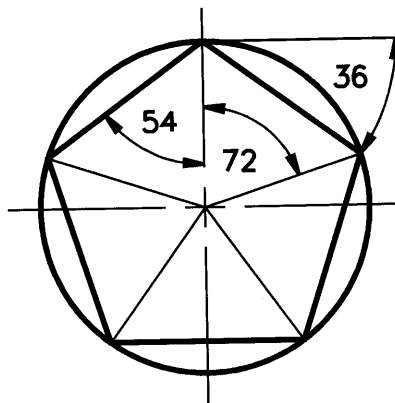
Editing commands used: <u>Extend</u>   <u>Chamfer</u>

4. Using the square grid, sketch the orthographic views when viewed in the direction of the arrows.
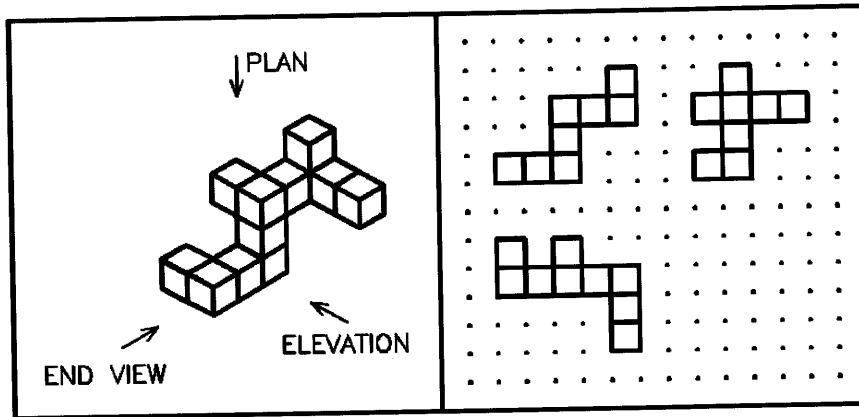
**5.** Inscribe a regular pentagon in the circle shown. Show all constructions required.

6. Shown on the square grid are three orthographic views of an object. The incomplete pictorial sketch of the object is shown on the isometric grid. Complete the pictorial sketch.
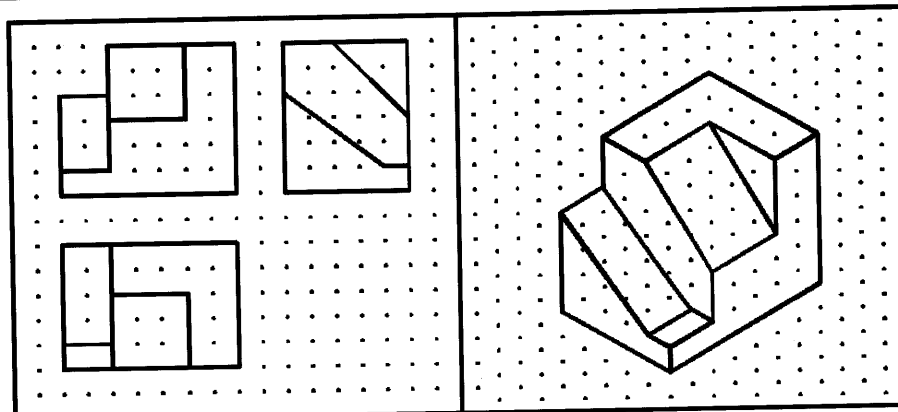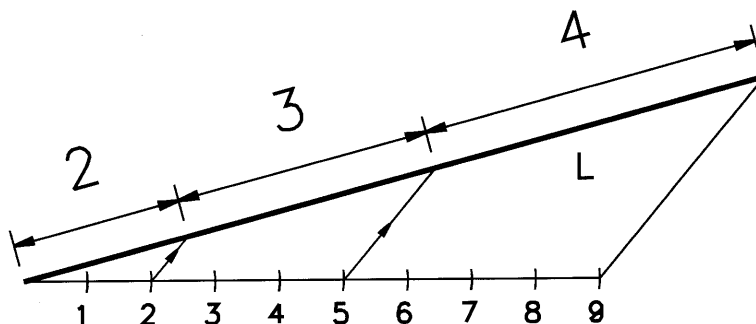
7. Shown is a circle with centre O and a line L. Locate a point P which is 10mm from the circumference of the circle and 15mm from the the line L.
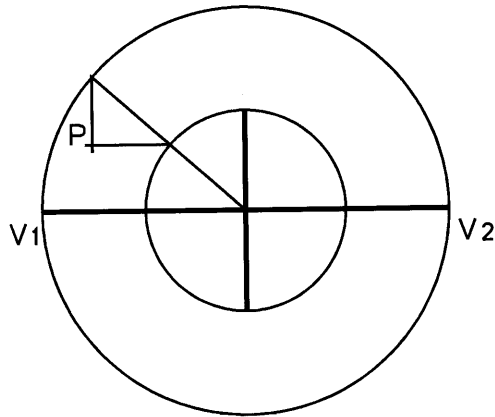
P

10

L

O

15
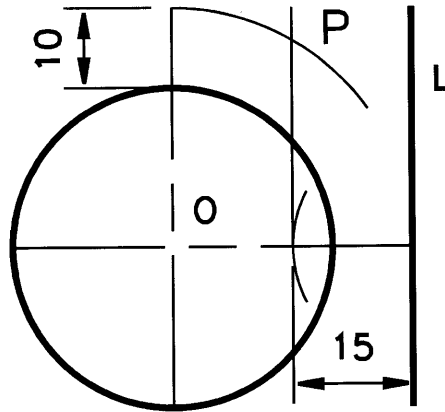
8. The elevation, plan and <u>incomplete</u> end view of a truncated solid are shown. Complete the end view.
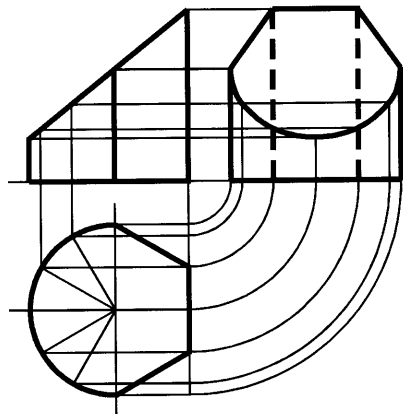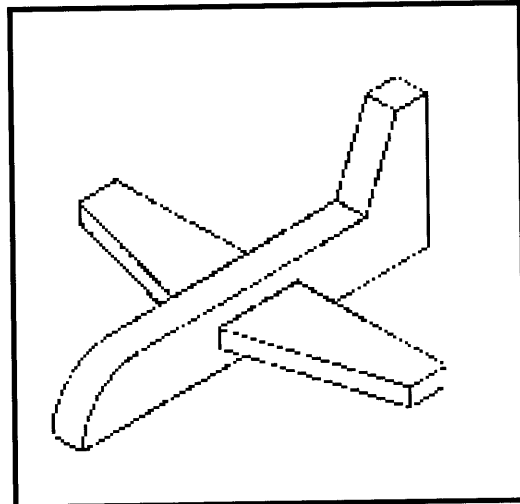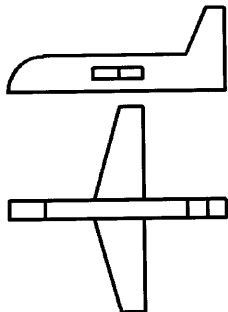
9. Divide the given line L in the ratio 2:3:4

4

3

2

L

1 2 3 4 5 6 7 8 9

10. Shown is the major axis V1— V2 of an ellipse and a point P which lies on the curve. Draw the minor axis to show its correct position and length.
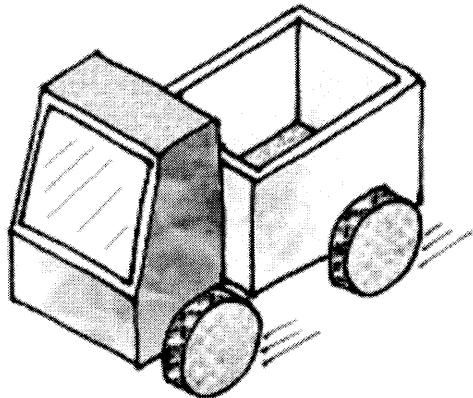

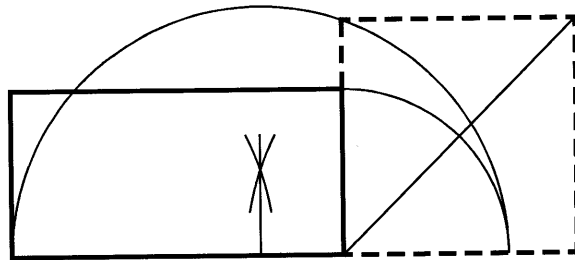**11.** Shown is the elevation and plan of a model plane.

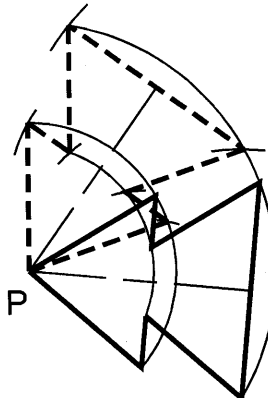Make a freehand pictorial sketch of the model plane in the space provided.

12. Apply shading to enhance the sketch of the toy truck shown.

13. Convert the given rectangle into a square of equal area.

14. Rotate the given figure anti-clockwise through 60° about point P.

P

15. The orthographic views of a shaped solid are shown. The sloping top surface has been indexed in plan. Index this surface in elevation and end view.

d' e'   e"   d"

b'   c'

c"

a' f'   b"

f"   a"

f   e

c

a   b   d