Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate 2015

Marking Scheme

Technical Graphics

Higher Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.
Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.
In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

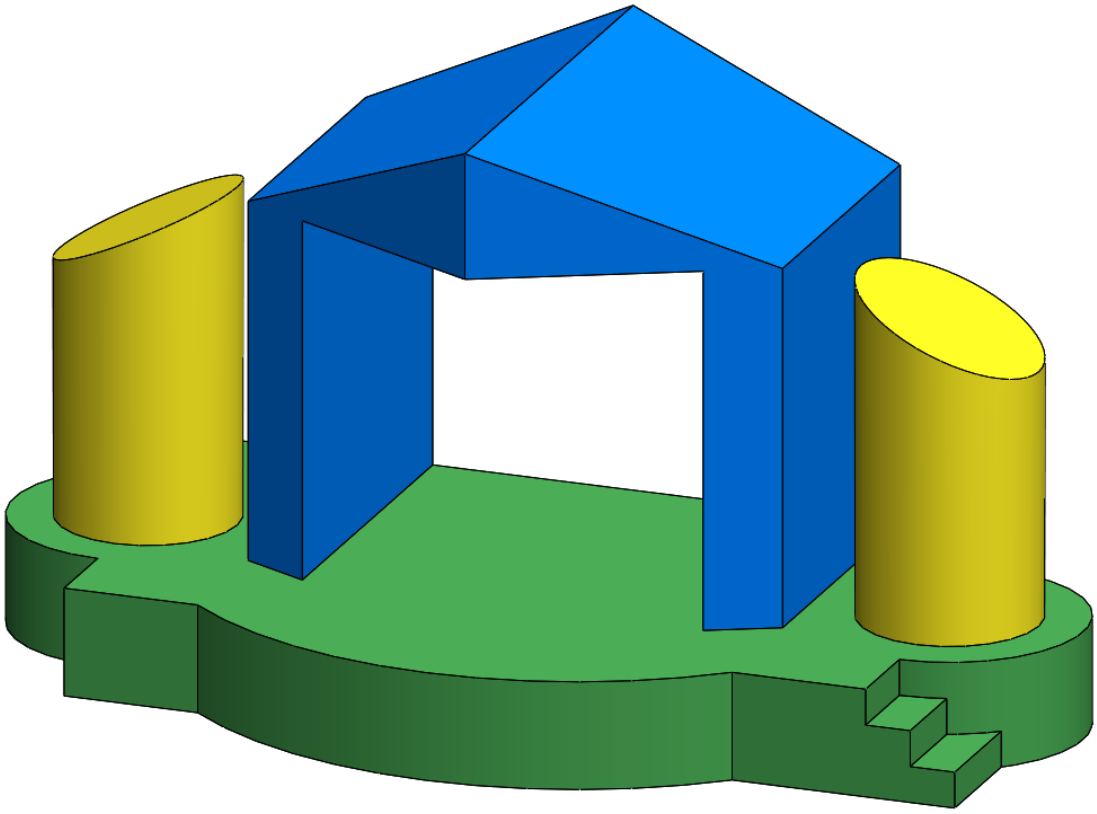
Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination, 2015

Technical Graphics



Higher Level
Marking Scheme

Section A and Section B

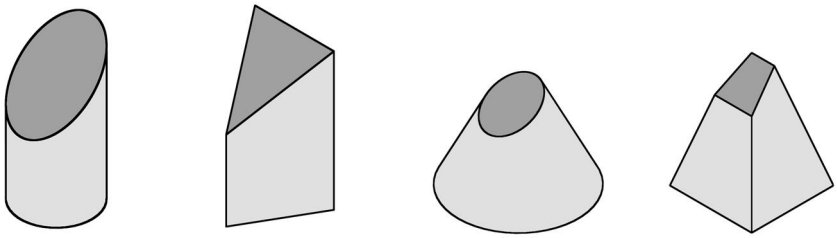
***Section A** – any **ten** questions from this section*

***Section B** – any **four** questions from this section*

***Section A** – any **ten** questions from this section*

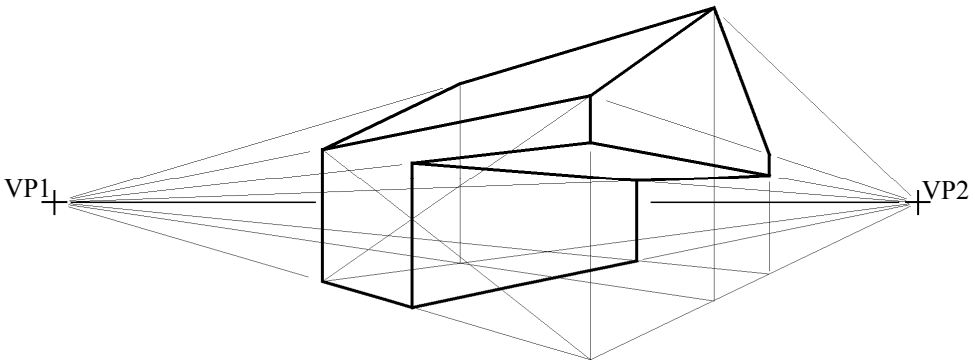
Q1	12	Four diagrams, 3 marks for each correct label.
Q2	3	Constructions: locate mid pt (1), apex (2)
	9	Nine lines, 1 mark each
Q3	4	A = 100º
	4	B = 54º
	4	C = 29º
Q4	4	Base
	6	Wedges (3, 3)
	2	Colour or Shade
Q5	2	Locate height of side
	6	Step out length (2 correct increment, 4 correct No)
	4	Completion
Q6	5	Projecting to elevation
	7	Completion of elevation
Q7	3	Projecting perpendicular to $\mathbf{X_1Y_1}$
	2	Marking heights in auxiliary view
	7	Completing auxiliary elevation (5), hidden detail (2)
Q8	8	Scales depicted in a good quality freehand pictorial sketch.
	4	Appropriate shading or colour.
Q9	12	Extend, Rotate, Offset, Extrude (4 marks for each correct term)
Q10	4	Rotating points around **O**
	8	Completion of **ABCD** in rotated position
Q11	8	Division of side of triangle
	4	Drawing line dividing area of triangle
Q12	4	1. = C
	4	2. = A
	4	3. = B
Q13	6	Shadow of square-based prism; projectors and shadow
	6	Shadow of cylinder; projectors and shadow
Q14	4	Dividing sides of rectangle
	4	Drawing parabola construction
	4	Drawing parabola
Q15	10	Five correctly-sized bars
	2	Colour or shade

1.



Cylinder | Triangular Prism | Cone | Pyramid

2.



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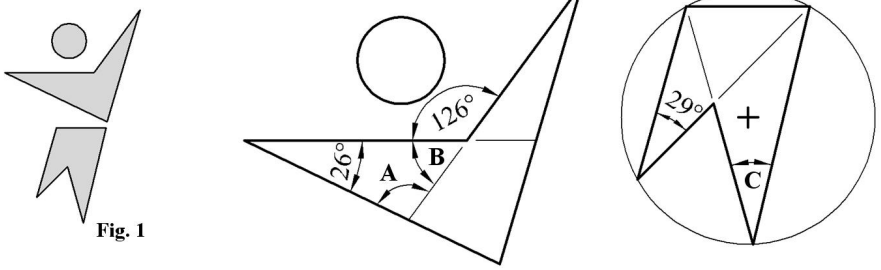

A = 100º **B** = 54º **C** = 29º

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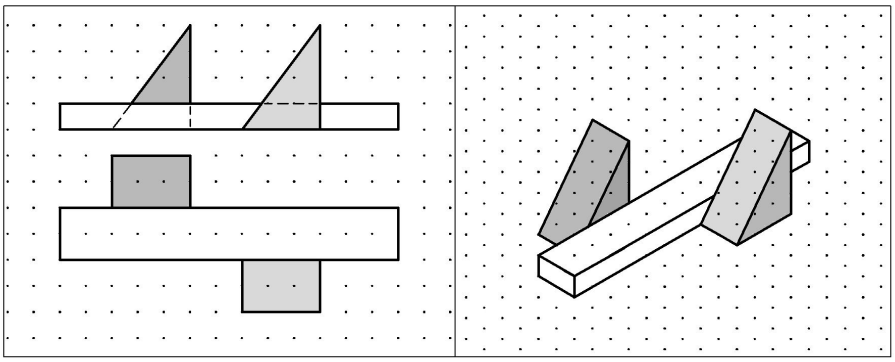

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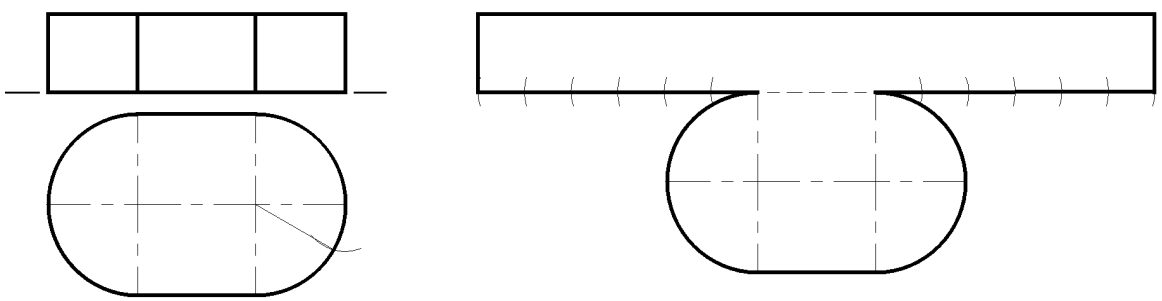

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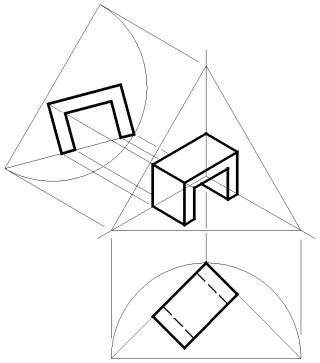

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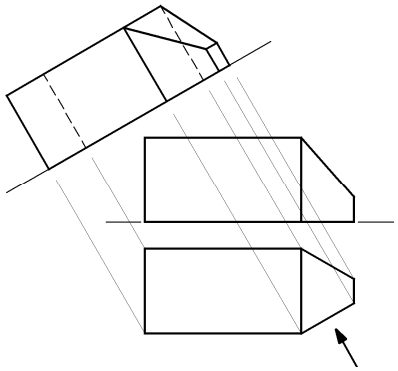

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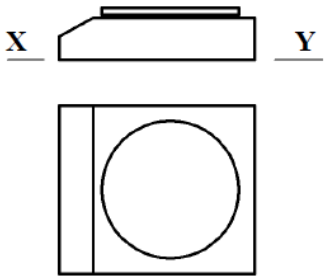

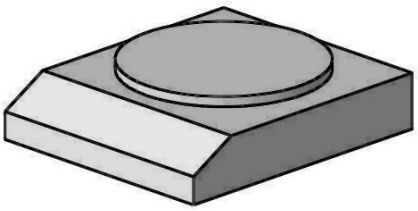

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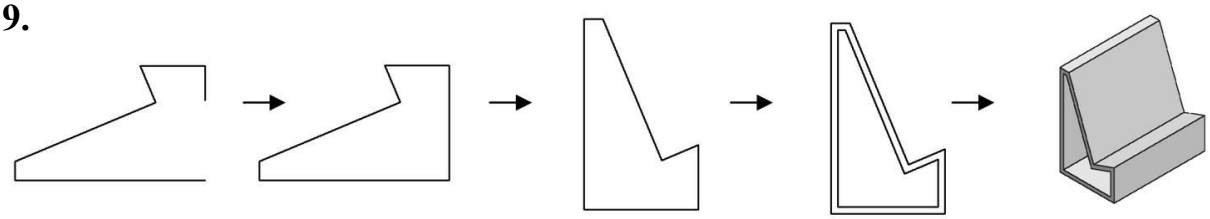
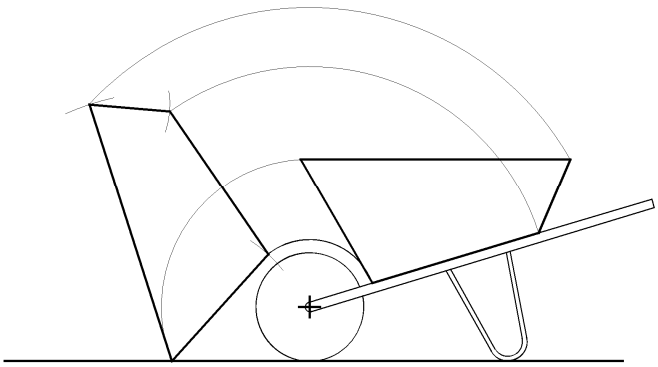


Extend Rotate Offset Extrude / Push / Pull

10.



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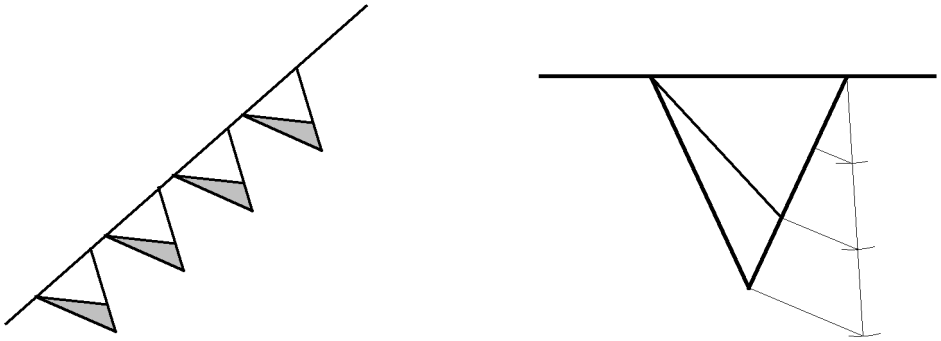

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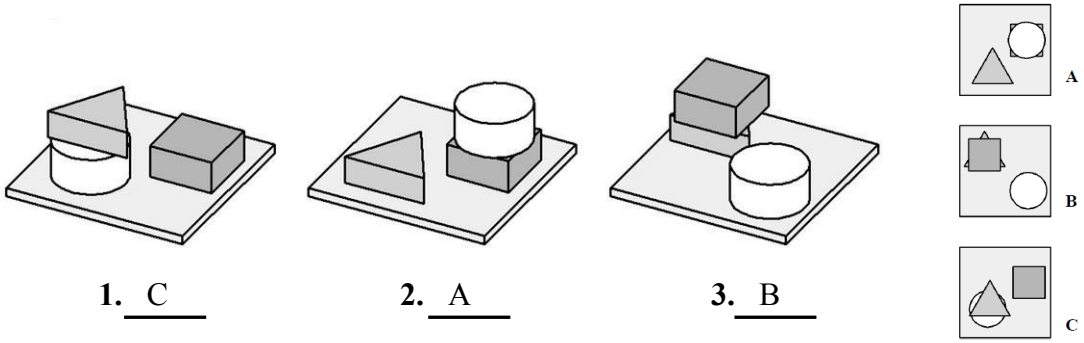
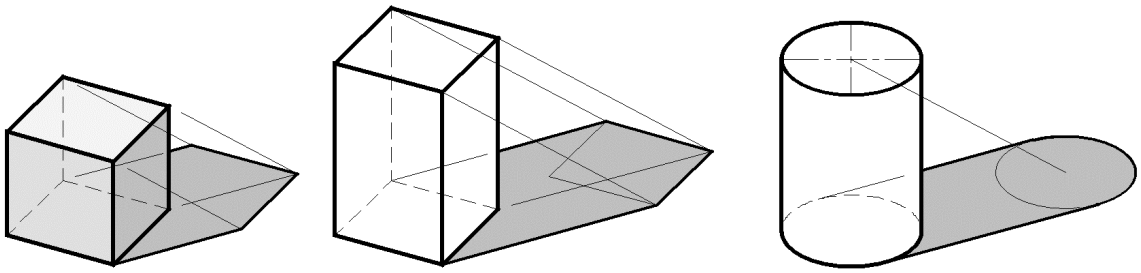


1. C **2.** A **3.** B

13.



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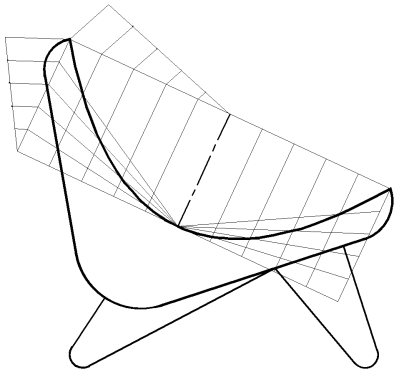

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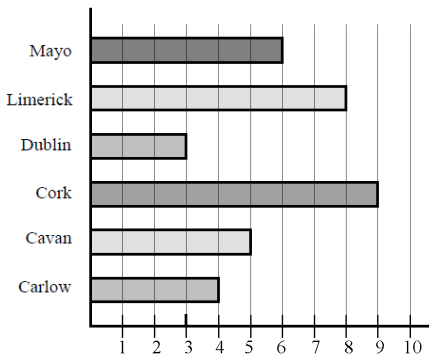
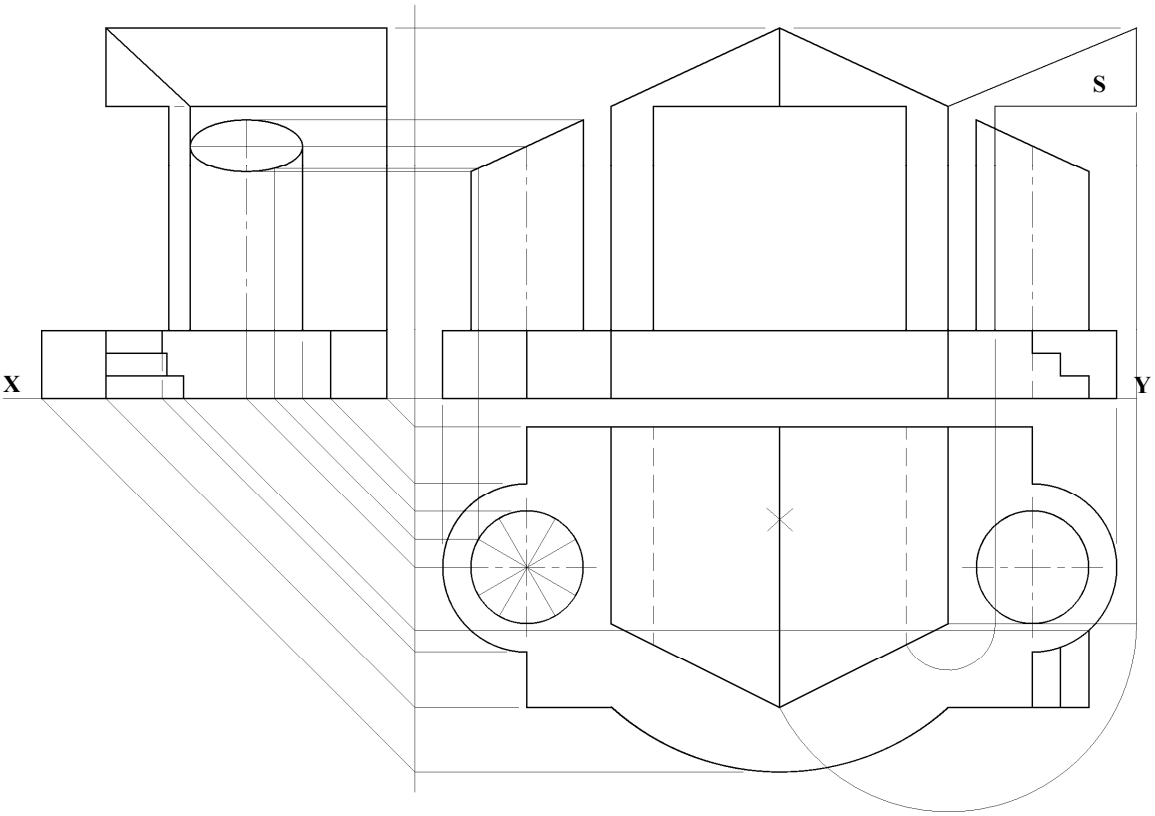


***Section B** – any **four** questions from this section*

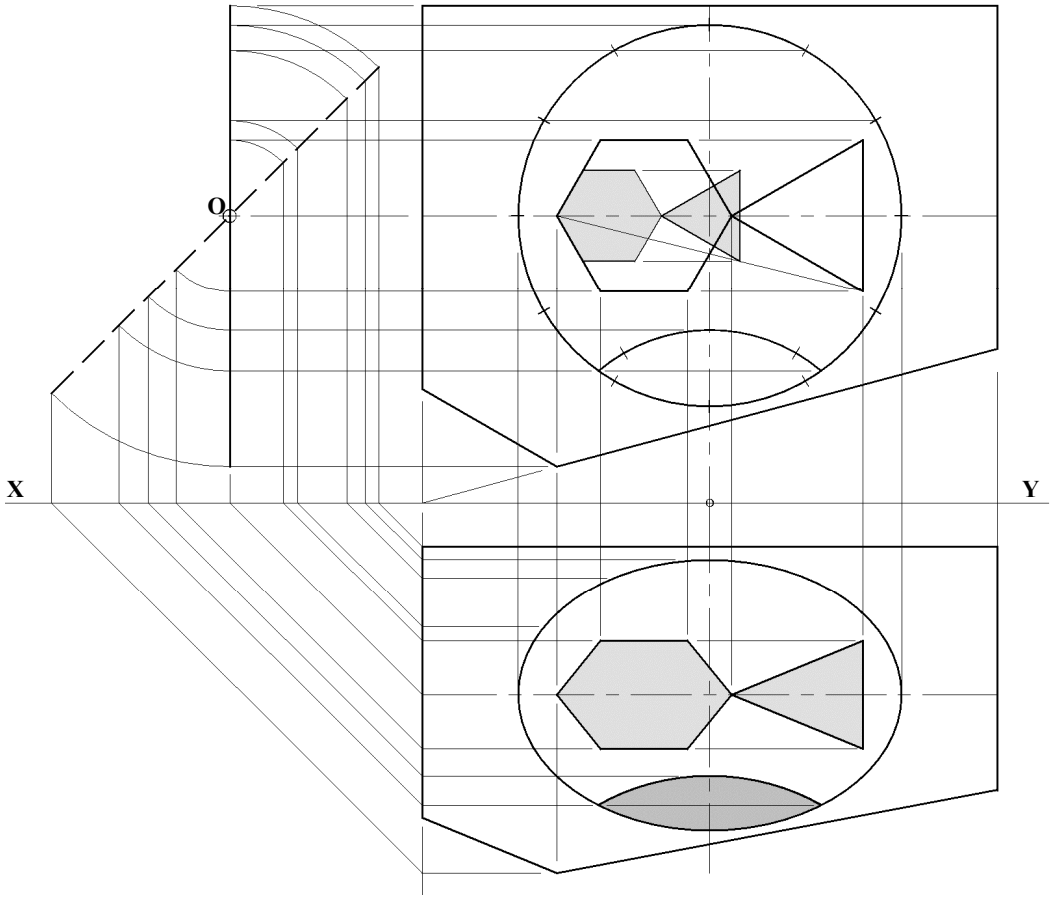
Q.1 – Orthographic projection.



	Elevation (17)	
6	Base outline (4), steps (2)	
6	Portal	
4	Truncated cylinders	
1	Hidden detail	
	Plan (15)	
8	Outline (6), steps (2)	
6	Arcs and circles	
1	Hidden detail	
	End View (20)	
4	Base	
6	Portal	
3	Steps	
6	Elliptical curve: Points in plan, project to EV, project to elev. Draw (1,1,2,2)	
1	Hidden detail	
	True Shape (8)	
	Rotate in plan	Project perpendicular
	Project from plan (3), project from elevation (2), completion (3)	New xy lines (3), transfer heights (2), completion (3)
10	**Drafting, accuracy, presentation**	

Total Marks 70

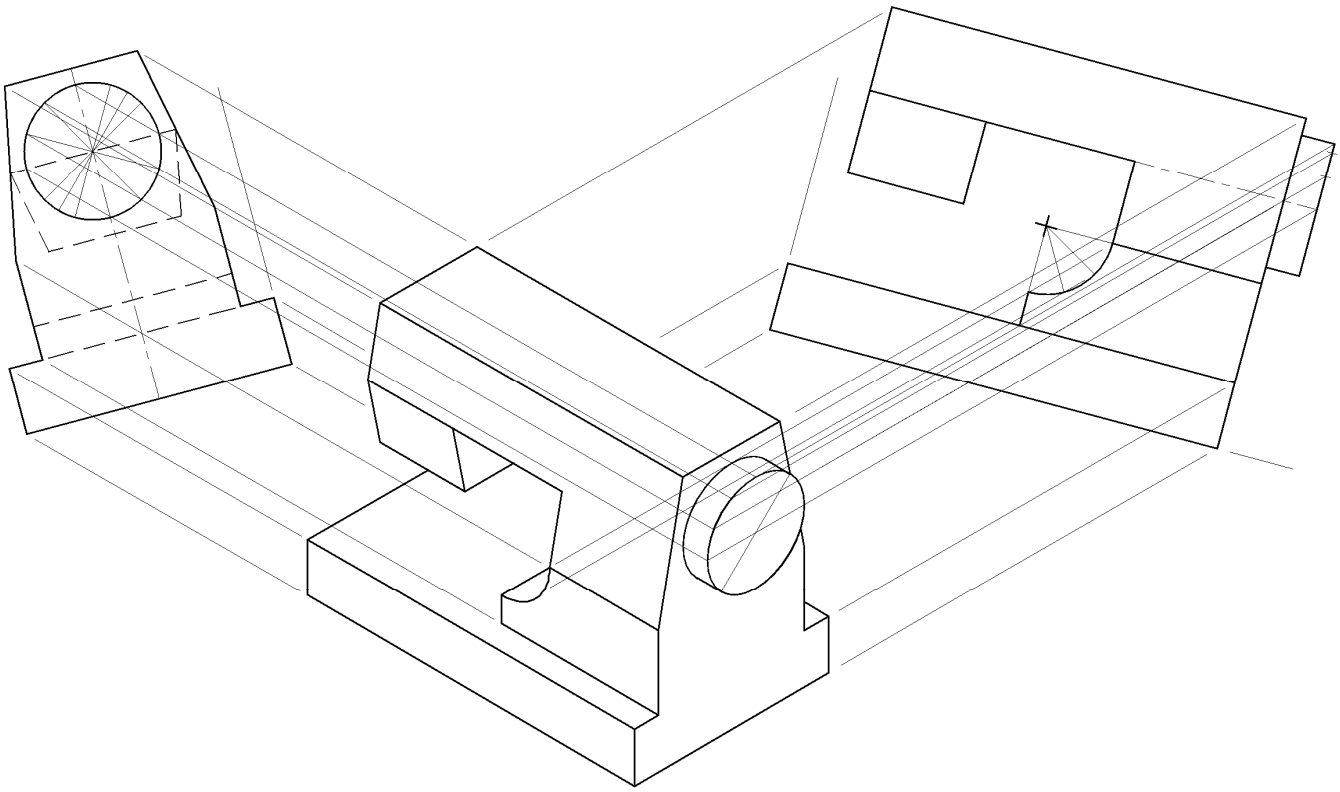
Q.2 - Orthographic, Rotation, End View.



	Given Elevation (18)
5	Outline
4	Arcs
3	Establish width of hexagon: Draw logo any size (2), line marking width (1)
6	Hexagon (4), triangle (2)
	Given End View (6)
2	Vertical line
4	45º angle (2), correct length (2)
	New Figure (36)
3	Projection of points to end view
3	Rotation of points in end view
3	Projections from end view to new figure in plan
3	Projections from elevation to new figure in plan
5	Outline
8	Ellipse
4	Partial ellipse
7	Hexagon (5), triangle (2)
10	**Drafting, accuracy, presentation**

Total Marks 70

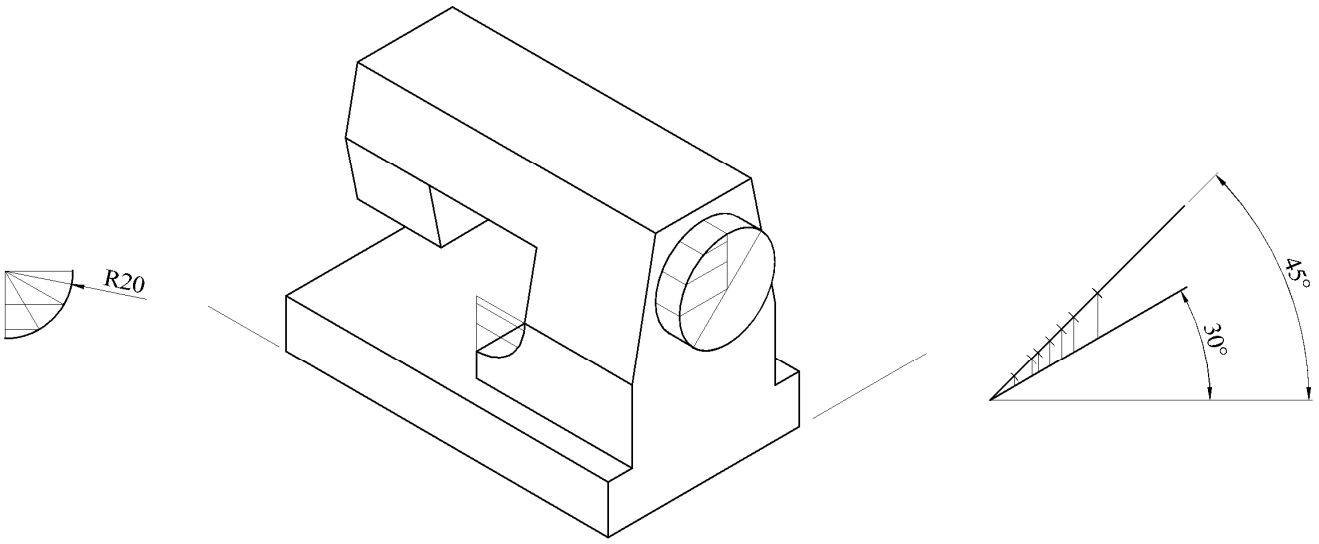
Q.3 (a) - Isometric Projection (Axonometric Axes Method)



Axonometric Axes Method	
	Elevation (16)
6	Base (2), Support (4)
4	Top of sewing machine
3	Head of sewing machine
3	Cylinder
	End View (10)
5	Outline
2	Circle
3	Hidden detail
	Completion of Isometric Projection (34)
5	Base
8	Support (4), Curve (4)
7	Top of sewing machine
4	Head of sewing machine
10	Cylinder
10	**Drafting, accuracy, presentation**

Total Marks 70

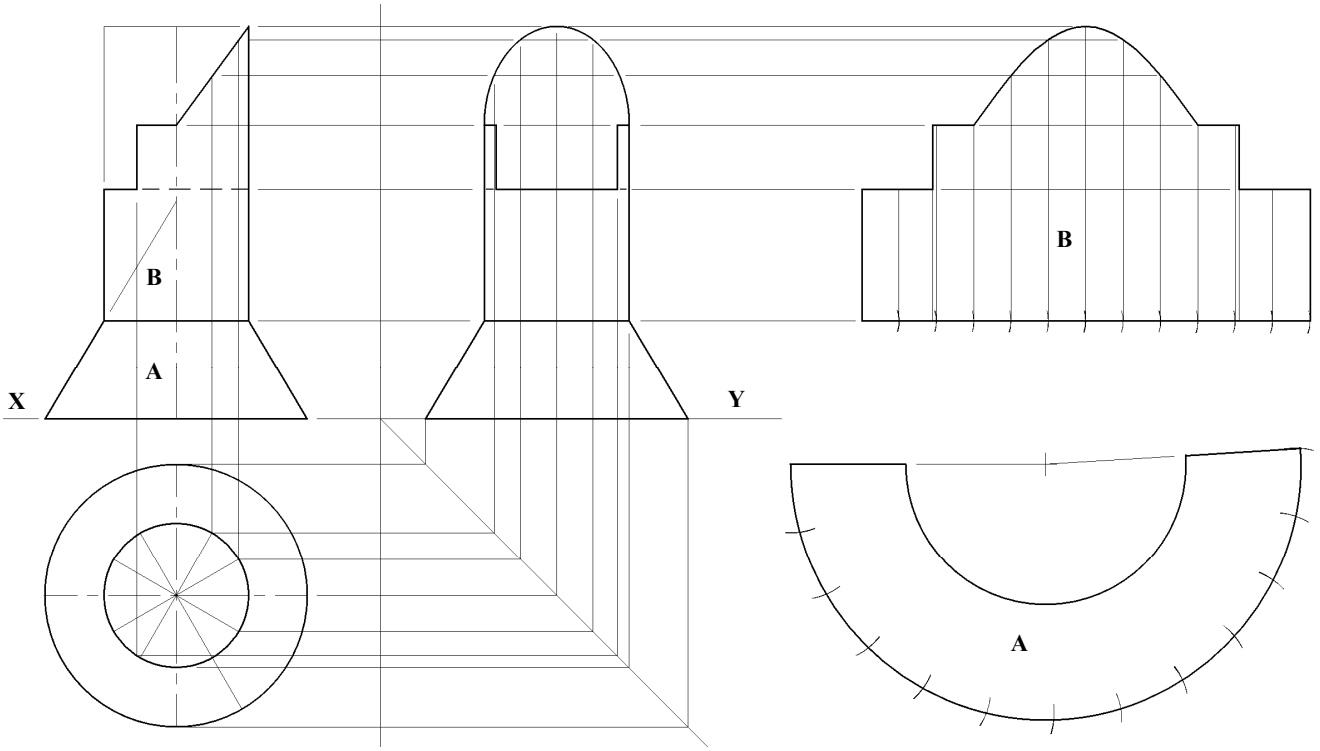
Q.3 (b) - Isometric Projection (Isometric Scale Method)



Isometric Scale Method	
	Isometric Scale (11)
4	Setting up isometric scale (2 marks for 30º line and 2 marks for 45º line)
4	Applying dimensions on 45º line
3	Projecting from 45º line onto 30º line
	Construction of sewing machine (9)
3	Apply measurements required for base and body
6	Construction required for curves (2,2,2)
	Isometric Projection (6)
6	Direction of axes (2,2,2)
	Completion of Isometric Projection (34)
5	Base
8	Support (4), Curve (4)
7	Top of sewing machine
4	Head of sewing machine
10	Cylinder
10	**Drafting, accuracy, presentation**

Total Marks 70

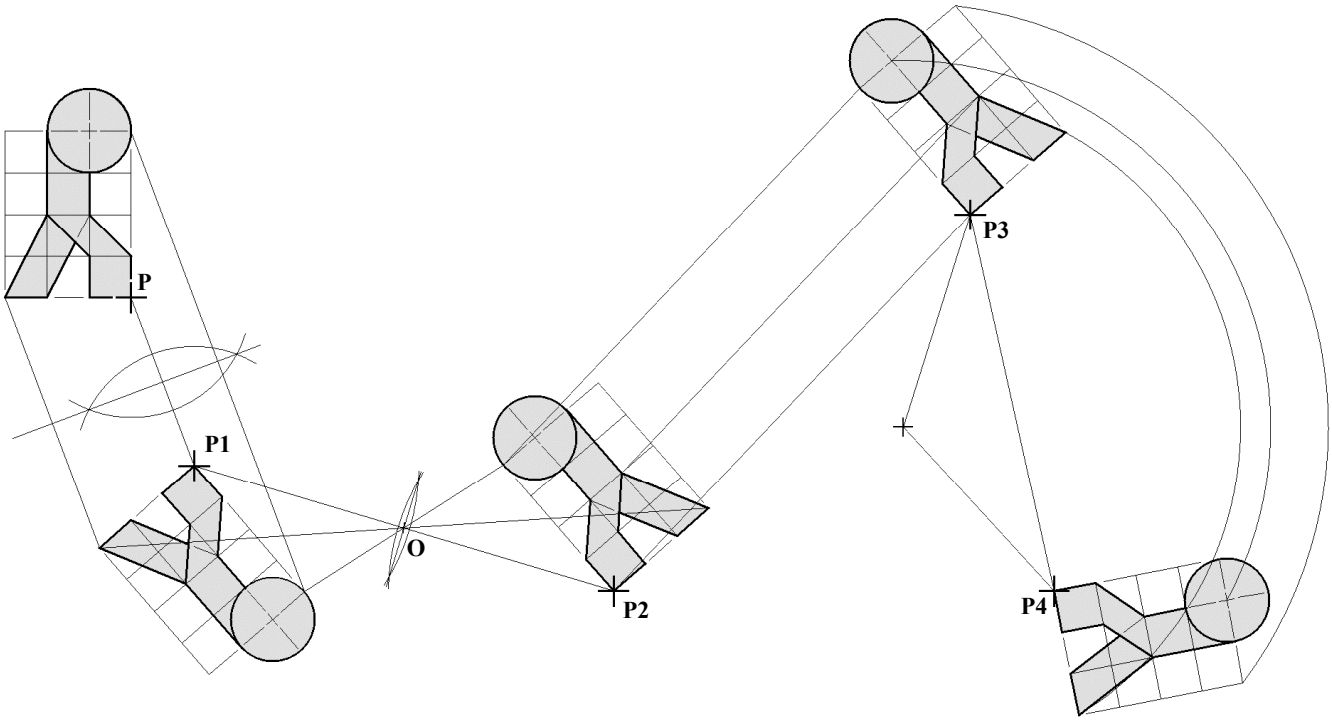
Q.4 - Development



	Elevation (8)
2	Conical base
6	Truncated cylinder (5), hidden detail (1)
	Plan (4)
2	Circle Ø80
2	Circle Ø44
	End View (14)
2	Conical base
6	Cylinder (2), seat (3), Hidden detail (1)
6	Elliptical curve: Points in plan, project to elev, project to EV, draw (1,1,2,2)
	Development of conical surface A (14)
2	Determine length of extreme generator
2	Swing arc equal to extreme generator
4	Stepping out length of developed curve (2 correct increment, 2 correct No.)
2	Swing arc equal to frustum
4	Drawing the required development
	Development of cylindrical surface B (20)
4	Stepping out length of development (2 correct increment, 2 correct No.)
4	Projecting heights
6	Locating points (4), Seat edge positions (2)
6	Drawing the required development
10	**Drafting, accuracy, presentation**

Total Marks 70

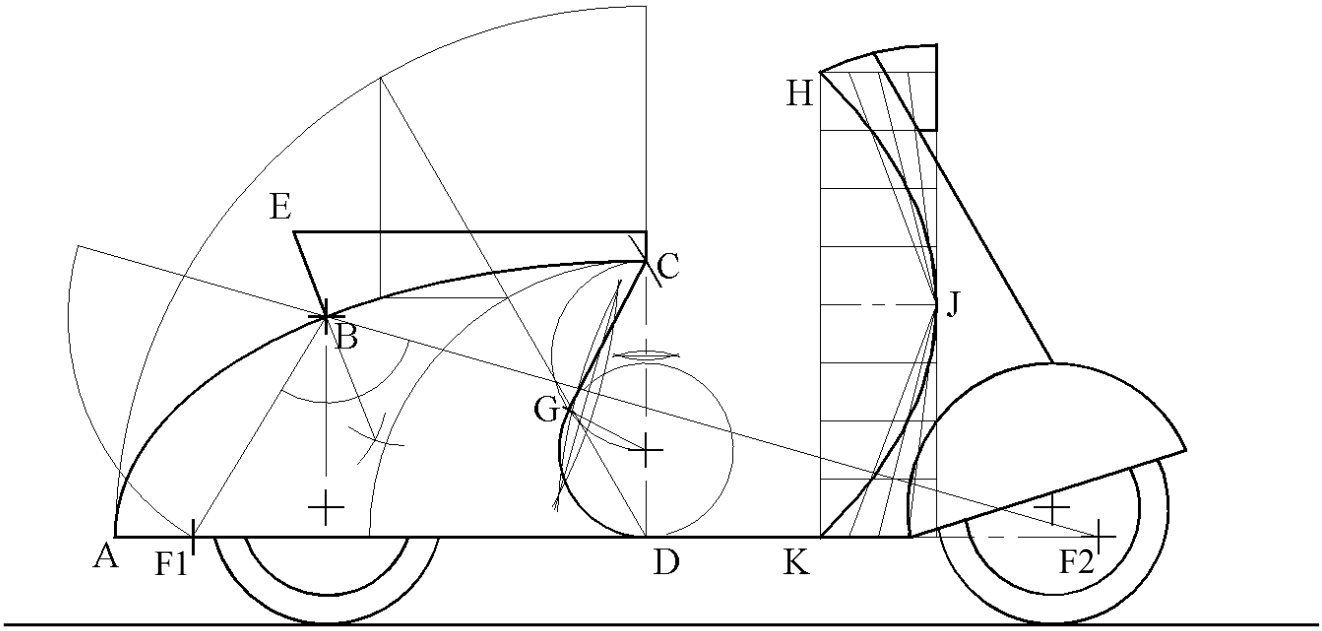
Q.5 - Transformation Geometry



	Setting up (8)
4	Construction outline
4	Complete figure
	Axial Symmetry (12)
4	Projecting perpendicular to symmetry line. (Deduct 2 marks if not perp.)
4	Locating key image points.
4	Drawing the image figure accurately.
	Central Symmetry (12)
4	Locate pt **O** (2), project lines through **O** (2)
4	Locating key image points
4	Drawing the image figure accurately
	Translation (12)
4	Lines projected parallel to $\mathbf{P_2} - \mathbf{P_3}$.
4	Locating key image points.
4	Drawing the image figure accurately.
	Rotation (16)
4	Locating centre of rotation. (Joining $\mathbf{P_3}$ to $\mathbf{P_4}$ and applying 30° angles).
4	Drawing arcs
4	Locating key image points.
4	Drawing the image figure accurately.
10	**Drafting, accuracy, presentation**

Total Marks 70

Q.6 - Ellipse and Parabola



	Ellipse (23)
5	Locate points **F1** and **F2** (2), pt **B** (1), draw **F1B** and **F2B** (2)
3	Determine half major axis: length (2), bisect (1)
5	Draw major (3) and minor (2)
6	Locating additional points on the curve (2,2,2)
4	Drawing the ellipse **ABC**
	Normal BE (5)
3	Bisect angle **FBF_1**
2	Draw normal **BE**
	Tangent CG (6)
2	Draw arc R15
4	Bisect, Draw semi-circle, Point of Contact, Tangent **CG** (1,1,1,1)
	Parabola (12)
8	Construction to determine points on the parabola (2,2,2,2)
4	Drawing of parabola **HJK**
	Completion (14)
2	Completing seat
4	Circular wheels
3	Mudguard: Circle (1), line (2)
5	Light (2), front of scooter (1), lines (2)
10	**Drafting, accuracy, presentation**

Total Marks 70