Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate 2013

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.

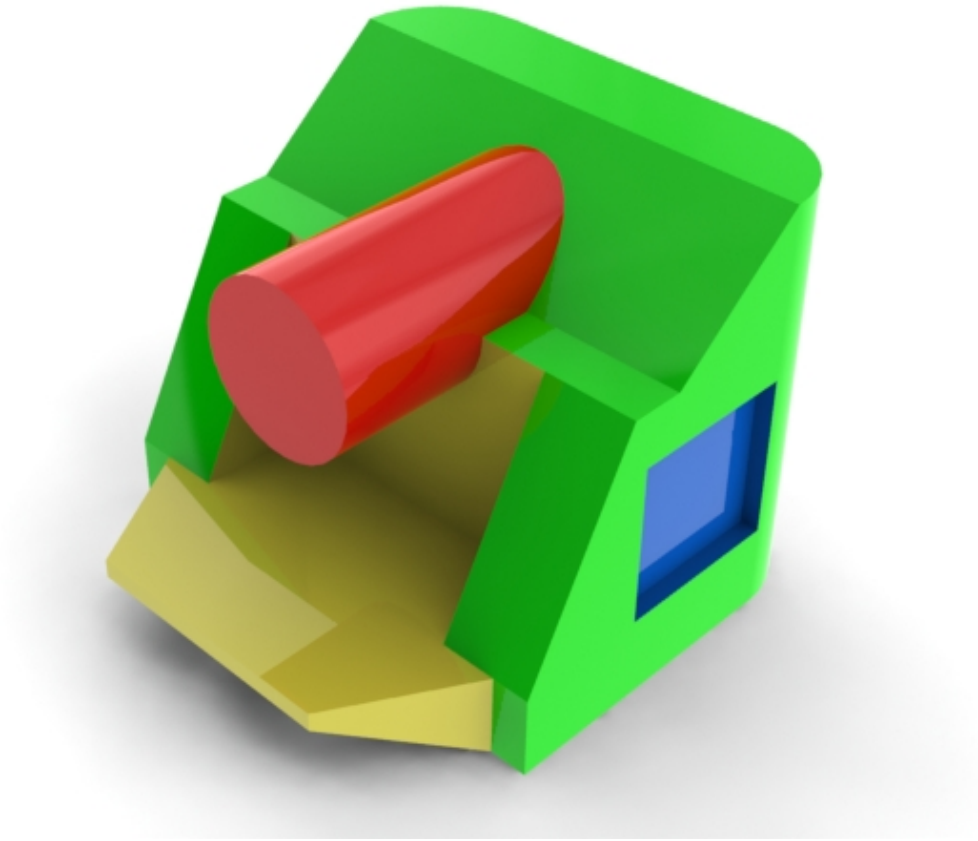
Future Marking Schemes

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 2013

Technical Graphics



Higher Level
Marking Scheme

Section A and B

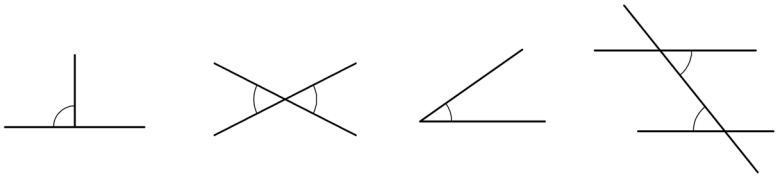
Section A *– any* ***ten*** *questions from this section*

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

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

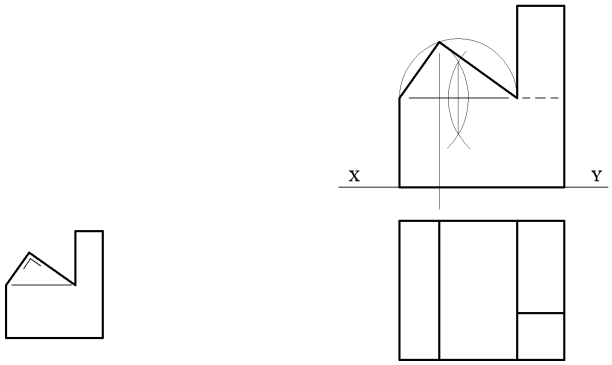
Q1	12	Four diagrams, 3 marks for each correct label.
Q2	6	Bisect base of triangle (3), draw semi-circle (3)
	2	Project from plan
	4	Complete elevation
Q3	2	Locate back apex
	10	Ten lines, 1 mark each
Q4	4	Legs
	3	Seat
	3	Back
	2	Colour or Shade
Q5	6	Bisect side of triangle
	6	Drawing required rectangle
Q6	2	Drawing **FP** & **F1P**
	3	Determine half major axis; length (2), bisect (1)
	3	Draw major (1) and minor (2)
	4	Draw semi-ellipse
Q7	4	Projections to plan
	8	Cut surface in plan
Q8	8	Sander depicted in a <u>good quality</u> freehand pictorial sketch.
	4	Appropriate shading or colour.
Q9	12	Line, Dimension, Extrude, Chamfer (4 marks for each correct term)
Q10	4	Projecting points from plan and end view (2,2)
	8	Completion dispenser
Q11	4	A = 76°
	4	B = 38°
	4	C = 52°
Q12	6	Join centres (1), bisect line (3), draw semi-circle (2)
	2	Add radii and swing arc
	2	Locate points of contact
	2	Draw tangent
Q13	4	Two arcs identifying centre
	4	Drawing plate in position
	4	Points of contact
Q14	3	Projecting perpendicular to X1Y1
	2	Marking heights in auxiliary view
	7	Completing block (5), Hidden detail (2)
Q15	8	Four points, 2 marks each.
	4	Complete graph

1.



Perpendicular Opposite Acute Alternate

2.



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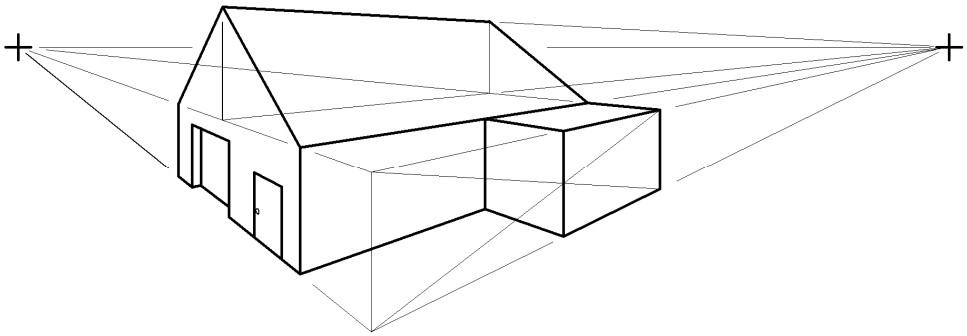

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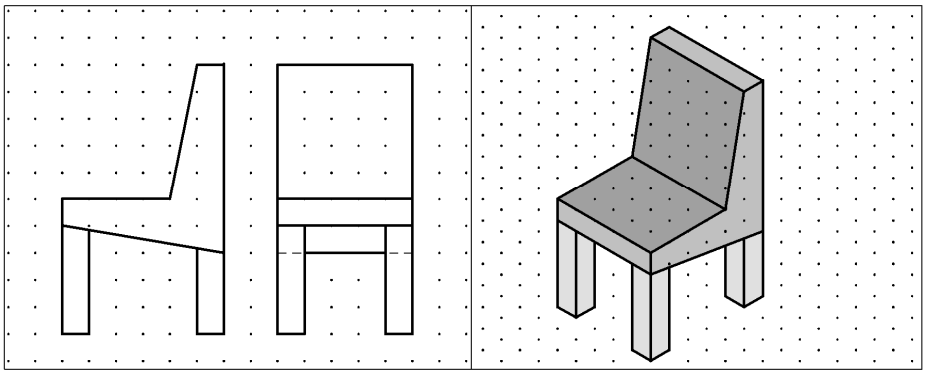

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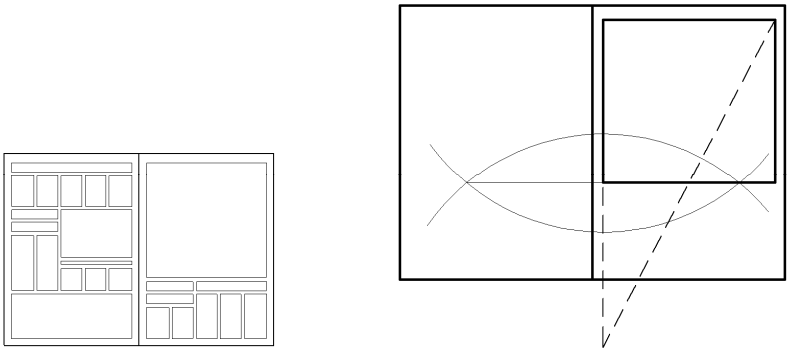

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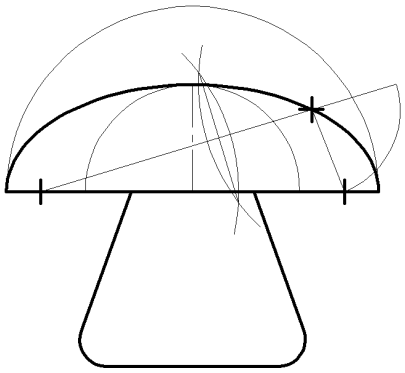

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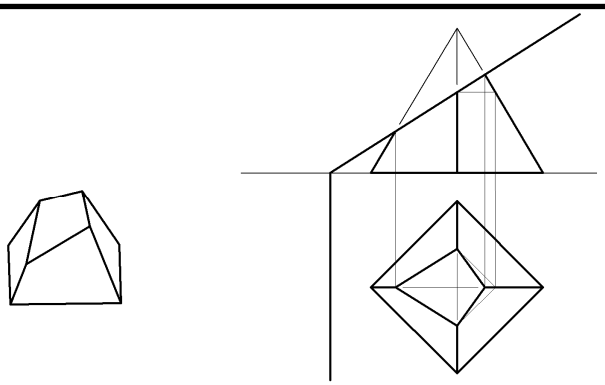

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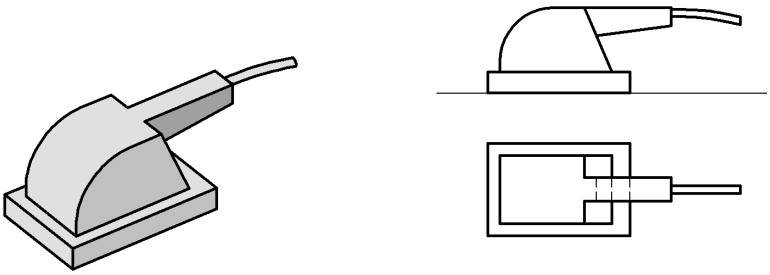

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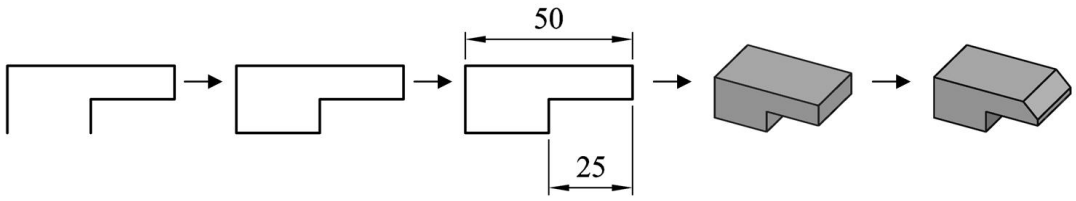
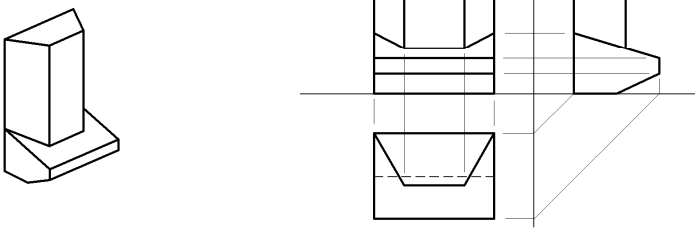


Line Dimension Extrude Chamfer

10.



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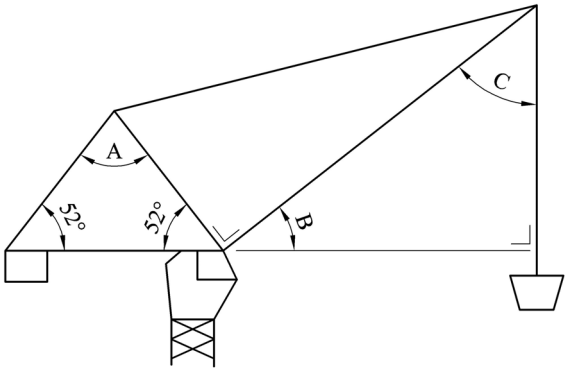
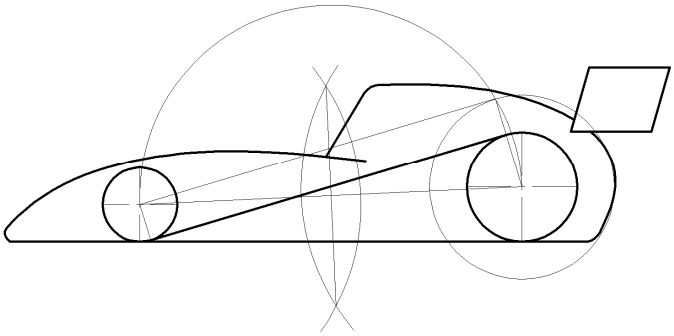


A = 76°

B = 38°

C = 52°

12.



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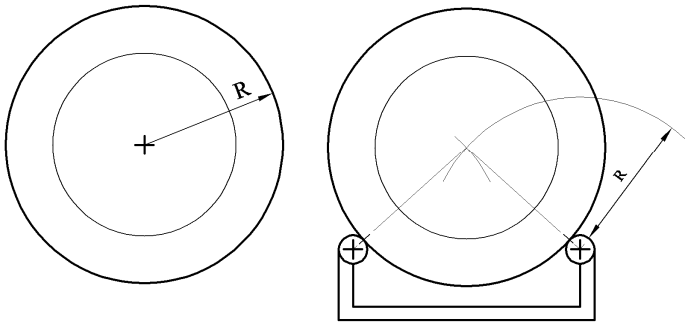

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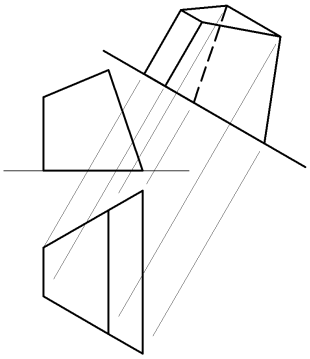

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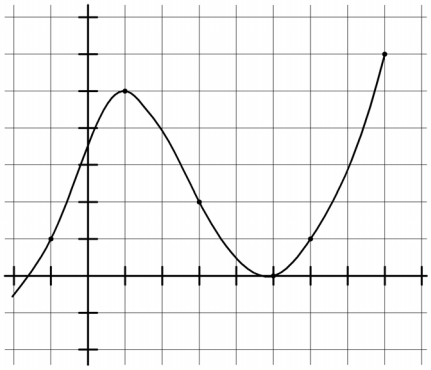
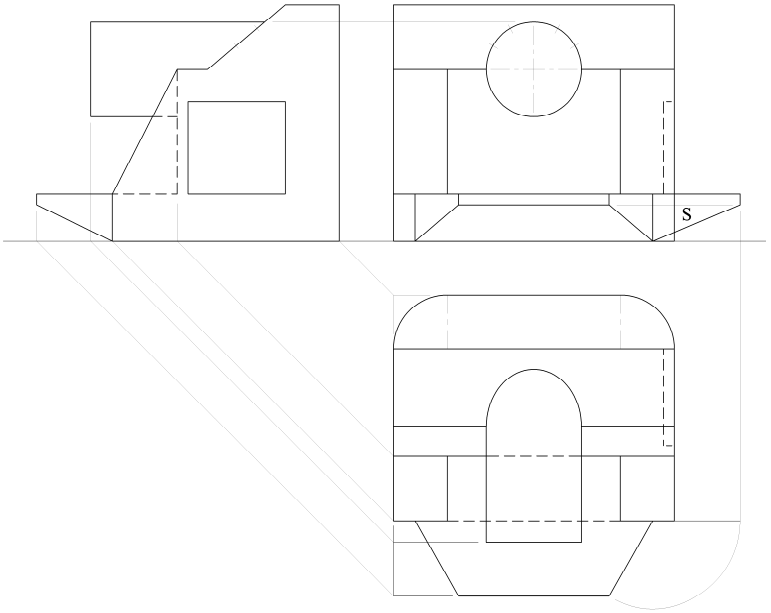


*Section B – any **four** questions from this section*

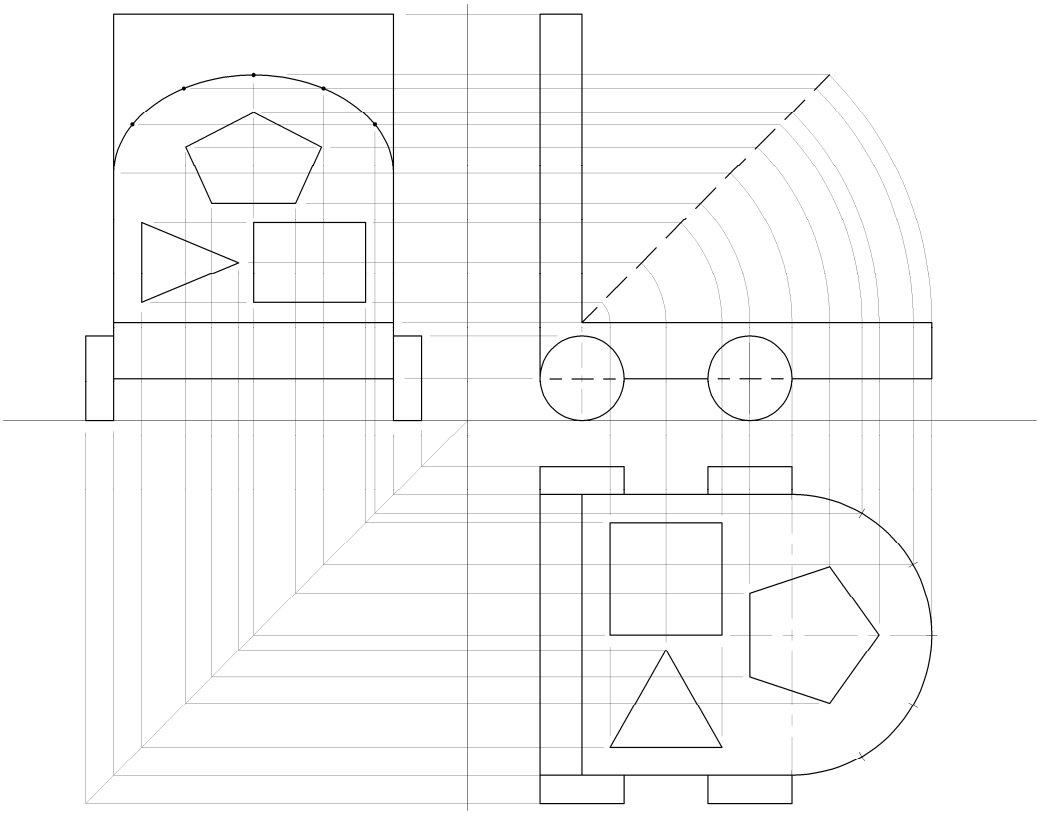
Q.1 – Orthographic projection.



	Elevation (15)	
6	Lines	
1	Inner recess	
2	Circular dispenser	
5	Front shelf	
1	Hidden detail	
	Plan (21)	
7	Machine outline (5,2)	
1	Inner recess	
2	Dispenser	
3	Front shelf	
6	Elliptical curve: Points in elev, project to EV, project to plan, Draw (1,1,2,2)	
2	Hidden detail	
	End View (16)	
7	Straight lines	
2	Dispenser	
3	Front shelf	
2	Rectangle	
2	Hidden detail	
	True Shape (8)	
8	Rotate in plan	Project perpendicular
	Project from plan (3), project height (2), completion (3)	New xy line (3), transfer heights (2), completion (3)
10	**Drafting, accuracy, presentation**	

Total Marks 70

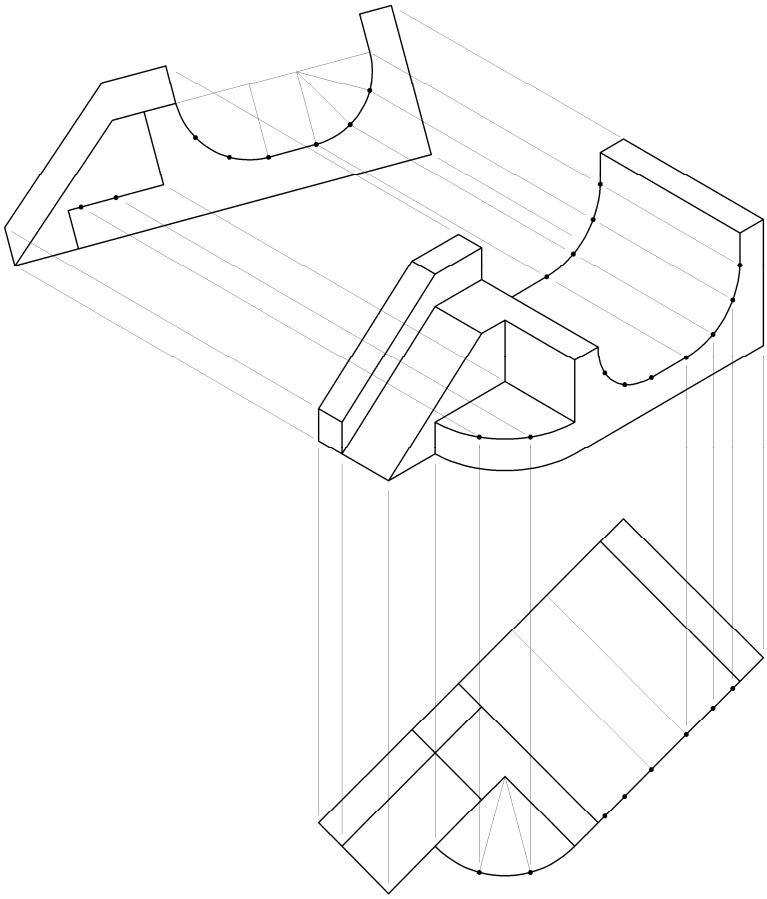
Q.2 - Orthographic, Rotation, End View.



	Given Elevation (12)
6	Outline and hidden detail
2	Wheels
4	45° angle (2), correct length (2)
	Given Plan (13)
3	Outline
4	Wheels
6	Square (2), triangle (2) pentagon (2)
	New Figure (35)
3	Projection of points to elevation
3	Rotation of points in elevation
3	Projections from plan to new figure in end view
3	Projections from elevation to new figure in end view
3	Outline of walker
4	wheels
6	Semi-elliptical curve
10	Square (2), triangle (3) pentagon (5)
10	**Drafting, accuracy, presentation**

Total Marks 70

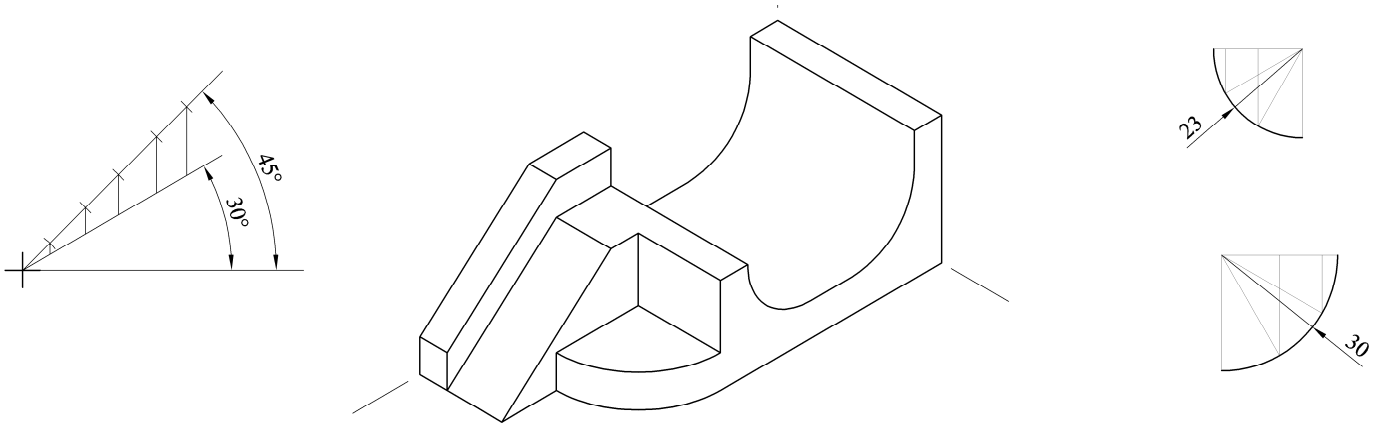
Q.3 (a) - Isometric Projection (Axonometric Axes Method)



Axonometric Axes Method	
	Elevation (15)
5	Half-pipe outline
5	Inner lines of half-pipe
5	Front quadrant
	Plan (11)
6	Half-pipe outline
1	Circular arc
4	Inner lines
	Completion of Isometric Projection (34)
5	Half-pipe outline
10	Internal of half-pipe
4	Sloping left side bottom
8	Sloping left side top
7	Cylindrical quadrant
10	**Drafting, accuracy, presentation**

Total Marks 70

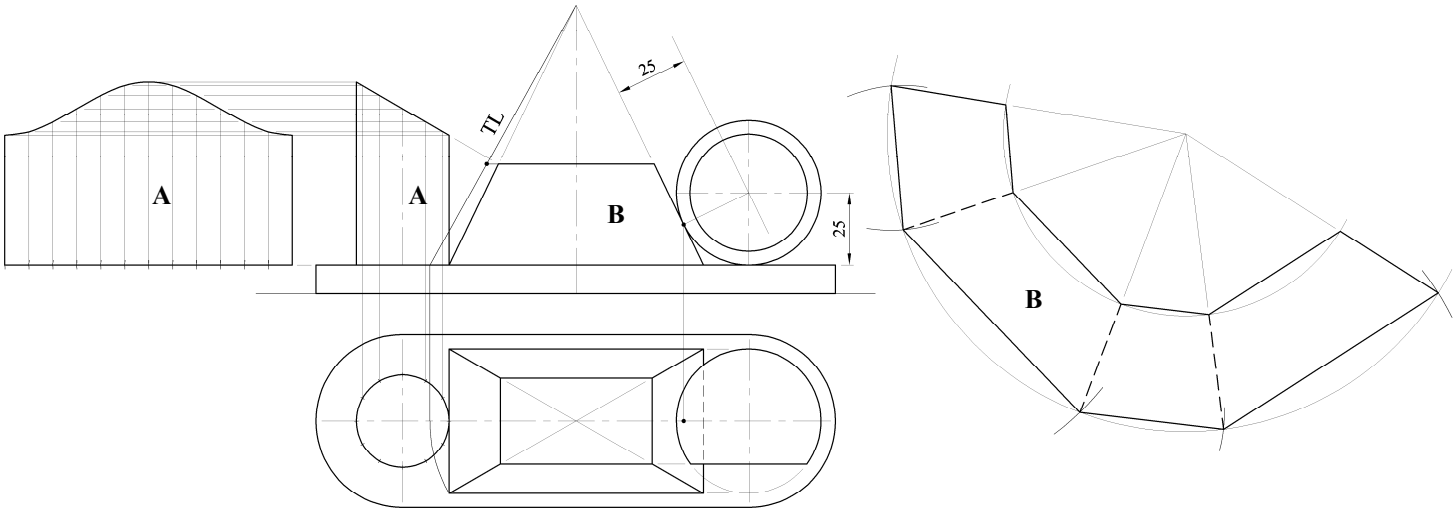
Q.3 (b) - Isometric Projection (Isometric Scale Method)



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 half-pipe (9)
3	Apply measurements required for half-pipe
6	Construction required for arcs (3,3)
	Isometric Projection (6)
6	Direction of axes (2,2,2)
	Completion of Isometric Projection (34)
5	Half-pipe outline
10	Internal of half-pipe
4	Sloping left side bottom
8	Sloping left side top
7	Cylindrical quadrant
10	**Drafting, accuracy, presentation**

Total Marks 70

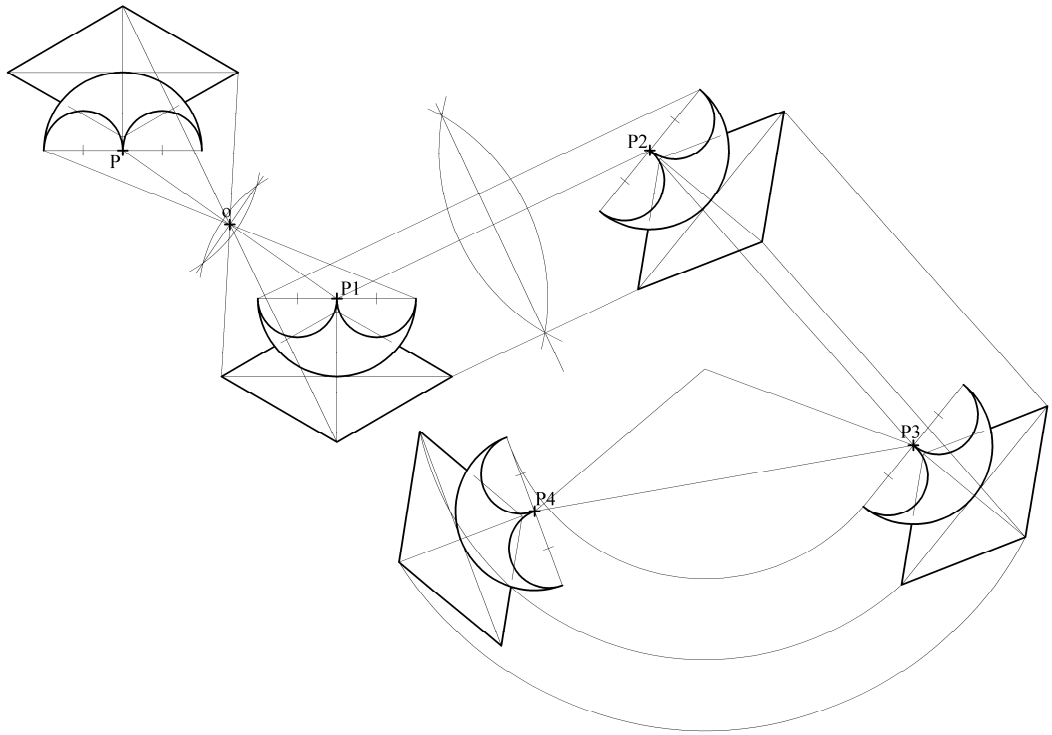
Q.4 - Development



	Plan (12)
1	Left side of base
2	Cylinder
3	Pyramid
4	Sphere: Project centre from elev. (1), POC (1), draw sphere (2)
2	Complete base
	Elevation (15)
2	Base
2	Truncated cylinder
3	Truncated pyramid
8	Sphere: Height of centre (1), locate centre (2), POC (1), draw sphere (4)
	Development of cylindrical surface (17)
6	Stepping out length of development (3 correct increment, 3 correct no.)
3	Projecting heights
3	Locate points
5	Drawing the required development
	Development of sloping surfaces of truncated pyramid (16)
2	Determine true length of edge
2	Swing arc of correct true length
4	Step out correct lengths on developed arc (2 correct lengths, 2 correct no.)
2	Swing arc equal to true length of truncated
6	Drawing the required development
10	**Drafting, accuracy, presentation**

Total Marks 70

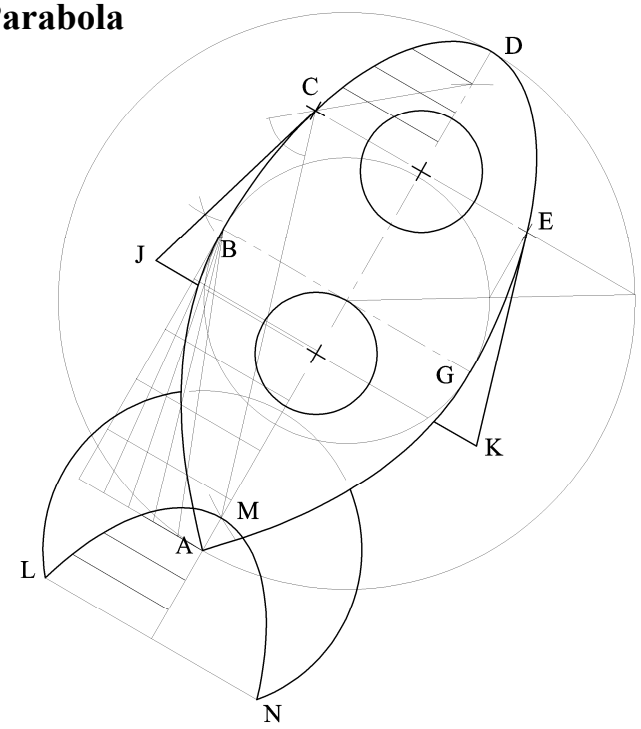
Q.5 - Transformation Geometry



	Setting up (8)
4	Construction outline
4	Complete Arcs (2,1,1)
	Central Symmetry (12)
4	Locate point **O** (2), Project lines through **O** (2)
4	Locating key image points.
4	Drawing the image figure accurately.
	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.
	Translation (12)
4	Lines projected parallel to **P2 – P3**
4	Locating key image points
4	Drawing the image figure accurately
	Rotation (16)
4	Locating centre of rotation. (Joining **P3** to **P4** and applying 30° angle).
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 (22)	
4	Draw major circle	
8	Identify (6) and draw (2) minor circle	
6	Locating additional points on the curve (2, 2, 2)	
4	Drawing the curve	
	Parabolas (12)	
8	Construction to determine points on the parabola (2,2,2,2)	
4	Drawing of parabolas **AB** and **GA**	
	Tangents JC and EK (10)	
2	Locate focal points	
2	Join $\mathbf{F_1CF_2}$ or $\mathbf{F_1EF_2}$	
2	Bisecting angle $\mathbf{F_1CF_2}$ or $\mathbf{F_1EF_2}$	
2	Draw tangents to points **J** and **K**.	
2	Completion of wingtips	
	Tail and Curve LMN (12)	
2	Circular arc at tail	
4	Identify points **LMN**	
4	Identify ordinates for points on curve **LMN** (2,2)	Translate points parallel to **DM**
2	Draw the curve **LMN**	
	Completion (4)	
4	Circular portholes	
10	**Drafting, accuracy, presentation**	

Total Marks 70