Coimisiún na Scrúduithe Stáit
State Examinations Commission

# JUNIOR CERTIFICATE 2009

# MARKING SCHEME

# TECHNICAL GRAPHICS

# HIGHER LEVEL

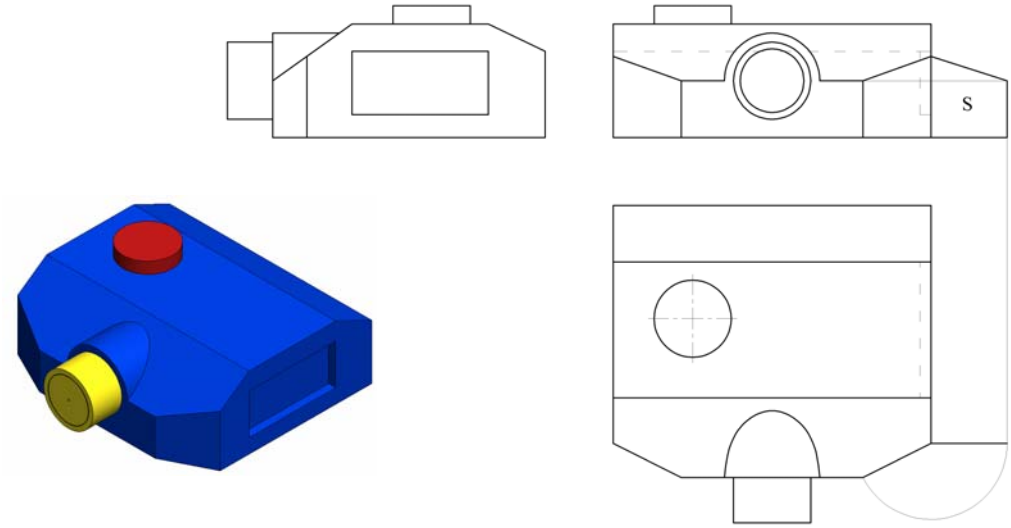
***Sections A and B***

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

| | | |
|---|---|---|
| **Q1** | 12 | Four diagrams, 3 marks for each correct label. |
| **Q2** | 12 | 2 marks per line |
| **Q3** | 12 | Four points of contact, 3 marks each |
| **Q4** | 6 | Front three faces |
| | 4 | mp3 player |
| | 2 | Remainder of docking station |
| **Q5** | 12 | Four faces, 3 marks each face |
| **Q6** | 12 | 3 marks for each correct coordinate |
| **Q7** | 3 | Three lines perpendicular to **L** |
| | 4 | Marking distances from **L** to image |
| | 5 | Three lines and semi-circular arc |
| **Q8** | 8 | 3 marks back, 3 marks button, 2 marks spindle |
| | 4 | Appropriate shading or colour |
| **Q9** | 12 | Offset, Fillet and Hatch (4 marks for each correct term) |
| **Q10** | 12 | 6 blocks |
| **Q11** | 4 | A = 24° |
| | 4 | B = 45° |
| | 4 | B = 135° |
| **Q12** | 6 | Locating focal points 3 marks each |
| | 6 | Constructions (4), location of point of contact (2) |
| **Q13** | 3 | Projection lines from elevation to plan |
| | 3 | Rotate lines in plan |
| | 3 | Project to elevation |
| | 3 | Complete figure |
| **Q14** | 4 | Project lines front elevation to plan |
| | 4 | Project lines end view to plan |
| | 4 | Complete plan |
| **Q15** | 12 | Three columns, 4 marks each |

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

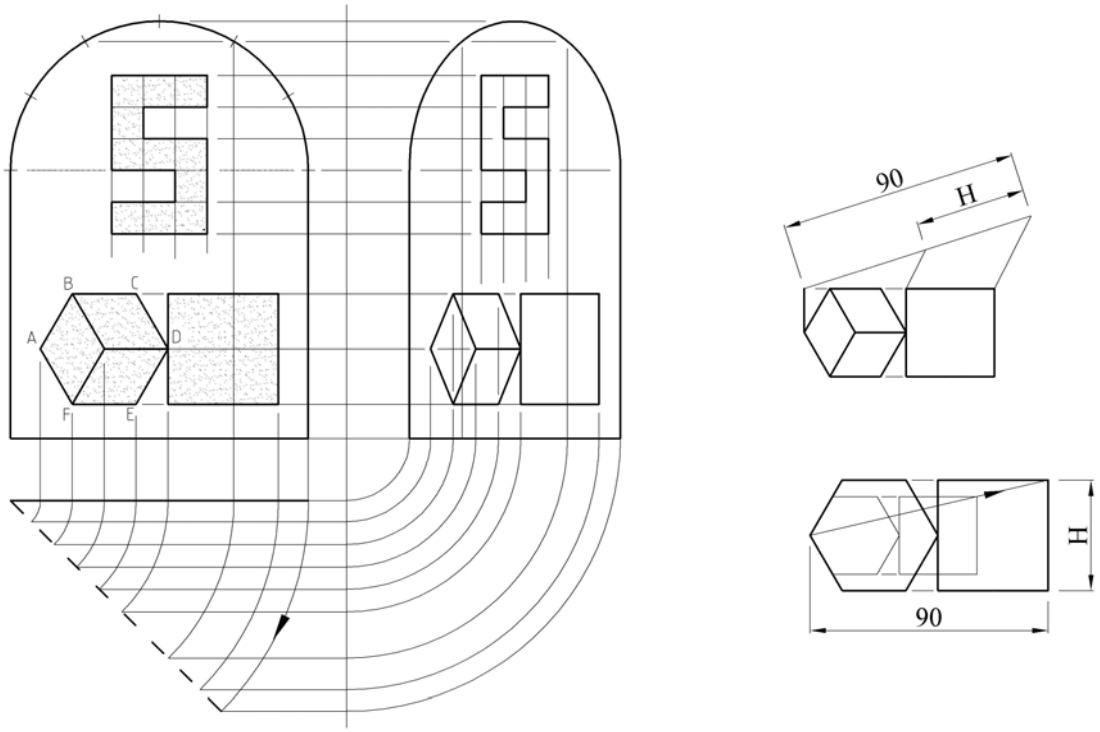
## Q.1 – Orthographic projection.




| | | |
|---|---|---|
| | **Elevation (17)** | |
| 6 | Straight lines | |
| 3 | Cylindrical button | |
| 3 | Front circle and arc | |
| 4 | Sloping lines | |
| 1 | Hidden detail | |
| | **Plan (18)** | |
| 6 | Lines | |
| 2 | Sloping lines | |
| 1 | Circle | |
| 6 | Elliptical curve: Points in elev, project to EV, project to plan, Draw (1,1,3,1) | |
| 2 | Cylinder outline: three lines | |
| 1 | Hidden detail | |
| | **End View (17)** | |
| 7 | Lines | |
| 4 | Rectangle | |
| 6 | Cylinder outlines: three lines each | |
| | **True Shape (8)** | |
| 8 | Rotate in plan | Project perpendicular |
| | Project from plan (3), project from end view (3), completion (2) | New xy lines (3), transfer heights (3), completion (2) |
| **10** | **Drafting, accuracy, presentation** | |

**Total Marks 70**

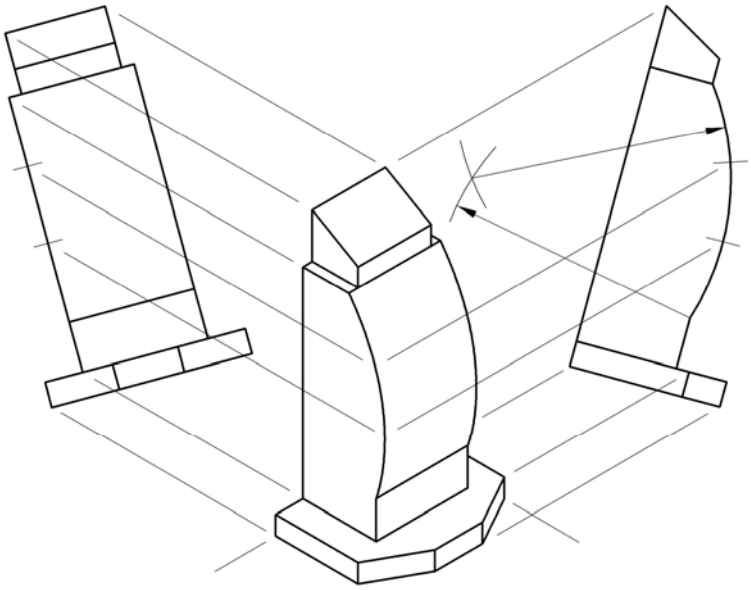
## Q.2 - Orthographic, Rotation, End View.




| | |
|---|---|
| | **Given Elevation (18)** |
| 2 | Outline: lines (1) , semi-circle (1) |
| 5 | Number ‘5’ outline |
| 4 | Establish height of hexagon: Draw logo any size (3), line marking height (1) |
| 7 | Logo: hexagonal outline (3), three inner lines (3), square (1) |
| | **Given Plan (6)** |
| 2 | Horizontal line |
| 4 | 45° angle (2), correct length (2) |
| | **New Figure (36)** |
| 3 | Projection of straight lines of outline from elevation to plan |
| 3 | Rotation of points in plan |
| 3 | Projection from plan to new figure in end view |
| 3 | Projection from elevation to new figure in end view |
| 3 | Draw outline |
| 5 | Semi-elliptical curve – 5 points |
| 10 | Complete number ‘5’ in end view |
| 6 | Complete bottom logo - hexagon (2 + 2), square (2) |
| **10** | **Drafting, accuracy, presentation** |

**Total Marks 70**

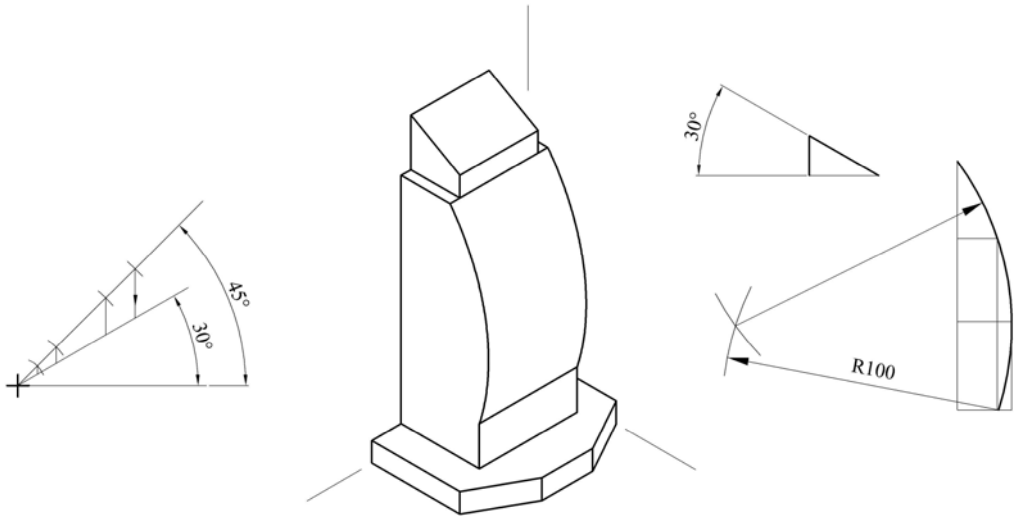
## Q.3 (a) - Isometric Projection (Axonometric Axes Method)



| Axonometric Axes Method | |
|---|---|
| | **Front Elevation -left drawing (12)** |
| 4 | Base |
| 4 | Pillar: four lines |
| 4 | Top panel: four lines |
| | **Side Elevation –right drawing (14)** |
| 5 | Base: five lines |
| 5 | Pillar: two lines (2), one arc (1,1,1) |
| 4 | Top panel: (one line and line at 30º 3 marks) |
| | **Completion of Isometric Projection (34)** |
| 8 | Base – outline (4), chamfered (4) |
| 6 | Pillar |
| 4 | Locate points for curves |
| 8 | Draw curves – 4 marks each curve |
| 8 | Top panel |
| **10** | **Drafting, accuracy, presentation** |

**Total Marks 70**

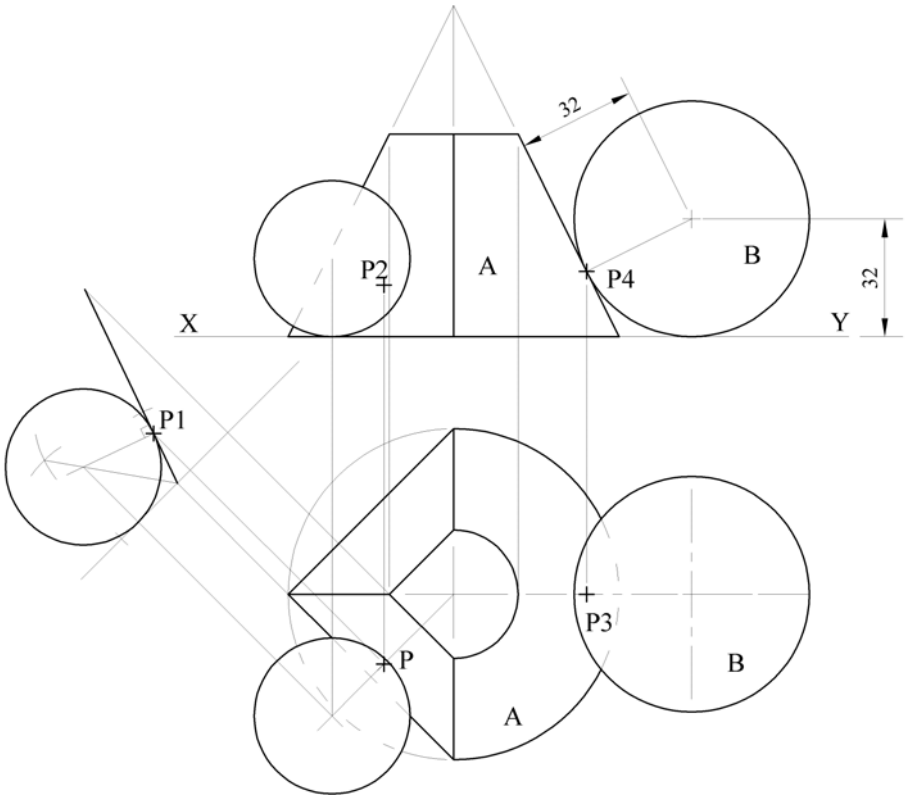
## Q.3 (b) - Isometric Projection (Isometric Scale Method)




| Isometric Scale Method | |
|---|---|
| | **Isometric Scale (8)** |
| 4 | Setting up isometric scale (2 marks for 30º line and 2 marks for 45º line) |
| 2 | Applying dimensions on 45º line |
| 2 | Projecting vertically from 45º line onto 30º line |
| | **Construction of meter (12)** |
| 2 | Apply scaled measurements required for meter |
| 8 | Draw arcs full size (4), and plot construction for arcs (2,2) |
| 2 | Determine height of top panel |
| | **Isometric Projection (6)** |
| 6 | Direction of axes (2,2,2) |
| | **Completion of Isometric Projection (34)** |
| 8 | Base – outline (4), chamfered (4) |
| 6 | Pillar |
| 4 | Locate points for curves |
| 8 | Draw curves – 4 marks each curve |
| 8 | Top panel |
| **10** | **Drafting, accuracy, presentation** |

**Total Marks 70**

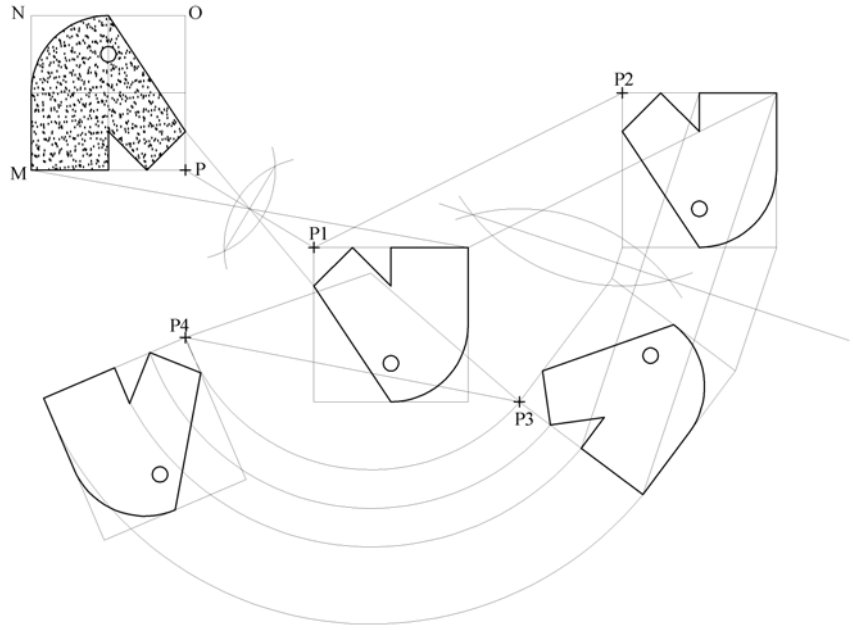
## Q.4 - Solids in Contact




| | |
|---|---|
| | **Elevation (15)** |
| 7 | **Solid A**: heights (2), widths (2), outer edges (2), centre edge (1) |
| 8 | **Sphere B**: height of centre (2), locate sphere centre (4), draw sphere (2) |
| | **Plan (17)** |
| 9 | **Solid A**: circle (2), two base lines (4), edges (3) |
| 5 | Truncation – semi circle (3), edges (2) |
| 3 | **Sphere B**: Project centre from elev. (1), draw sphere (2) |
| | **Sphere C (22)** |
| 2 | Point P in plan |
| 3 | Edge view of pyramid face |
| 2 | Locate auxiliary elevation of P in edge view |
| 4 | Locate sphere centre in elev: perpendicular line through P (2), bisection (2) |
| 4 | Line perp from P in plan (2), project centre to plan and elevation (1,1) |
| 4 | Drawing the sphere in plan and elevation (2,2) |
| 3 | Hidden detail (1,1,1) |
| | **Points of Contact (6)** |
| 6 | P2, P3, P4 (2,2,2) |
| **10** | **Drafting, accuracy, presentation** |

**Total Marks 70**

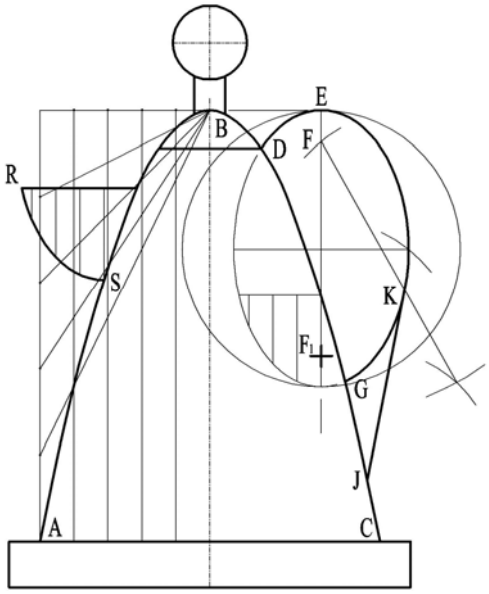
## Q.5 - Transformation Geometry




| | |
|---|---|
| | **Setting up (8)** |
| 4 | Construction grid |
| 4 | Drawing figure |
| | **Central Symmetry (12)** |
| 4 | Locate point 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 P – P1. |
| 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 |
| | **Rotation (16)** |
| 4 | Locating centre of rotation. (Joining P3 to P4 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




| | |
|---|---|
| | **Outline (18)** |
| 4 | Base |
| 8 | Construction to determine points on the parabola (2,2,2,2) |
| 6 | Drawing of parabola ABC |
| | **Ellipse (22)** |
| 4 | Draw major circle |
| 8 | Locating minor axis: swing major from **F** or $\mathbf{F_1}$ (4) and draw (4) minor circle |
| 6 | Locating additional points on the curve (2, 2, 2) |
| 4 | Drawing the curve |
| | **Tangent (8)** |
| 2 | Swing arc **JF** or $\mathbf{JF_1}$ |
| 2 | Swing major axis to cut arc |
| 2 | Locate point of contact |
| 2 | Draw tangent |
| | **Curve RS (8)** |
| 2 | Draw ordinate 30 mm from vertex |
| 4 | Identify vertical and horizontal distances for three points (2,2) |
| 2 | Draw the curve **RS** |
| | **Completion (4)** |
| 4 | Three lines, one circle |
| **10** | **Drafting, accuracy, presentation** |

## Total Marks 70