



**Coimisiún na Scrúduithe Stáit**  
**State Examinations Commission**

**Leaving Certificate 2013**

**Marking Scheme**

**Design and Communication Graphics**

**Ordinary 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*

*Leaving Certificate Examination 2013*

***Design and Communication  
Graphics  
Ordinary Level***



***Marking Scheme  
and Sample Solutions***

*(Other valid solutions are acceptable and are marked accordingly)*

**QUESTION A-1**

**MARKS**

**(a) Plan (10)**

- (i) Complete projections to plan ..... 3
- (ii) Identify points in plan ..... 3
- (iii) Complete plan ..... 4

**(b) Elevation (8)**

- (iv) Projections to elevation ..... 3
- (v) Identify points in elevation ..... 3
- (vi) Complete elevation ..... 2
- (vii) *Presentation* ..... 2

*Total = 20*

**QUESTION A-2**

**MARKS**

**Perspective Projection (18)**

- (i) Perspective of vertical surface ..... 4
- (ii) Perspective of sloping surface ..... 4
- (iii) Complete outline of top surface ..... 4
- (iv) Perspective rectangular opening ..... 4
- (v) Complete the opening ..... 2
- (vi) *Presentation* ..... 2

*Total = 20*

**QUESTION A-3**

**MARKS**

|   |          |
|---|----------|
| (i) Right hand label end rotated to prism in plan .....   | 2        |
| (ii) Prism width rotated to label in plan on LHS.....     | 1        |
| (iii) Label end transferred to prism on LHS in plan ..... | 1        |
| (iv) Projections to elevation .....                       | 3        |
| (v) Identify points on envelopment .....                  | 5        |
| (vi) Drawing of envelopment.....                          | 5        |
| (vii) Hidden detail .....                                 | 1        |
| (viii) <i>Presentation</i> .....                          | <u>2</u> |

*Total = 20*

**QUESTION A-4**

**MARKS**

**(a) Semi-Parabola (13)**

|   |   |
|---|---|
| (i) Complete division of DA .....                 | 2 |
| (ii) Complete division of DV .....                | 2 |
| (iii) Construction lines (2 sets) ....(2,2) ..... | 4 |
| (iv) Identify points on curve .....               | 2 |
| (v) Draw curve .....                              | 3 |

**(b) Reflection of Semi-Parabola (5)**

|                                   |          |
|-----------------------------------|----------|
| (vi) Locate points on curve ..... | 2        |
| (vii) Draw curve .....            | 3        |
| (viii) <i>Presentation</i> .....  | <u>2</u> |

*Total = 20*

**QUESTION B-1**

**(a) Elevation (17)**

- (i) Rectangular outline.....10
- (ii) Constructions to establish heights ..... 1
- (iii) Complete the elevation ..... 6

**(b) Plan (12)**

- (iv) Rectangular outline in plan ..... 8
- (v) Complete the plan..... 4

**(c) End elevation (4)**

- (vi) Establish correct heights..... 1
- (vii) Establish correct widths ..... 1
- (viii) Complete the end elevation..... 2

**(d) Auxiliary elevation (8)**

- (ix)  $X_1Y_1$  parallel to plan of surface A ..... 1
- (x) Projections from plan ..... 1
- (xi) Transfer heights from elevation ..... 1
- (xii) Draw surface A ..... 1
- (xiii) Complete auxiliary elevation ..... 4

- (xiv) *Presentation* ..... 4
- 

**Total = 45**

**QUESTION B-2****MARKS****(a) Initial setup (10)**

- (i) Draw the equilateral triangle ..... 5
- (ii) Draw the X, Y and Z axes ..... 5

**(b) End Elevation and plan (10)**

- (iii) Projections to set up the end elevation ..... 2
- (iv) Semicircle in end elevation ..... 1
- (v) Draw the end elevation in correct position ..... 2
- (vi) Projections to set up the plan ..... 2
- (vii) Semicircle in plan ..... 1
- (viii) Draw the plan in correct position ..... 2

**(c) Axonometric projection (21)**

- (ix) Projections from the end elevation ..... 3
- (x) Projections from the plan ..... 3
- (xi) Draw the right hand face in axonometric ..... 2
- (xii) Complete the outline of the axonometric projection ..... 5
- (xiii) Complete the axonometric projection (inner detail) ..... 8
- (xiv) *Presentation* ..... 4

---

**Total = 45**

**QUESTION B-3**

**MARKS**

**(a) Plan and Elevation (33)**

- (i) Draw plan of the pillar as given ..... 6
- (ii) Draw the plan of the wall as given ..... 5
- (iii) Draw the elevation of the wall as given ..... 5
- (iv) Complete the elevation as given..... 5

***Interpenetration on Left Hand Side (LHS)***

- (v) Projection from LHS of plan ..... 2
- (vi) Locate points on LHS in elevation ..... 2
- (vii) Complete LHS of elevation ..... 2

***Interpenetration on Right Hand Side (RHS)***

- (viii) Projections from RHS of plan ..... 2
- (ix) Locate points on RHS in elevation ..... 2
- (x) Complete RHS of elevation ..... 2

**(b) End View (8)**

- (xi) Transfer of widths from plan..... 2
- (xii) Projection of heights from elevation ..... 2
- (xiii) End view of wall ..... 2
- (xiv) Complete end view ..... 2

- (xv) ***Presentation*** ..... 4
- 

**Total = 45**



**QUESTION C-1**

**MARKS**

|  |                   |
|--|-------------------|
| <b>(a) Profile (21)</b>  |                   |
| (i) Measure heights and draw horizontal lines .....                    | 6                 |
| (ii) Projections from intersections between line AB and contours ..... | 7                 |
| (iii) Draw outline of profile .....                                    | 8                 |
| <b>(b) Earthworks for roadway (20)</b>                                 |                   |
| (iv) Parallel lines at 5m intervals .....                              | 5                 |
| (v) Identify points on cutting curve .....                             | 5                 |
| (vi) Identify points on embankment curve .....                         | 5                 |
| (vii) Draw earthworks curve .....                                      | 5                 |
| (viii) <i>Presentation</i> .....                                       | 4                 |
|  | <hr/>             |
|  | <i>Total = 45</i> |

**QUESTION C-2**

**MARKS**

**(a) Elevation and Plan (25)**

- (i) Outline of surface ABCD in plan ..... 6
- (ii) Elements in plan (incl. division) ..... 7
- (iii) Outline of surface ABCD in elevation ..... 6
- (iv) Elements in elevation (incl. division or proj.) ..... 4
- (v) Curve in elevation ..... 2

**(b) End view of Hyperbolic Paraboloid (16)**

- (vi) Determine heights and widths for surface ABCD ..... 4
- (vii) Draw the outline of the hyperbolic paraboloid ..... 4
- (viii) Draw the elements ..... 6
- (ix) Curve in end view ..... 2
  
- (x) *Presentation* ..... 4

---

*Total = 45*

**QUESTION C-3**

**MARKS**

**(a) Plan and Elevation (22)**

- (i) Draw straight line edges in elevation ..... 8
- (ii) Establish centres and draw curves .....(4,2)..... 6
- (iii) Draw plan ..... 8

**(b) Surface development (19)**

- (iv) Development of front and back surfaces ..... 4
- (v) Development of vertical surfaces ..... 4
- (vi) Development of inclined surfaces ..... 4
- (vii) Division of curved surface ..... 3
- (viii) Development of curved surfaces ..... 4
  
- (ix) *Presentation* ..... 4

---

**Total = 45**

**QUESTION C-4****MARKS****(a) Displacement Diagram (27)**

|       |  |   |
|-------|--|---|
| (i)   | 360° division (widths on displacement diag.) .....             | 6 |
| (ii)  | Correct use of 50mm height .....                               | 2 |
| (iii) | Establish follower position at 0°, 90°, 180° and 360° .....    | 4 |
| (iv)  | 0° to 90°, Uniform Velocity .....                              | 3 |
| (v)   | 90° to 180°, Dwell .....                                       | 3 |
| (vi)  | 180° to 360°, Uniform Acceleration and Retardation (UAR) ..... | 6 |
| (vii) | Complete Displacement Diagram .....                            | 3 |

**(b) Cam Profile (14)**

|        |   |   |
|--------|---|---|
| (viii) | Cam centre and nearest approach .....                         | 2 |
| (ix)   | Camshaft .....  | 1 |
| (x)    | Angular divisions corresponding to displacement diagram ..... | 3 |
| (xi)   | Correct direction of rotation .....                           | 1 |
| (xii)  | Identify points on the profile .....                          | 3 |
| (xiii) | Draw the cam profile .....                                    | 4 |
| (xiv)  | <b>Presentation</b> .....                                     | 4 |

---

**Total = 45**

**QUESTION C-5****MARKS*****Assembly (12)***

- (i) Relative positioning of components ..... 8
- (ii) Use of Section View ..... 4

***Bottom Clamp Jaw (8)***

- (iii) Outline ..... 6
- (iv) Hole ..... 2

***Top Clamp Jaw (10)***

- (v) Circular End ..... 2
- (vi) Completion of Outline ..... 6
- (vii) Hole and Slot ..... 2

***Clamping Screw (6)***

- (viii) Outline ..... 3
- (ix) Threads ..... 1
- (x) Completion ..... 2

***M8 Bolt (2)***

- (xi) Completion ..... 2

***Drawing Completion (3)***

- (xii) Hatching and Centrelines ... (2,1) ..... 3
- (xiii) ***Presentation*** ..... 4

---

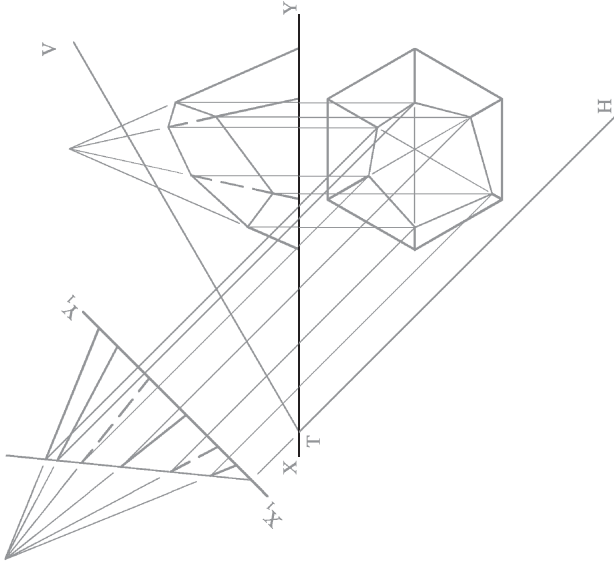
***Total = 45***

**SECTION A - Core - Answer Any Three of the questions on this A3 sheet**

**A-1.** The 3D graphic below shows a truncated hexagonal based pyramid designed to display a photograph.  
The incomplete plan and elevation of a similar pyramid are shown on the right. An auxiliary elevation is also given.

The solid is cut by an oblique plane VTH as shown.

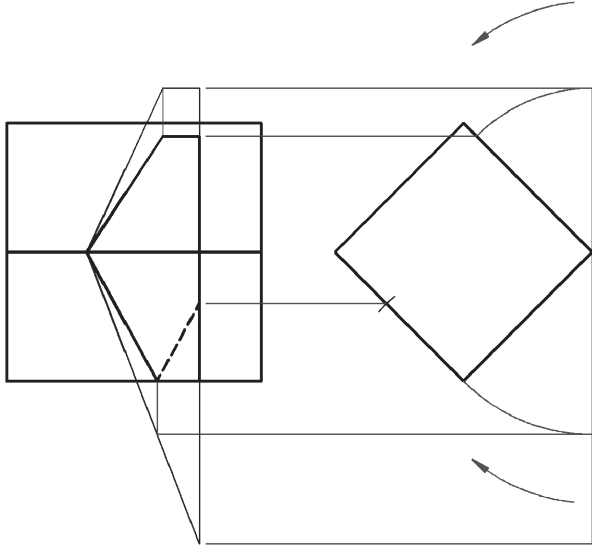
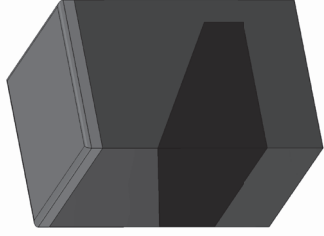
- (a) Complete the plan of the truncated pyramid.
- (b) Complete the elevation of the truncated pyramid.



**A-3.** The 3D graphic below shows a box for toys and a label which has been wrapped around it.

The drawing on the right shows the plan and elevation of the box. The label is also shown, before it has been wrapped around the box.

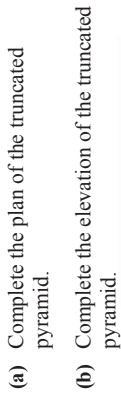
Complete the elevation showing the label in the wrapped position.



**A-2.** The 3D graphic below shows a toaster with one rectangular opening on its top surface.  
The drawing on the right shows the plan and a partially completed perspective view of a similar toaster.

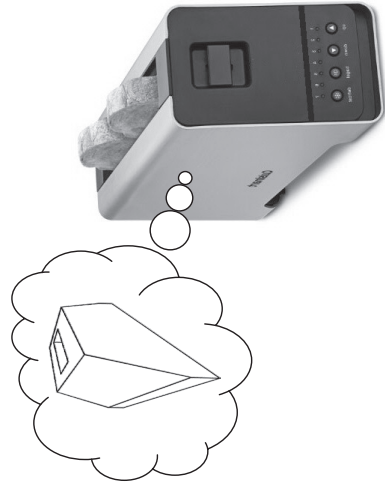
Complete the perspective view of the toaster.

- (a) Locate the remaining points on the parabola.
- (b) Draw the complete parabola.



**A-4.** The graphic below shows a water fountain in Sweden. The fountain is in the shape of a parabola.  
The drawing on the right shows a portion of a parabola inscribed in a rectangle ABCD. V is the vertex of the parabola.

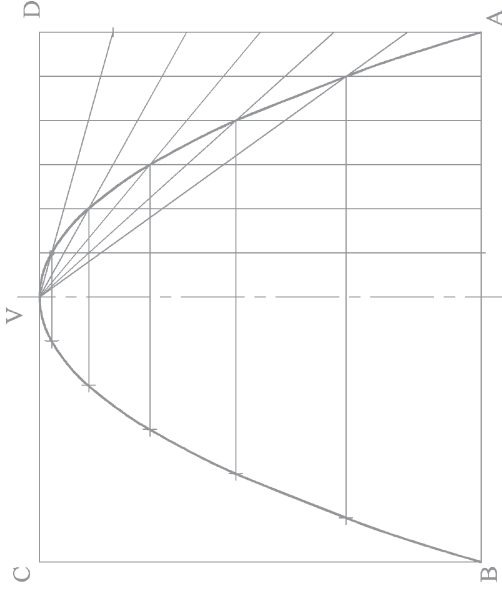
Complete the perspective view of the toaster.

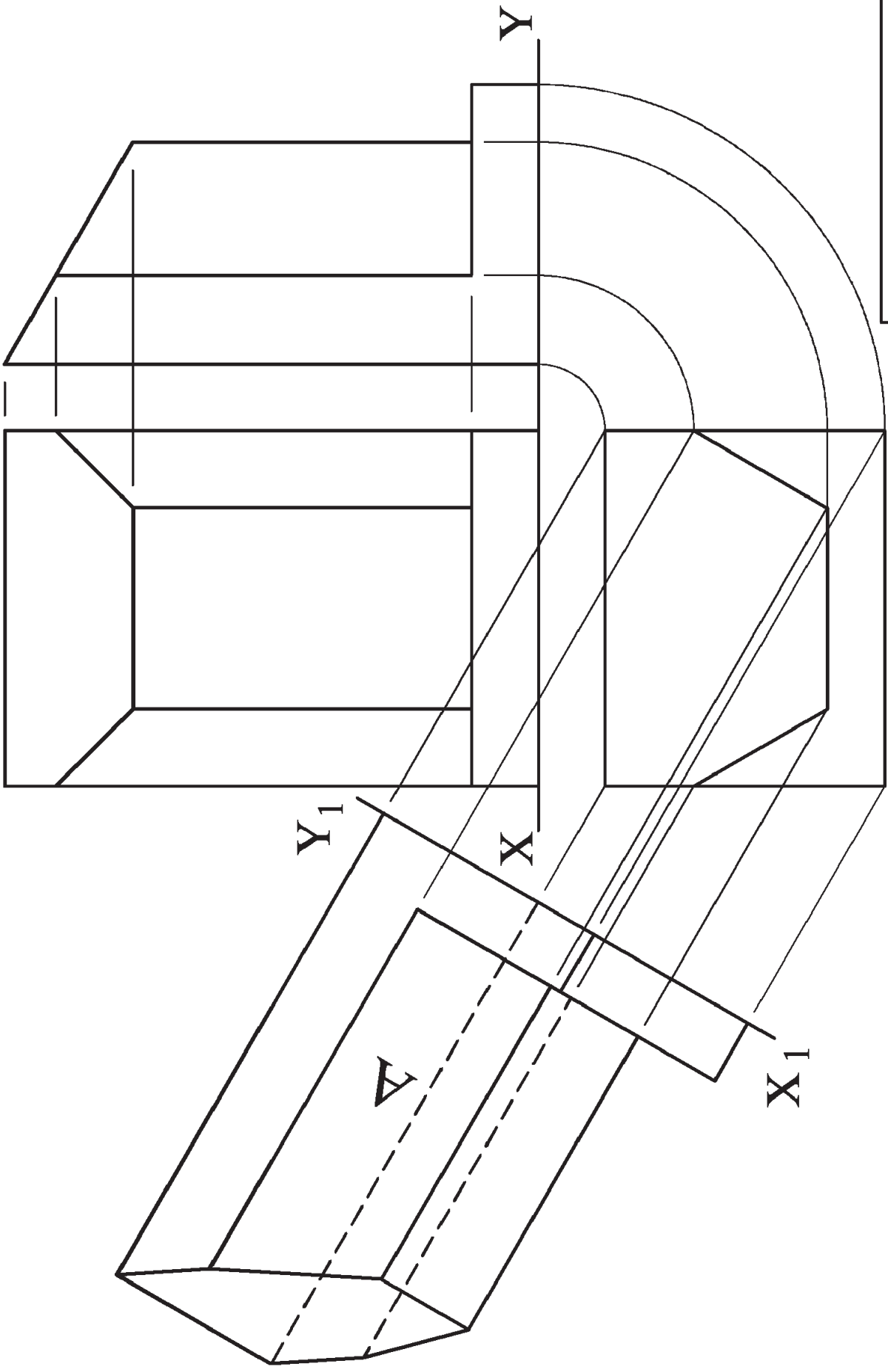
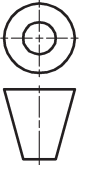


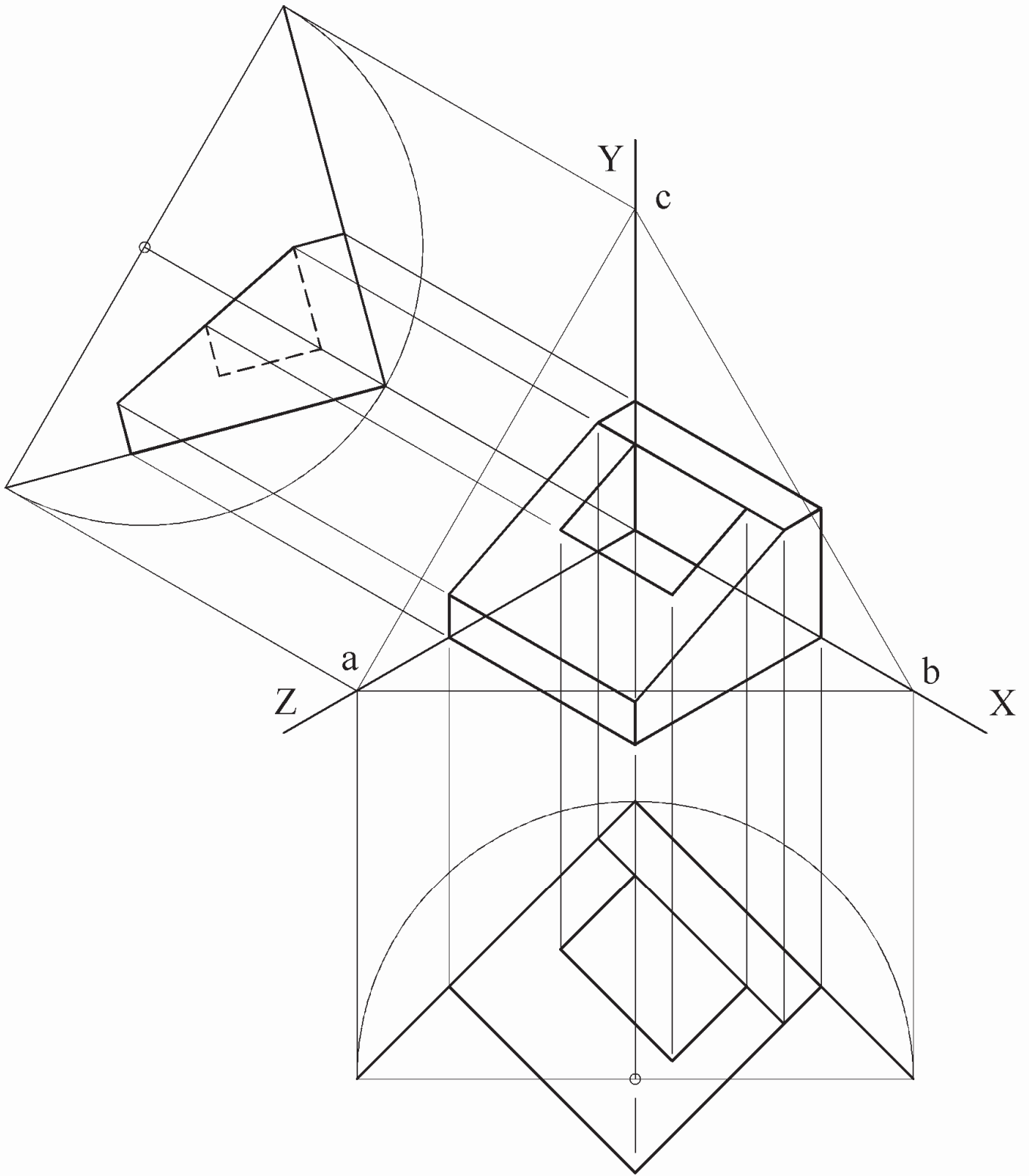
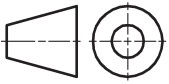
(a)

Locate the remaining points on the parabola.

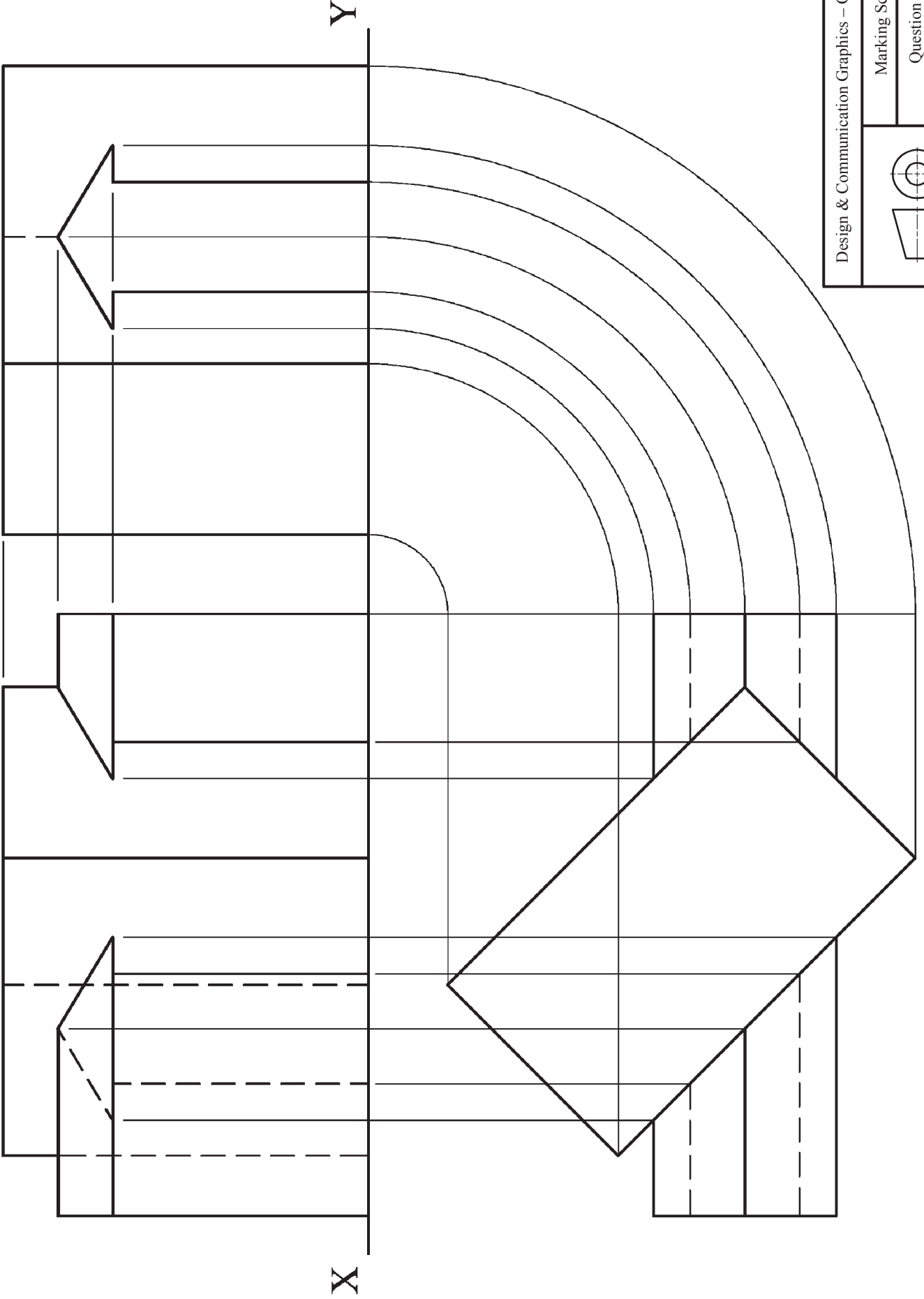
(b) Draw the complete parabola.

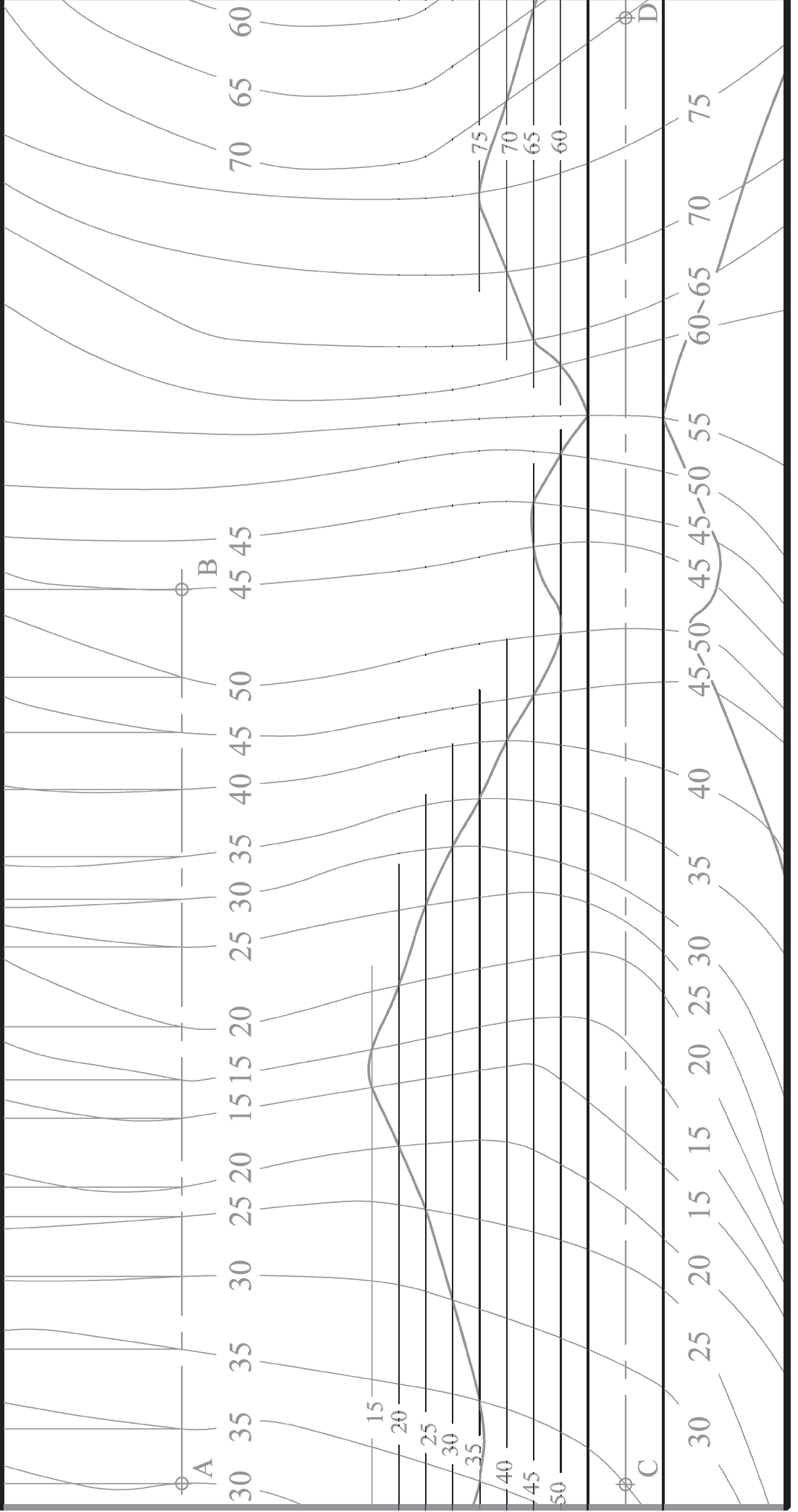
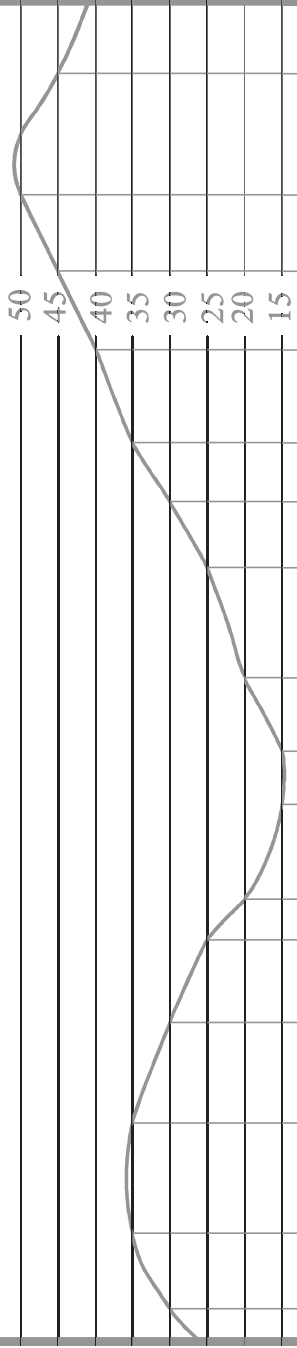
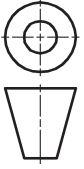


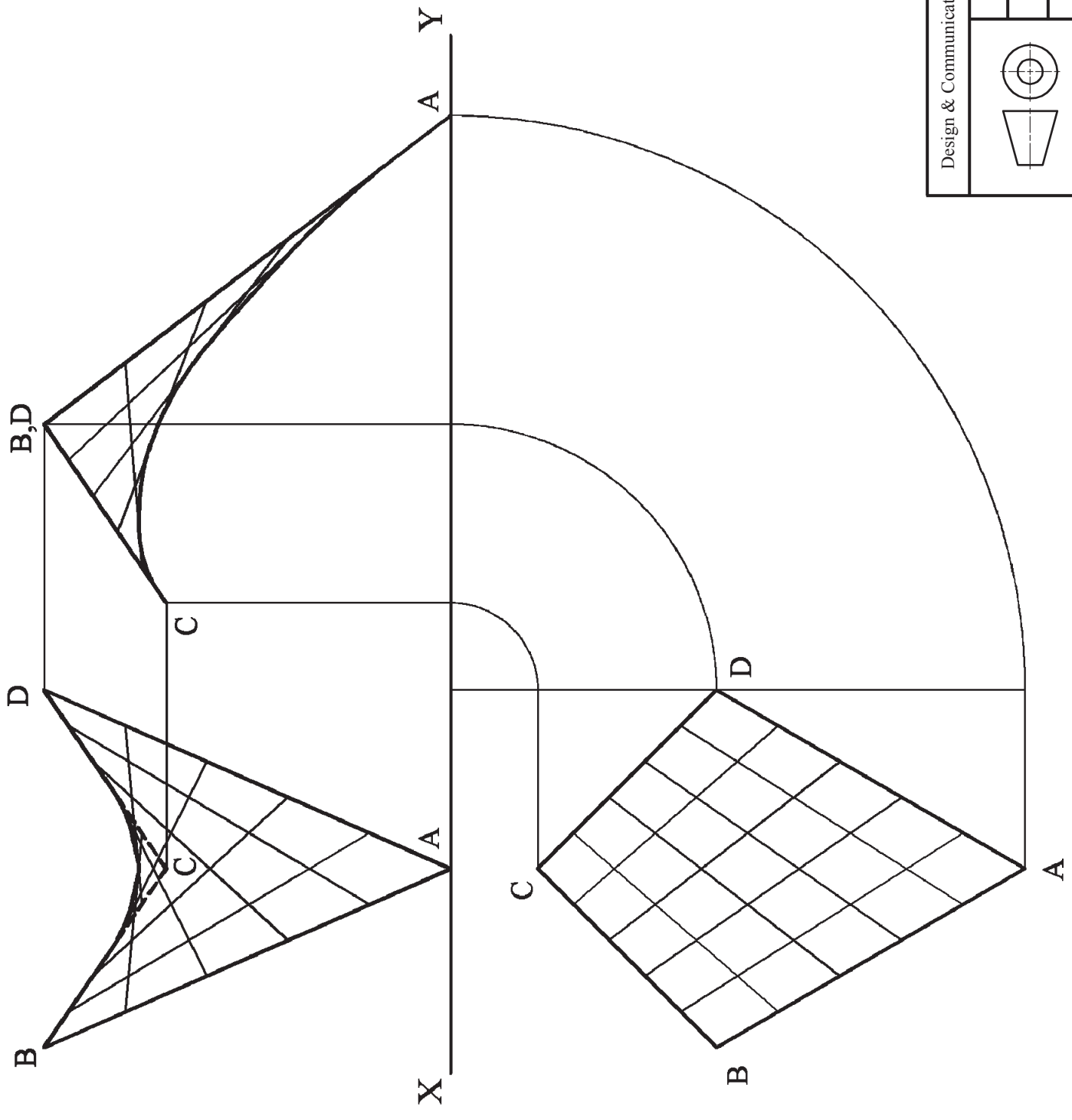


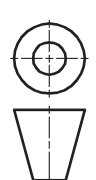


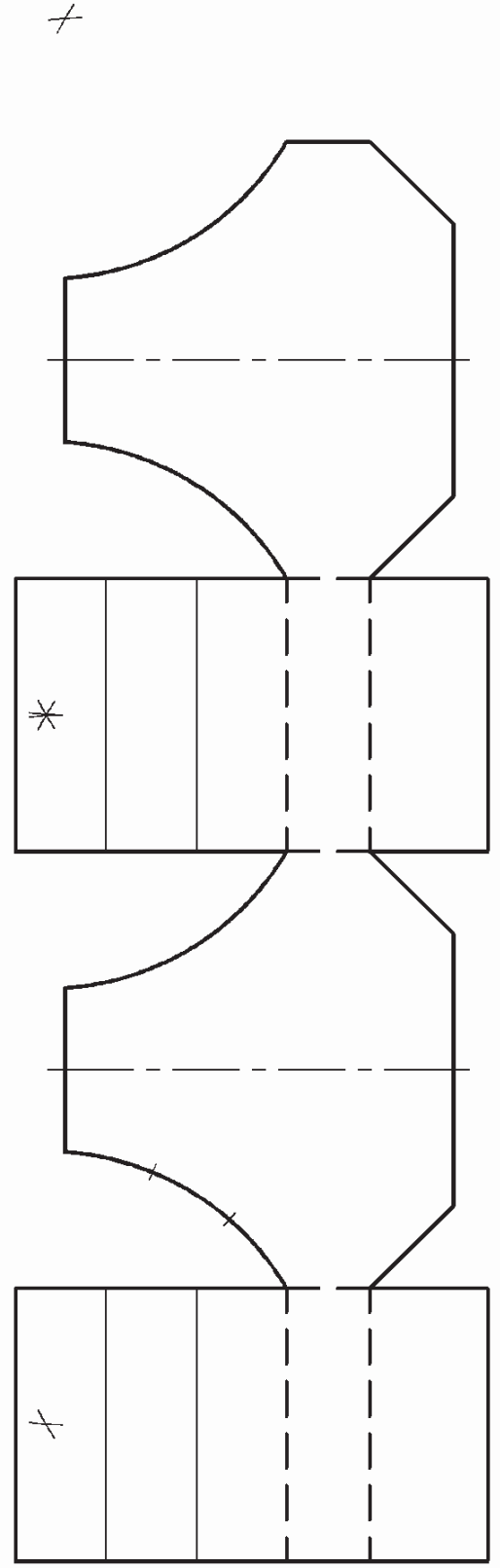
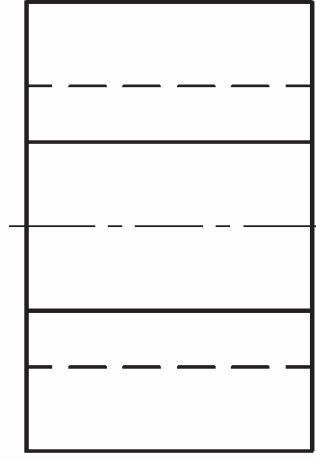
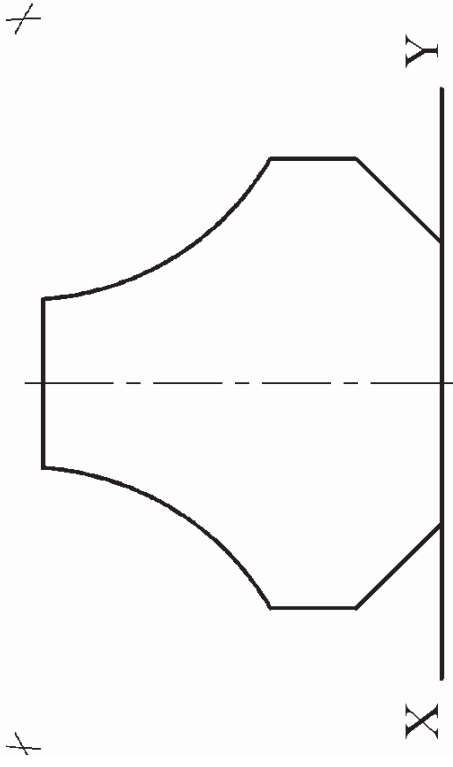
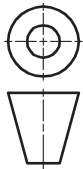


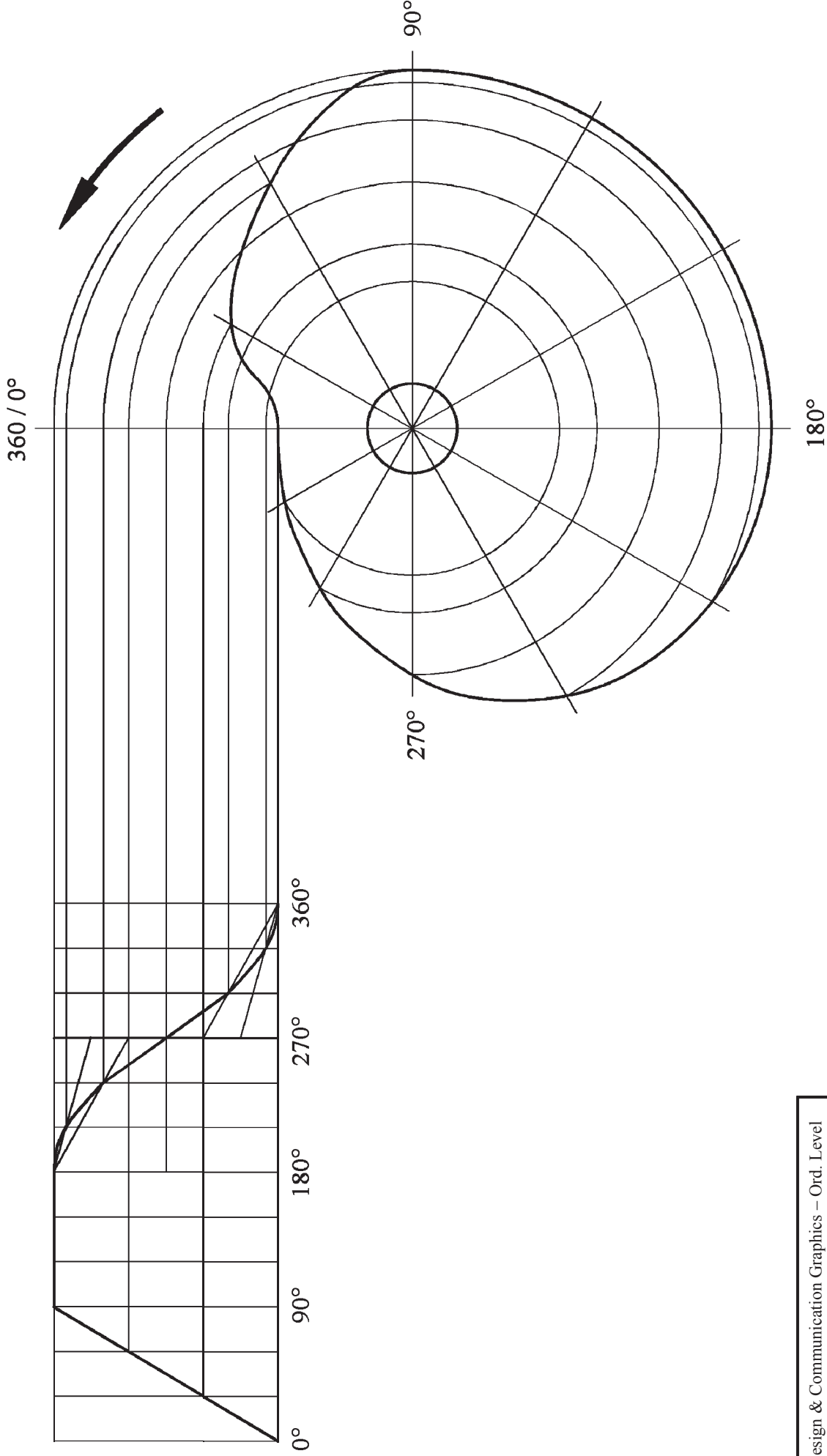






|   |           |
|---|-----------|
| Design & Communication Graphics – Ord. Level  |           |
|  |           |
| Marking Scheme  |           |
| Question C-2  |           |
| Scale: n/a  | June 2013 |





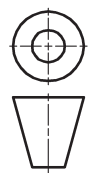
Design & Communication Graphics – Ord. Level

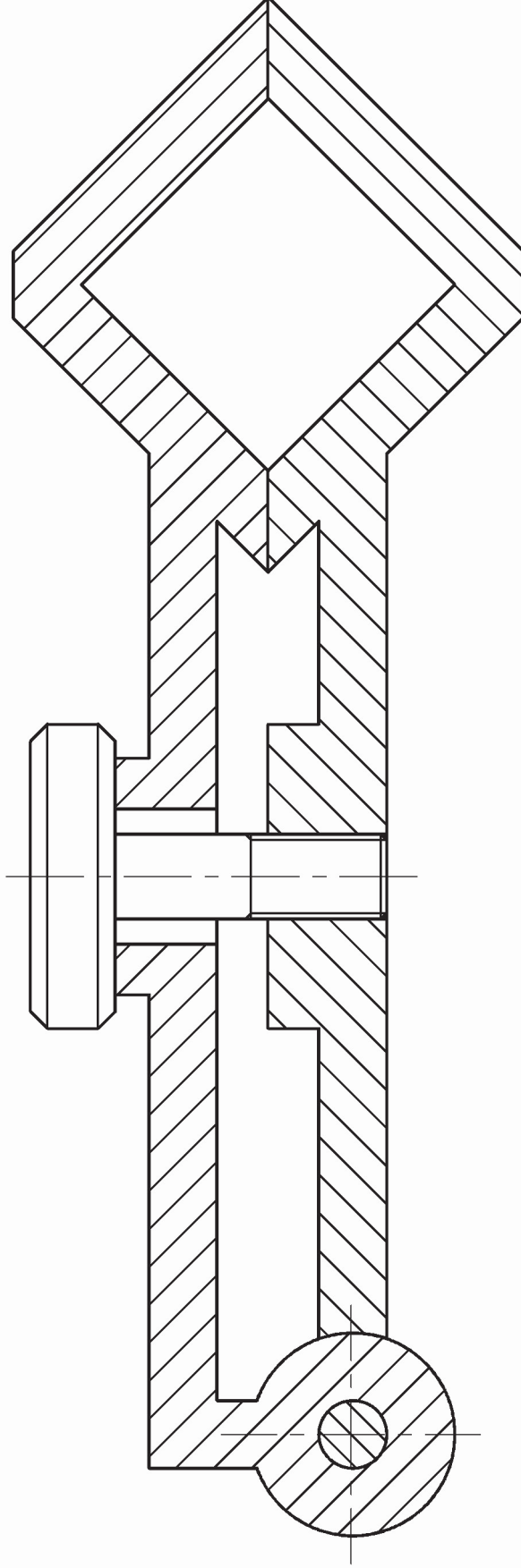
Marking Scheme

Question C-4

Scale: n/a

June 2013



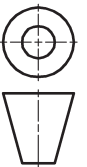


Design & Communication Graphics – Ord. Level

Marking Scheme

Question C-5

Scale: n/a June 2013





# Design and Communication Graphics

## Student Assignment - Ordinary Level

### Assessment Sheet 2013

Candidate Exam No.

| Output           | Marking criteria   | Marks        |
|------------------|--|--------------|
| <b>1</b>         | <b>Design Research</b> - Exploration of main design features using primary & secondary research; Selection of appropriate graphics; Effective layout and presentation of information combining images, sketches & annotations  |              |
|                  | a) Extensive range of relevant criteria considered - excellent presentation  | 13 - 15      |
|                  | b) Most relevant criteria considered - very good presentation  | 10 - 12      |
|                  | c) Some relevant criteria considered - good presentation   | 7 - 9        |
|                  | d) Limited criteria considered - fair presentation   | 4 - 6        |
|                  | e) At least one criterion considered - poor presentation   | 0 - 3        |
| <b>2</b>         | <b>Design Feature Comparison</b> - Selection of two appropriate images; Main dimensions inserted; Comparison of main design features; Contrasting of main design features; Effective layout and presentation of information combining images, sketches & annotations |              |
|                  | a) Extensive range of relevant criteria considered - excellent presentation  | 13 - 15      |
|                  | b) Most relevant criteria considered - very good presentation  | 10 - 12      |
|                  | c) Some relevant criteria considered - good presentation   | 7 - 9        |
|                  | d) Limited criteria considered - fair presentation   | 4 - 6        |
|                  | e) At least one criterion considered - poor presentation   | 0 - 3        |
| <b>3</b>         | <b>Freehand Graphical Representation</b> – Proportion; Form/Volume; Use of Tone/Line for effective rendering; Detailed communication of main design features to include 3D presentation quality drawing; Layout & presentation                                       |              |
|                  | a) Extensive range of relevant criteria considered - excellent presentation  | 17 - 20      |
|                  | b) Most relevant criteria considered - very good presentation  | 13 - 16      |
|                  | c) Some relevant criteria considered - good presentation   | 9 - 12       |
|                  | d) Limited criteria considered - fair presentation   | 5 - 8        |
|                  | e) At least one criterion considered - poor presentation   | 0 - 4        |
| <b>4</b>         | <b>SolidWorks Parts, Assembly, Drawing and eDrawing files</b>  |              |
|                  | • Adherence to required filing structure   | 4            |
|                  | • Creation of a minimum of 3 Part files  | 6            |
|                  | • Part models - Proficiency in Parametric CAD; Selection of most appropriate profile; Sketches fully defined; Features renamed; Appropriate type of extrusions used  | 12           |
|                  | • Assembly – Creation of Assembly environment; Accuracy of parts to facilitate correct assembly; Correct mating of parts; Application of appropriate appearances   | 6            |
|                  | • Factor of difficulty   | 3            |
|                  | • eDrawing of CAD model  | 2            |
| <b>5</b>         | <b>Hardcopy outputs from SolidWorks</b> - Detailed orthographic views of the Assembly; Rendered pictorial view of the Assembly; Exploded view of the CAD model; Inclusion of main dimensions; Scaling, layout and presentation                                       |              |
|                  | a) Extensive range of relevant criteria considered - excellent presentation  | 17 - 20      |
|                  | b) Most relevant criteria considered - very good presentation  | 13 - 16      |
|                  | c) Some relevant criteria considered - good presentation   | 9 - 12       |
|                  | d) Limited criteria considered - fair presentation   | 5 - 8        |
|                  | e) At least one criterion considered - poor presentation   | 0 - 4        |
| <b>6</b>         | <b>Photorealistic Representation</b>   |              |
|                  | Produce photorealistic computer generated images of the artefact   | 7            |
| <b>7</b>         | <b>Graphical exploration of design solutions</b> - Exploration of theme/possible solution(s); Justification of chosen solution(s); Use of appropriate images/graphics; Effective layout and presentation of information combining images, sketches & annotations     |              |
|                  | a) Extensive range of relevant criteria considered - excellent presentation  | 17 - 20      |
|                  | b) Most relevant criteria considered - very good presentation  | 13 - 16      |
|                  | c) Some relevant criteria considered - good presentation   | 9 - 12       |
|                  | d) Limited criteria considered - fair presentation   | 5 - 8        |
|                  | e) At least one criterion considered - poor presentation   | 0 - 4        |
| <b>8</b>         | <b>Presentation of Modification/Concept Design</b> – Proportion, Form/Volume, Use of Tone/Line for effective rendering, Detailed communication of modified/concept design features; Layout and presentation  |              |
|                  | a) Extensive range of relevant criteria considered - excellent presentation  | 9 - 10       |
|                  | b) Most relevant criteria considered - very good presentation  | 7 - 8        |
|                  | c) Some relevant criteria considered - good presentation   | 5 - 6        |
|                  | d) Limited criteria considered - fair presentation   | 3 - 4        |
|                  | e) At least one criterion considered - poor presentation   | 0 - 2        |
| <b>9</b>         | <b>Hardcopy outputs from SolidWorks</b> - CAD model; Detailed orthographic views of the proposed solution; Rendered pictorial view of the CAD model, Inclusion of main dimensions; Scaling, layout and presentation  |              |
|                  | • Application of CAD skills  | 5            |
|                  | a) Extensive range of relevant criteria considered - excellent presentation  | 13 - 15      |
|                  | b) Most relevant criteria considered - very good presentation  | 10 - 12      |
|                  | c) Some relevant criteria considered - good presentation   | 7 - 9        |
|                  | d) Limited criteria considered - fair presentation   | 4 - 6        |
|                  | e) At least one criterion considered - poor presentation   | 0 - 3        |
| <b>Sub-total</b> |  |              |
|                  | <b>Marks deducted for pages in excess of maximum</b>   |              |
|                  |  | <b>Total</b> |

