



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

**LEAVING CERTIFICATE 2010**

**MARKING SCHEME**

**DESIGN AND COMMUNICATION  
GRAPHICS**

**ORDINARY LEVEL**

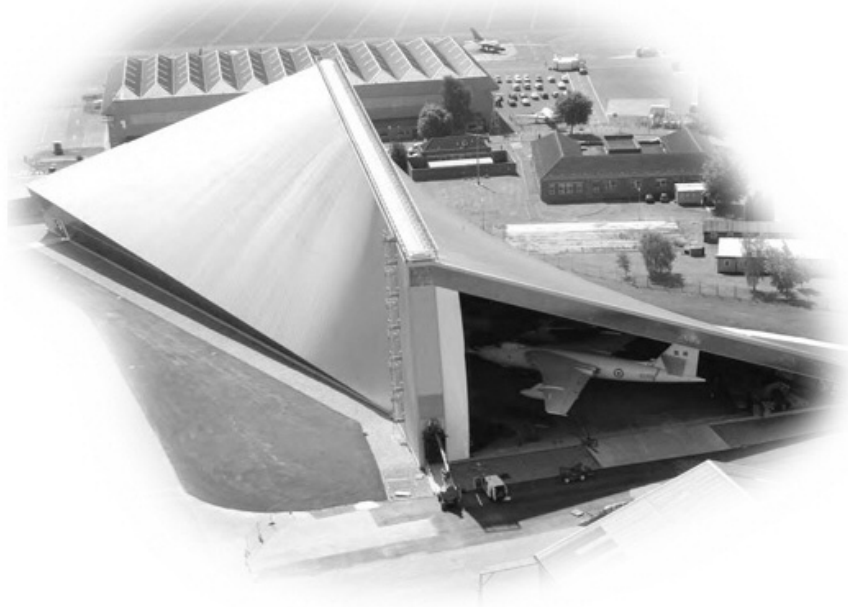


**STATE EXAMINATIONS COMMISSION**

**LEAVING CERTIFICATE 2010**

**DESIGN & COMMUNICATION GRAPHICS  
(ORDINARY LEVEL)**

**MARKING SCHEME  
AND SAMPLE SOLUTIONS**



The solutions presented are examples only.  
All other valid solutions are acceptable and are marked accordingly.

**QUESTION A-1**

**MARKS**

<b>(a) Ellipse (14)</b>	
(i) Draw the minor axis .....	3
(ii) Appropriate method of construction .....	4
(iii) Identify points on curve .....	3
(iv) Draw curve .....	4
<b>(b) Focal points (4)</b>	
(v) Locate focal points .....	4
(vi) <i>Presentation</i> .....	<u>2</u>
	<i>Total = 20</i>

**QUESTION A-2**

**MARKS**

<b>(a) Sphere A (9)</b>	
(i) Projection from plan .....	3
(ii) Establish the centre point in elevation .....	3
(iii) Draw sphere A .....	3
<b>(b) Sphere B (9)</b>	
(iv) Required construction in elevation .....	2
(v) Projections to the plan .....	3
(vi) Draw sphere B .....	3
(vii) Hidden detail .....	1
(viii) <i>Presentation</i> .....	<u>2</u>
	<i>Total = 20</i>

**QUESTION A-3**

	<b><u>MARKS</u></b>
<b>(a) Completion of elevation (9)</b>	
(i) Projections to elevation .....	2
(ii) Identify points in elevation .....	4
(iii) Complete elevation .....	3
<b>(b) True angle (9)</b>	
(iv) Projections from plan .....	2
(v) Set up X <sub>1</sub> Y <sub>1</sub> .....	2
(vi) Heights from elevation .....	2
(vii) Complete the auxiliary elevation .....	3
(viii) <i>Presentation</i> .....	<u>2</u>
<b>Total = 20</b>	

**QUESTION A-4**

	<b><u>MARKS</u></b>
<b>(a) Completion of plan (6)</b>	
(i) Transfer the correct widths to the plan .....	3
(ii) Complete the plan .....	3
<b>(b) Axonometric projection (12)</b>	
(iii) Projections from the plan .....	3
(iv) Projection from the elevation .....	3
(v) Identify points on the axonometric projection .....	3
(vi) Complete the axonometric projection .....	3
(vii) <i>Presentation</i> .....	<u>2</u>
<b>Total = 20</b>	

**QUESTION B-1****MARKS****Outline plan, outline elevation and end view (24)**

(i) Plan of rectangular prism .....	5
(ii) Elevation of rectangular prism .....	4
(iii) Elevation of square prism inc. setup (2, 2).....	4
(iv) Plan of square prism .....	4
(v) End view .....	7

**Interpenetration (17)**

(vi) Projections from LHS of plan .....	2
(vii) Locate points in elevation .....	3
(viii) Complete LHS of elevation .....	2
(ix) Projections from RHS of plan .....	3
(x) Locate points in elevation .....	4
(xi) Complete RHS of elevation .....	2
(xii) Hidden detail .....	1
(xiii) <i>Presentation</i> .....	4

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**Total = 45**

**QUESTION B-2**

**(a) Plan and elevation (26)**

(i) Plan of greenhouse .....	7
(ii) Plan of compost bin.....	7
(iii) Elevation of green house .....	8
(iv) Elevation of compost bin .....	4

**(b) Auxiliary elevation (15)**

(v) $X_1Y_1$ parallel to plan of surface A .....	2
(vi) Projections from plan .....	2
(vii) Transfer heights from elevation .....	3
(viii) Draw surface A .....	4
(ix) Complete auxiliary elevation .....	4
(x) <i>Presentation</i> .....	4

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**Total = 45**

**QUESTION B-3**

**MARKS**

**(a) Plan (12)**

(i) Plan of structure ..... 12

**(b) Perspective drawing (29)**

(ii) Plan of spectator, PP, VP<sub>1</sub> and VP<sub>2</sub> ..... 3

(iii) Elevation of GL, HL, VP<sub>1</sub> and VP<sub>2</sub> ..... 4

(iv) Sight lines from spectator to plan ..... 7

***Main structure***

(v) Perspective of bottom edges ..... 4

(vi) Establish heights ..... 2

(vii) Completion of main structure ..... 2

***Window***

(viii) Establish height for top of window opening ..... 2

(ix) Establish height for bottom of window opening ..... 2

(x) Completion of window ..... 2

(xi) Completion of inside of tent ..... 1

(xii) ***Presentation*** ..... 4

***Total = 45***



**QUESTION C-1**

**MARKS**

<b>(a) Profile (19)</b>	
(i) Measure heights and draw horizontal lines .....	6
(ii) Projections from intersections between line AB and contours .....	5
(iii) Draw outline of profile .....	8
<b>(b) Altitude difference (5)</b>	
(iv) Identify the altitude extremes .....	3
(v) Indicate the required dimension .....	2
<b>(c) Strike and dip (17)</b>	
(vi) Join the points in plan.....	4
(vii) Draw the triangle in elevation .....	3
(viii) Horizontal line in elevation .....	2
(ix) Strike in plan .....	3
(x) Viewing direction for dip .....	2
(xi) Determine dip (2 heights, edge view) .....	3
(xii) <b>Presentation</b> .....	4

**Total = 45**

**QUESTION C-2**

**MARKS**

**(a) Elevation and Plan (23)**

(i) Outline of surface ABCD in plan .....	5
(ii) Elements in plan (incl. division) .....	7
(iii) Outline of surface ABCD in elevation .....	4
(iv) Elements in elevation (incl. division or proj.) .....	5
(v) Curve in elevation .....	2

**(b) End view of Hyperbolic Paraboloid (18)**

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

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*Total = 45*

**QUESTION C-3****MARKS****(a) Plan and Elevation (19)**

(i) Outline plan .....	5
(ii) Outline elevation .....	5
(iii) End view .....	6
(iv) Complete the elevation and plan (1, 2) .....	3

**(b) Surface development (22)**

(v) Development of back surface .....	3
(vi) Development of bottom surface .....	2
(vii) Development of front vertical surface .....	2
(viii) Development of inclined surface .....	3
(ix) Development of side surfaces .....	4
(x) Division of circumference .....	2
(xi) Development of curved surface .....	2
(xii) Establish the width and length for the opening. ....	2
(xiii) Draw the opening .....	2
(xiv) <i>Presentation</i> .....	4

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**Total = 45**

**QUESTION C-4****MARKS****(a) Displacement Diagram (13)**

(i) 360° division (widths on displacement diag.) .....	3
(ii) Establish follower position at 0°, 120°, 180° and 360° .....	4
(iii) 0° to 120°, Uniform Velocity .....	2
(iv) 120° to 180°, Dwell .....	2
(v) 180° to 360°, Simple Harmonic Motion .....	2

**Cam Profile (12)**

(vi) Minimum radius .....	2
(vii) Camshaft diameter.....	2
(viii) Maximum radius.....	2
(ix) 0° to 120°, Uniform Velocity .....	1
(x) 120° to 180°, Dwell.....	1
(xi) 180° to 360°, Simple Harmonic Motion .....	1
(xii) Direction of rotation .....	1
(xiii) Draw cam profile.....	2

**(b) Cycloid (16)**

(xiv) Setup line AB, Circle C and Point P .....	6
(xv) Division of circle .....	2
(xvi) Centres marked on centre line .....	2
(xvii) Arcs swung from centres.....	2
(xviii) Points on locus .....	2
(xix) Draw locus .....	2
(xx) <b>Presentation</b> .....	4

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**Total = 45**

**QUESTION C-5****MARKS*****Assembly (8)***

- (i) Relative positioning of components ..... 8

***Mounting Bracket (10)***

- (ii) Outline ..... 6

- (iii) Hole ..... 1

- (iv) Hexagons ..... 3

***Fixing Plate (6)***

- (v) Outline ..... 4

- (vi) Hole ..... 2

***Connecting Pin (5)***

- (vii) Outline ..... 3

- (viii) Holes ..... 2

***Bolts, Nuts and Washers (6)***

- (ix) Heads (incl. curves) ..... 2

- (x) Shafts (incl. threads) ..... 2

- (xi) Nuts and washers (incl. curves) ..... 2

***Drawing Completion (6)***

- (xii) Hatching and Centrelines ... (3,3) ..... 6

- (xiii)
- Presentation***
- ..... 4

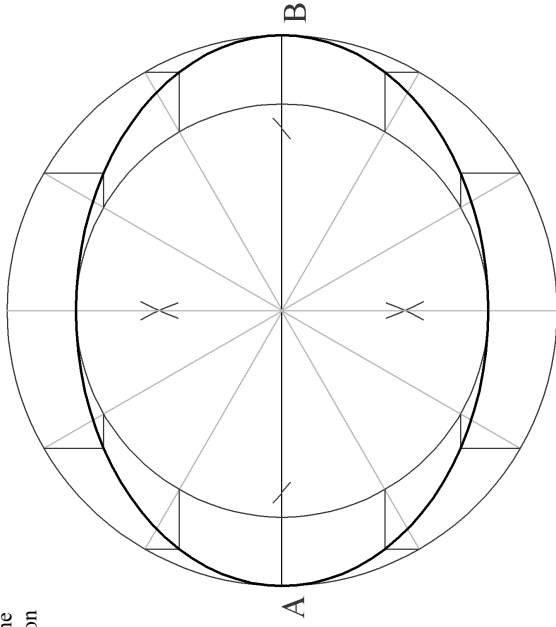
***Total = 45***

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

**A-1.** The 3D graphic on the left below shows a tennis racket. The head of the racket is an ellipse.

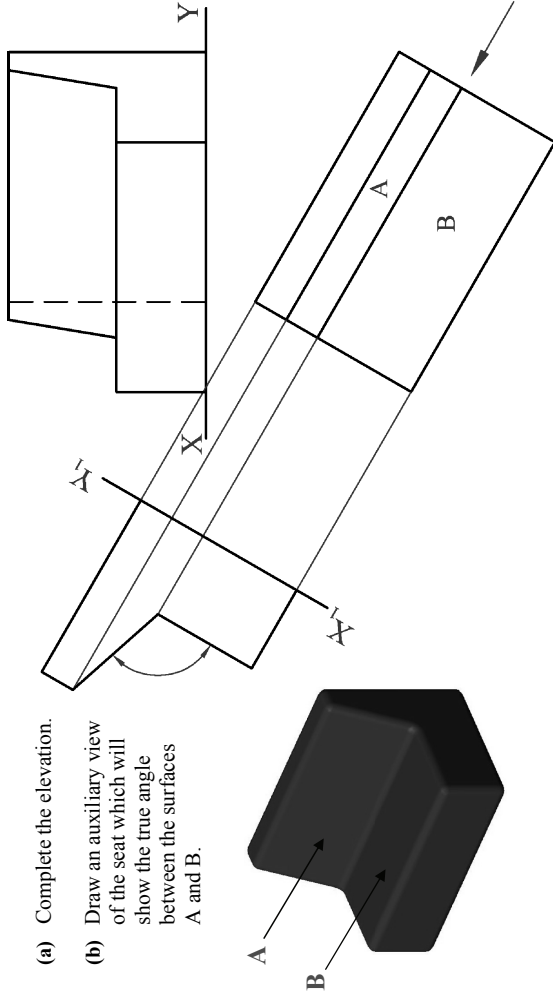
On the drawing on the right, AB is the major axis for the ellipse and a portion of the curve is already drawn.

- (a) Locate the minor axis and construct the complete ellipse.
- (b) Find the focal points for the ellipse.



**A-3.** The 3D graphic below shows a modern seat from a hotel lobby. The plan and incomplete elevation of the seat are shown on the right.

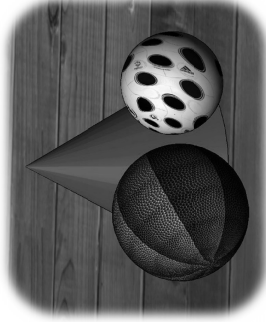
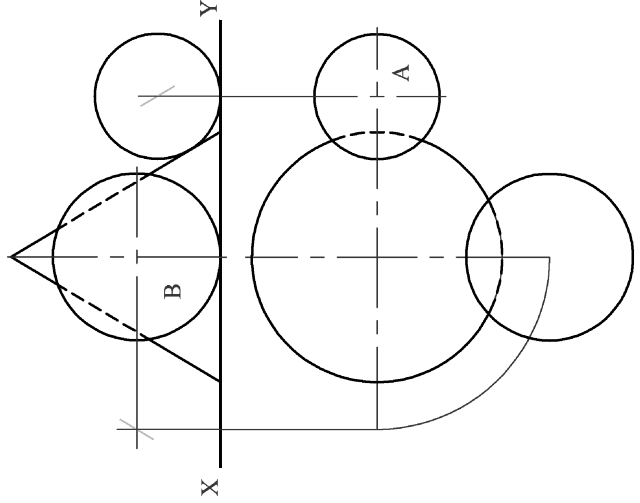
- (a) Complete the elevation.
- (b) Draw an auxiliary view of the seat which will show the true angle between the surfaces A and B.



**A-2.** The 3D graphic below shows a training cone which is in contact with a football (A) and a basketball (B) as shown. The three items rest on the floor.

The drawing on the right shows the plan and elevation of the cone. Sphere A is also shown in the plan and sphere B is shown in the elevation.

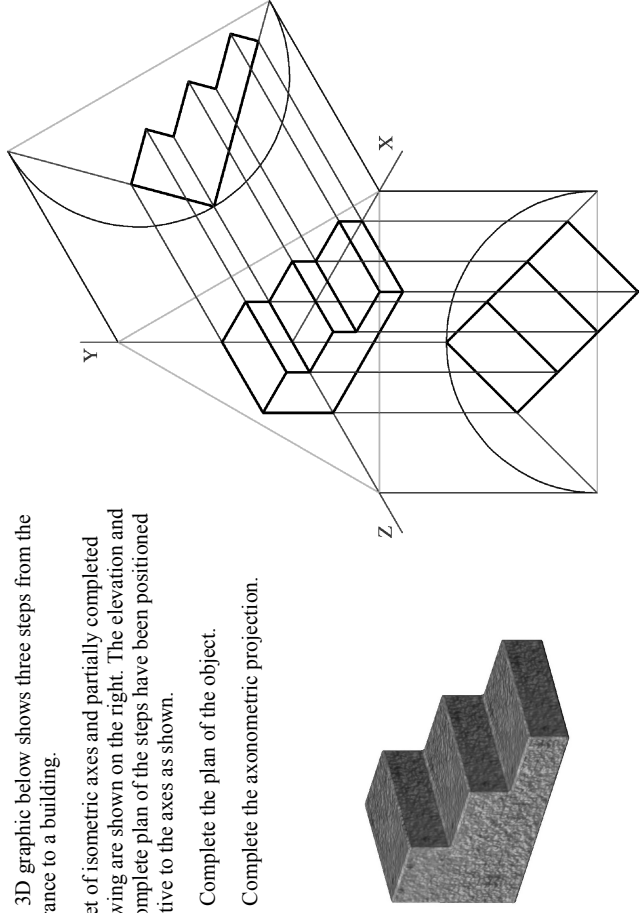
- (a) Draw the elevation of sphere A.
- (b) Draw the plan of sphere B.

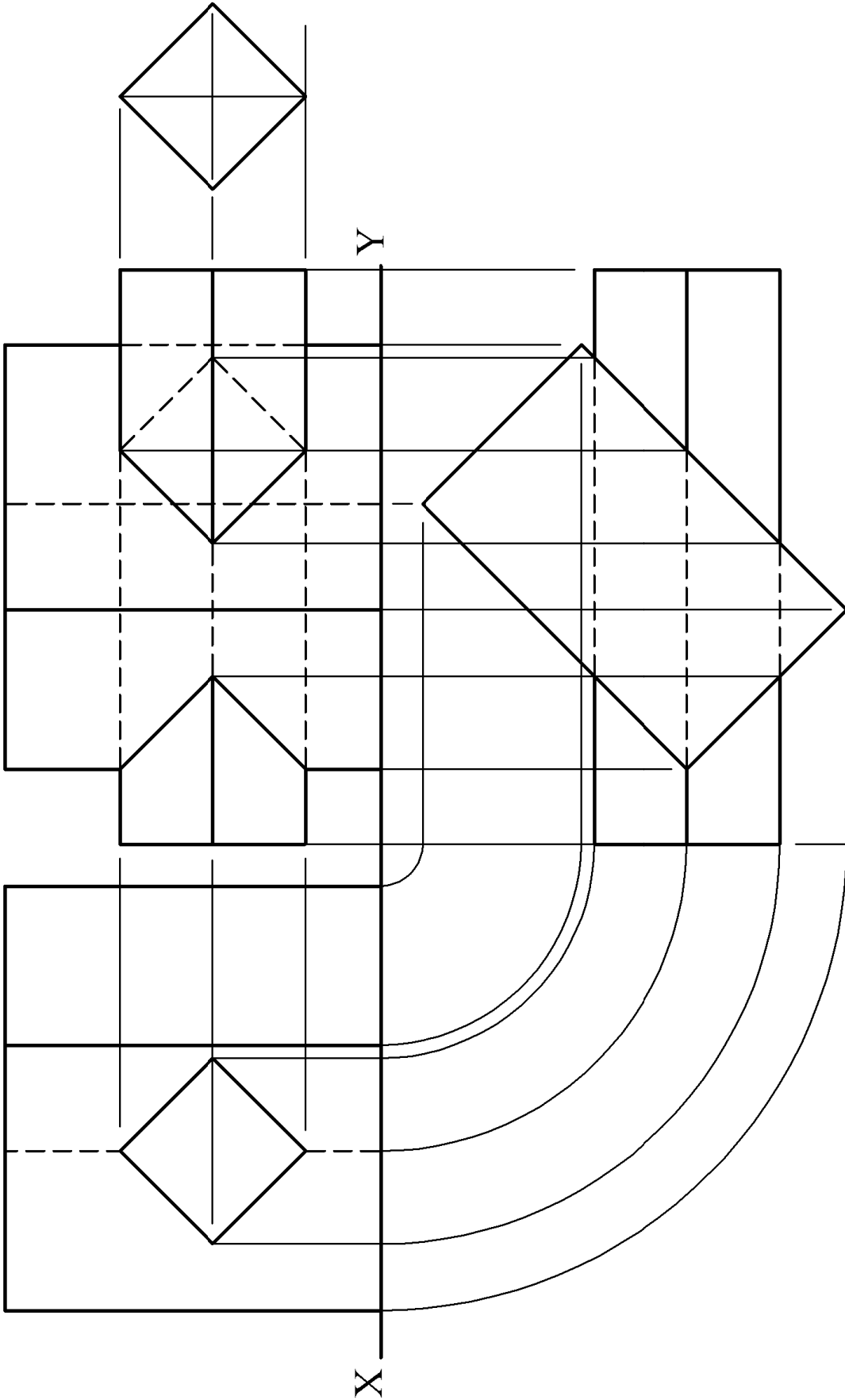


**A-4.** The 3D graphic below shows three steps from the entrance to a building.

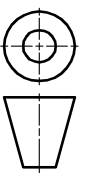
A set of isometric axes and partially completed drawing are shown on the right. The elevation and incomplete plan of the steps have been positioned relative to the axes as shown.

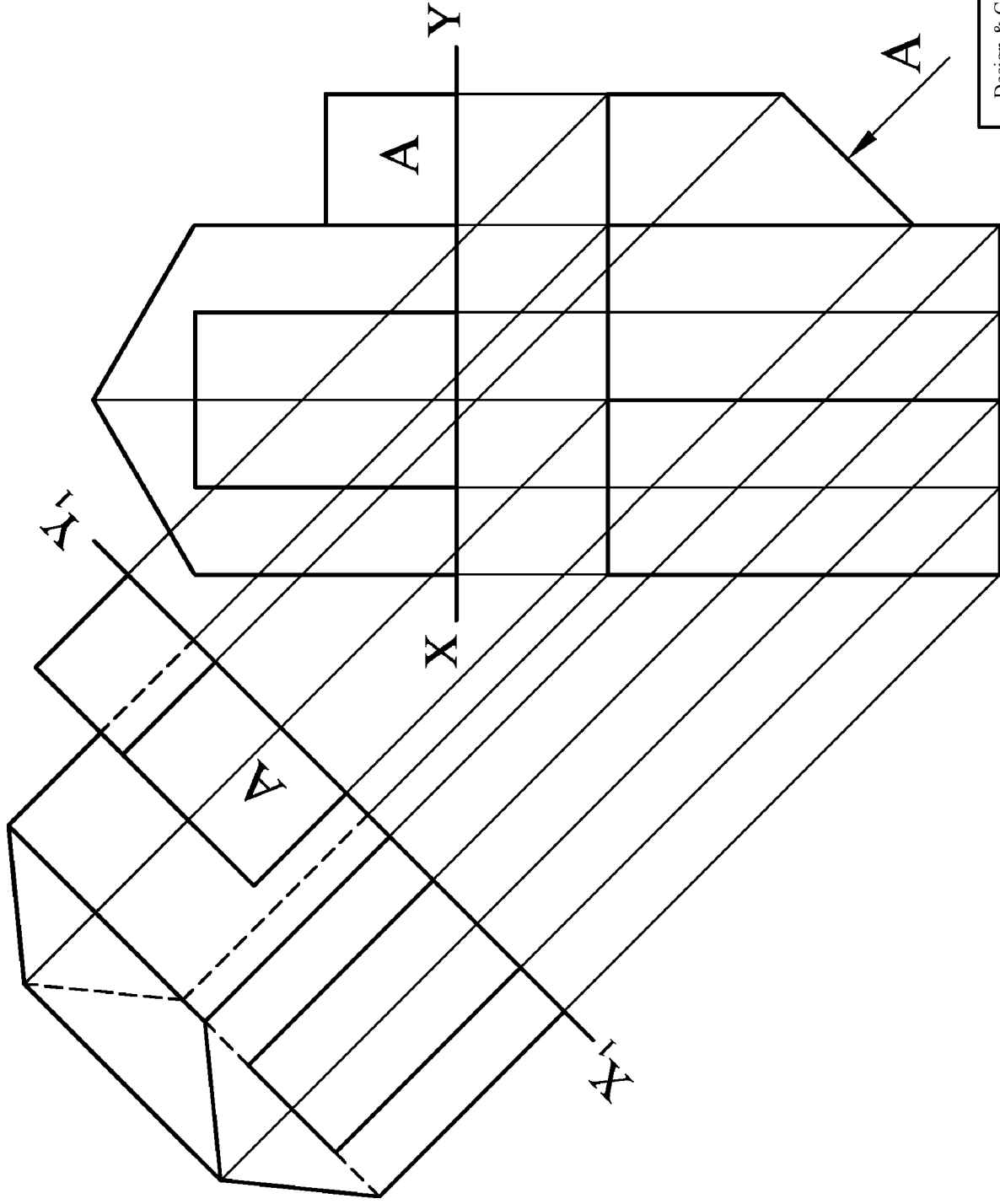
- (a) Complete the plan of the object.
- (b) Complete the axonometric projection.





Design & Communication Graphics – Ord. Level	
Marking Scheme	
Question B-1	
Scale: n/a	June 2010



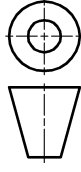


Design & Communication Graphics – Ord. Level

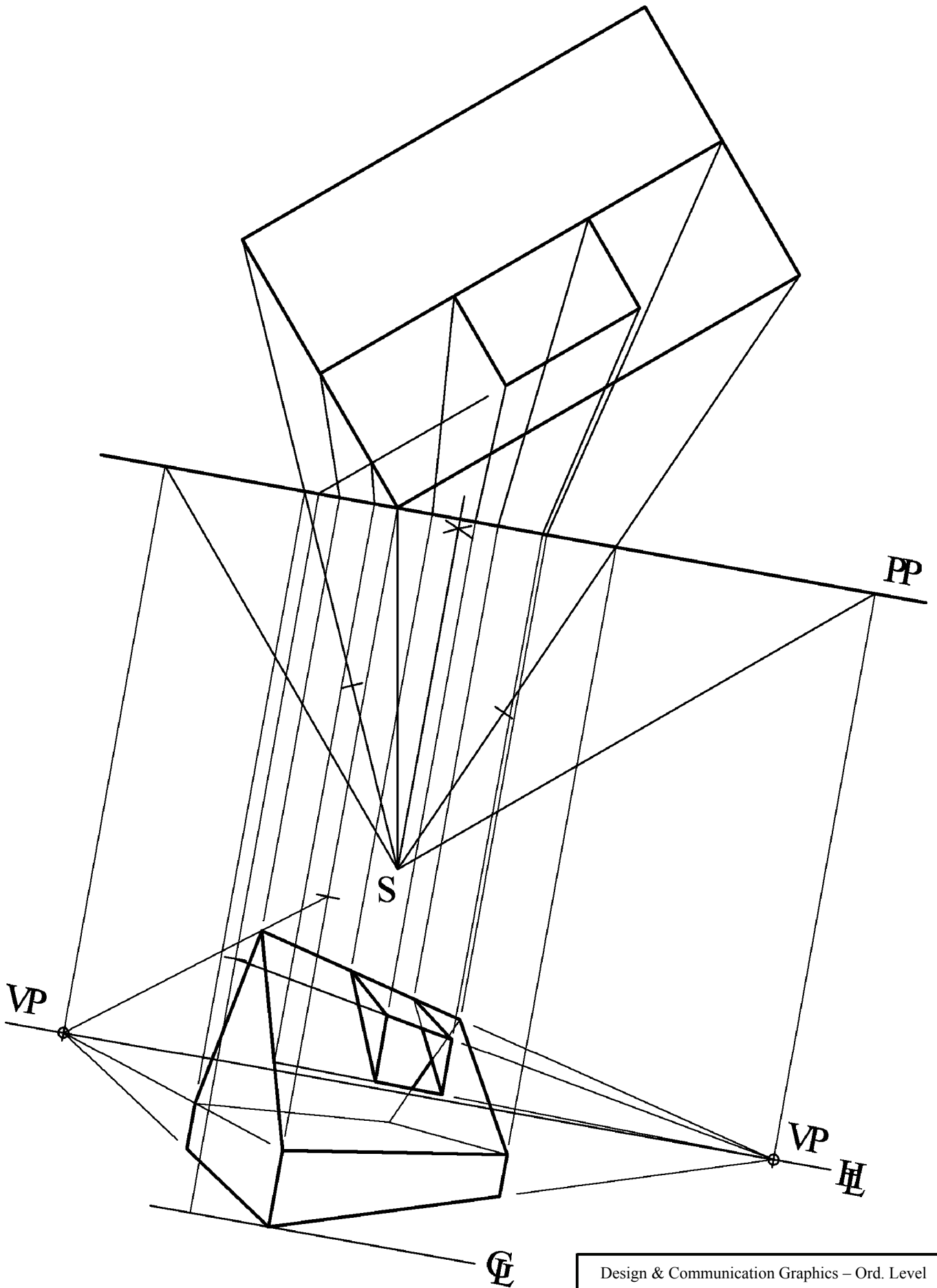
Marking Scheme

Question B-2

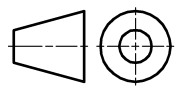
Scale: n/a June 2010



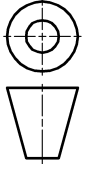
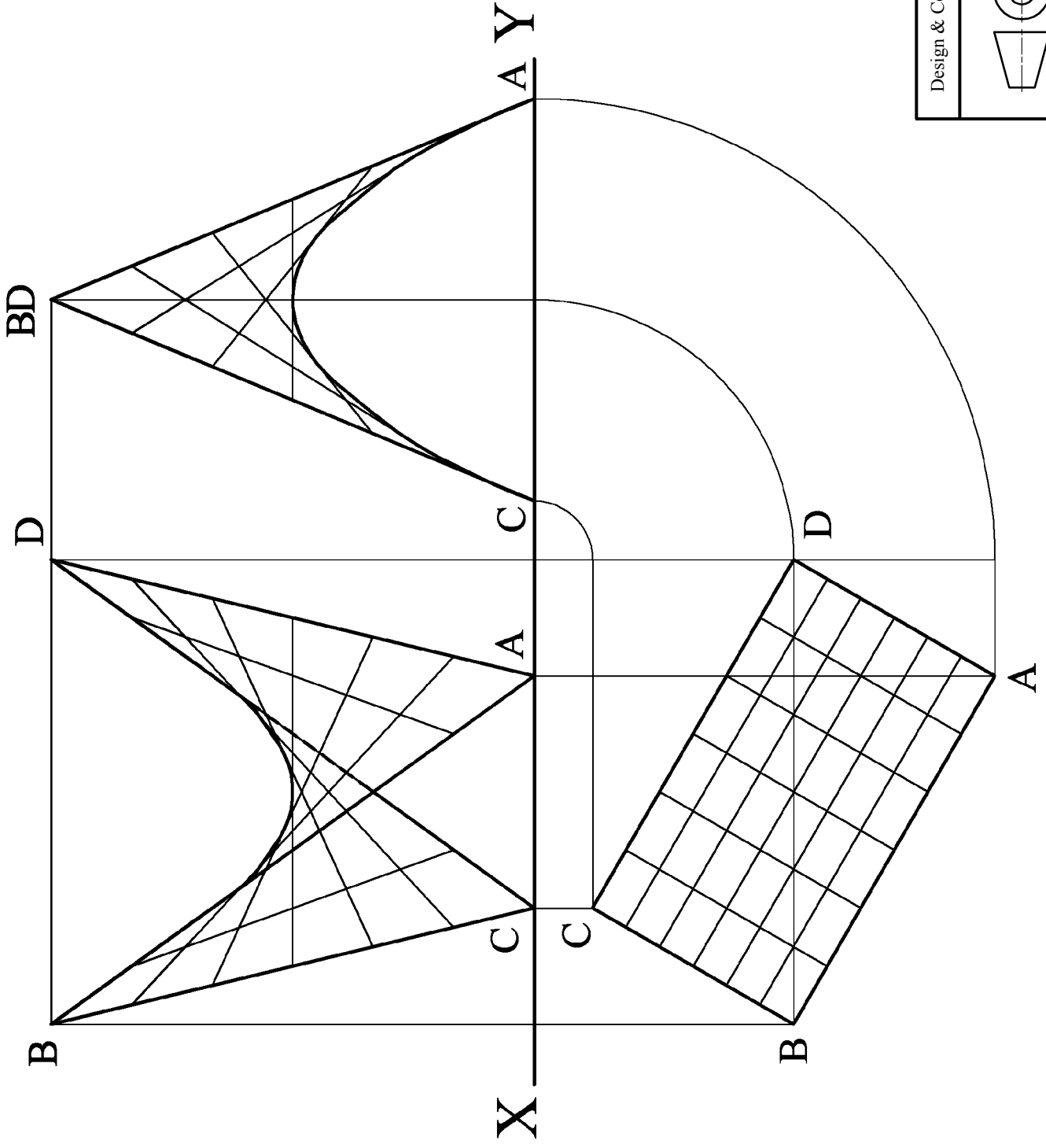


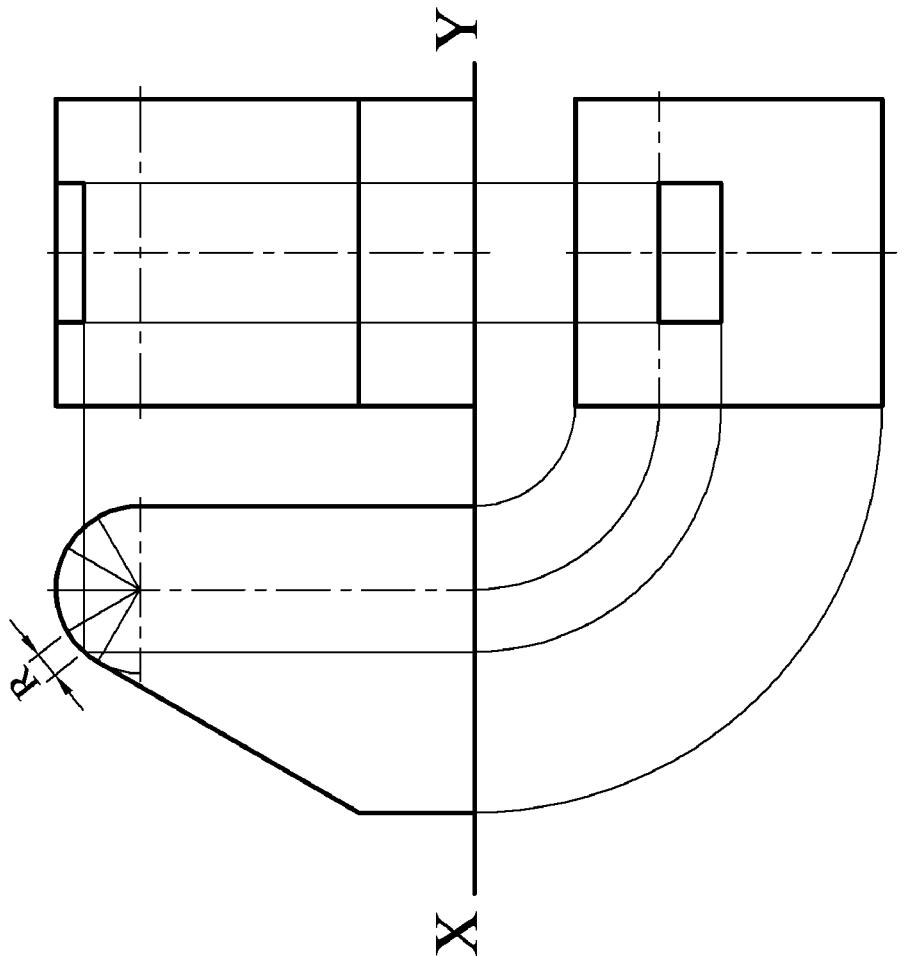
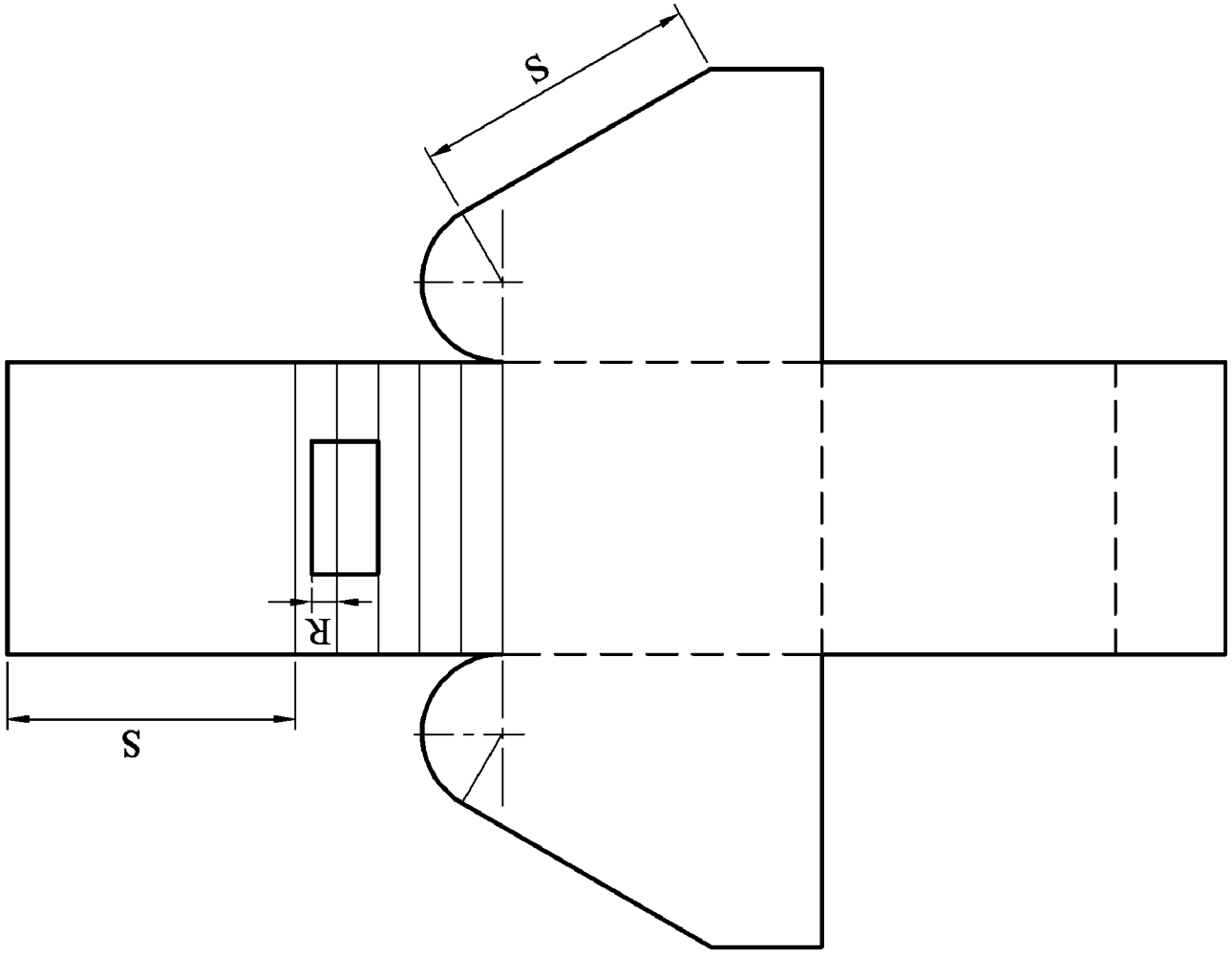
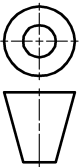


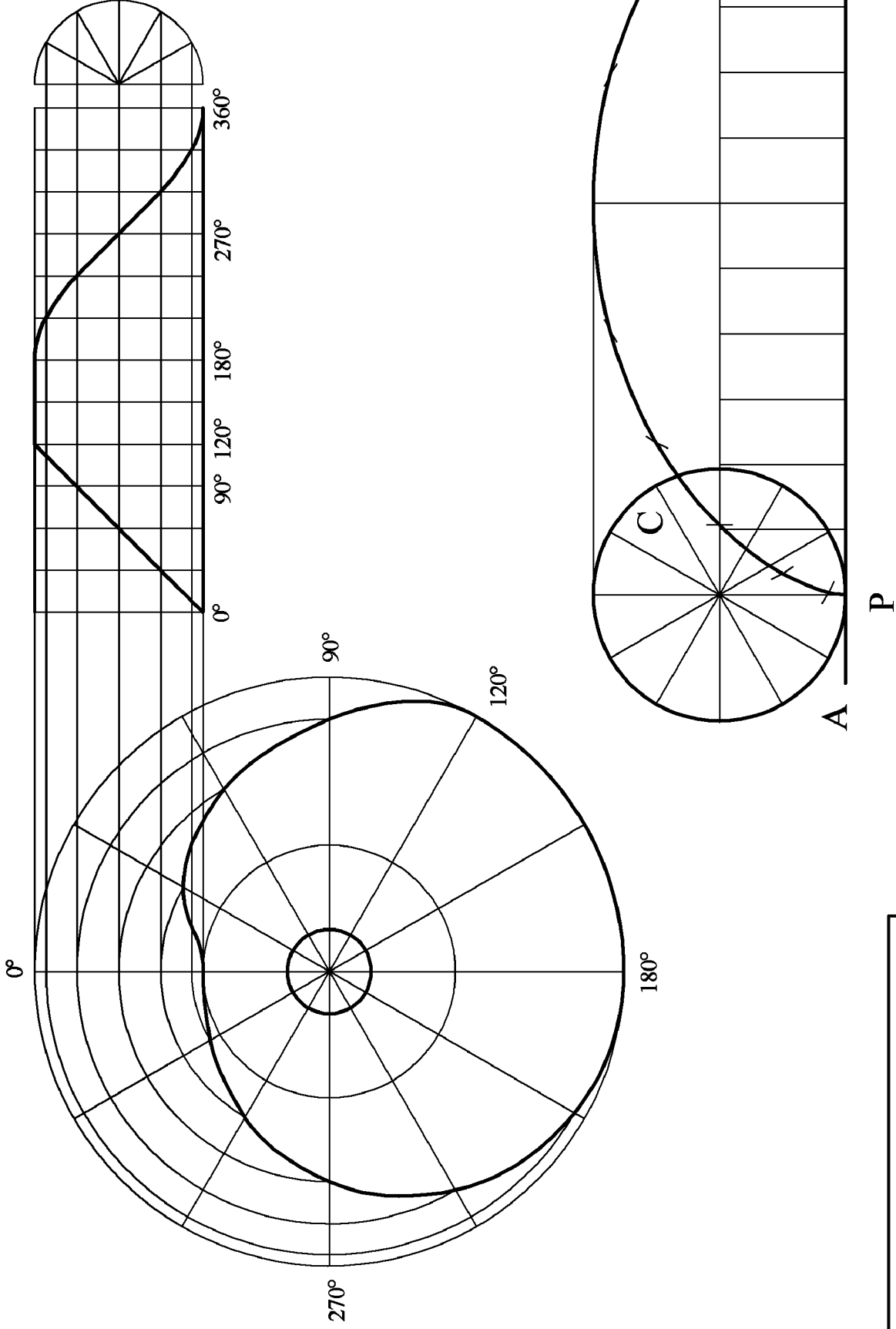
Design & Communication Graphics – Ord. Level	
Marking Scheme	
Question B-3	
Scale: n/a	June 2010



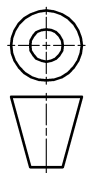


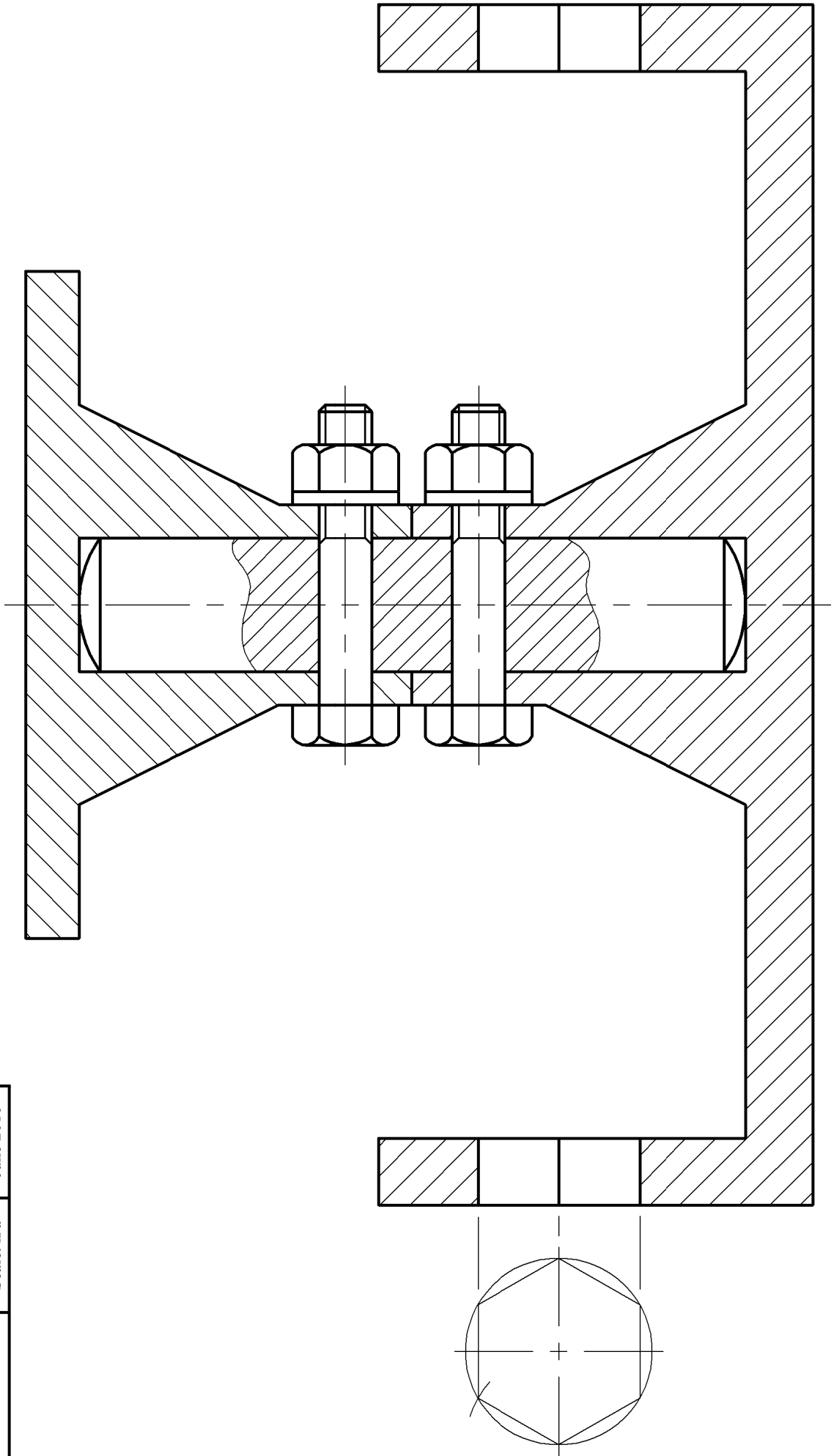
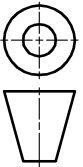






Design & Communication Graphics – Ord. Level	
Marking Scheme	
Question C-4	
Scale: n/a	June 2010







# Design and Communication Graphics

## Student Assignment - Ordinary Level

### Assessment Sheet

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) All 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) All 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) All 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 and eDrawing</b>	
	• Adherence to required filing structure	3
	• 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	3
<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) All 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 Image</b>	
	Produce a photorealistic computer generated image 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) All 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) All 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) All 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>

