Question 1.

The profile of the baby products logo given below, consists of a number of tangential arcs, lines and a part ellipse to form a stork carrying a partly elliptical bag.
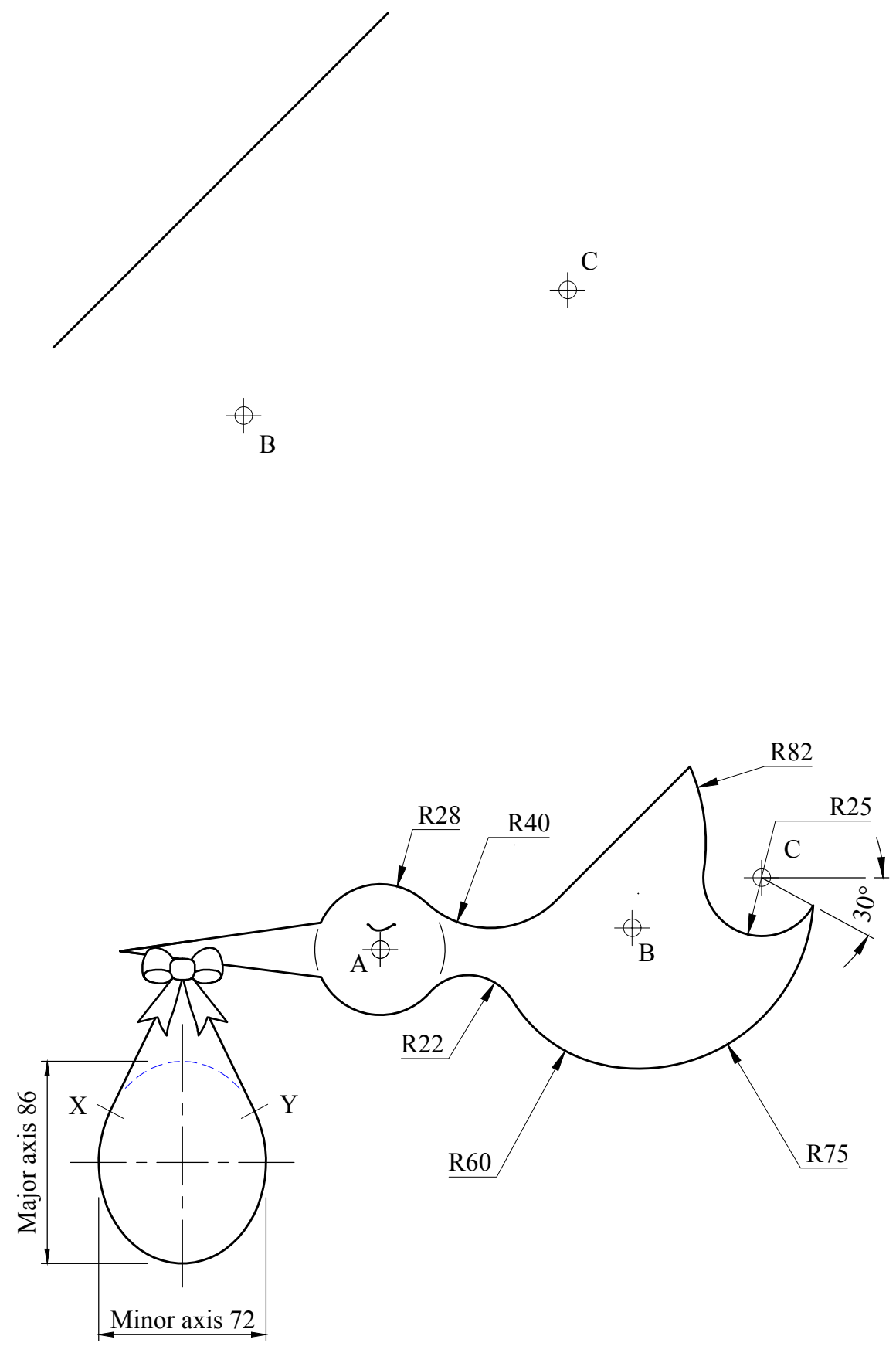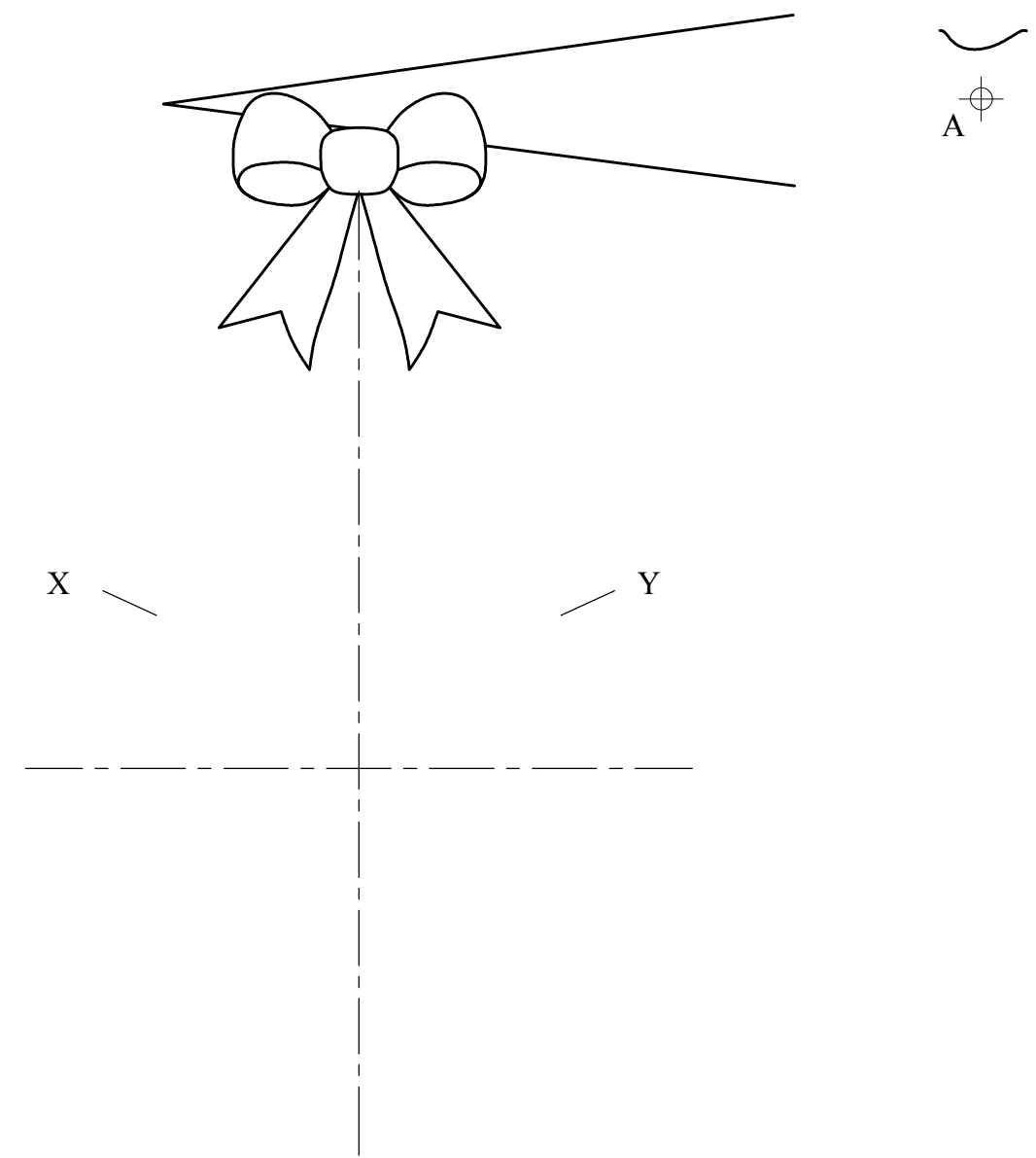
Using the given start lines:

a.   construct the part ellipse X-Y having a major axis 86 mm and a minor axis 72 mm;   (5)
b.   locate, by construction, the focal points of the ellipse;   (1)
c.   construct a tangent to the ellipse at point X and reflect the tangent at point Y;   (2)
d.   complete the profile of the stork.   (12)

Notes:
- *A is the centre of the R28 arcs.*
- *B is the centre of the R60 arc.*
- *C is the centre of the R25 arc.*
- *The straight portion of the wing is given.*
- *Leave all constructions and points of tangencies visible.*

(Total: 20 marks)

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Question 2.
Two stages of construction to produce an interlacing geometric design are given below.
Construct the design by following the next steps:

a.   construct an equilateral triangle ABC using the given line AB as the base;   (1)
b.   use apex C as the centre to draw a circle touching vertices A and B;   (1)
c.   inside the circle construct a regular hexagon having base AB;   (2)
d.   using a geometric method, divide base AB into five equal parts;   (1)
e.   draw the grid lines inside the hexagon parallel to the sides of the polygon;   (3)
f.   draw the pattern on the grid.   (4)

Note: Leave construction lines visible.

(Total: 12 marks)

C

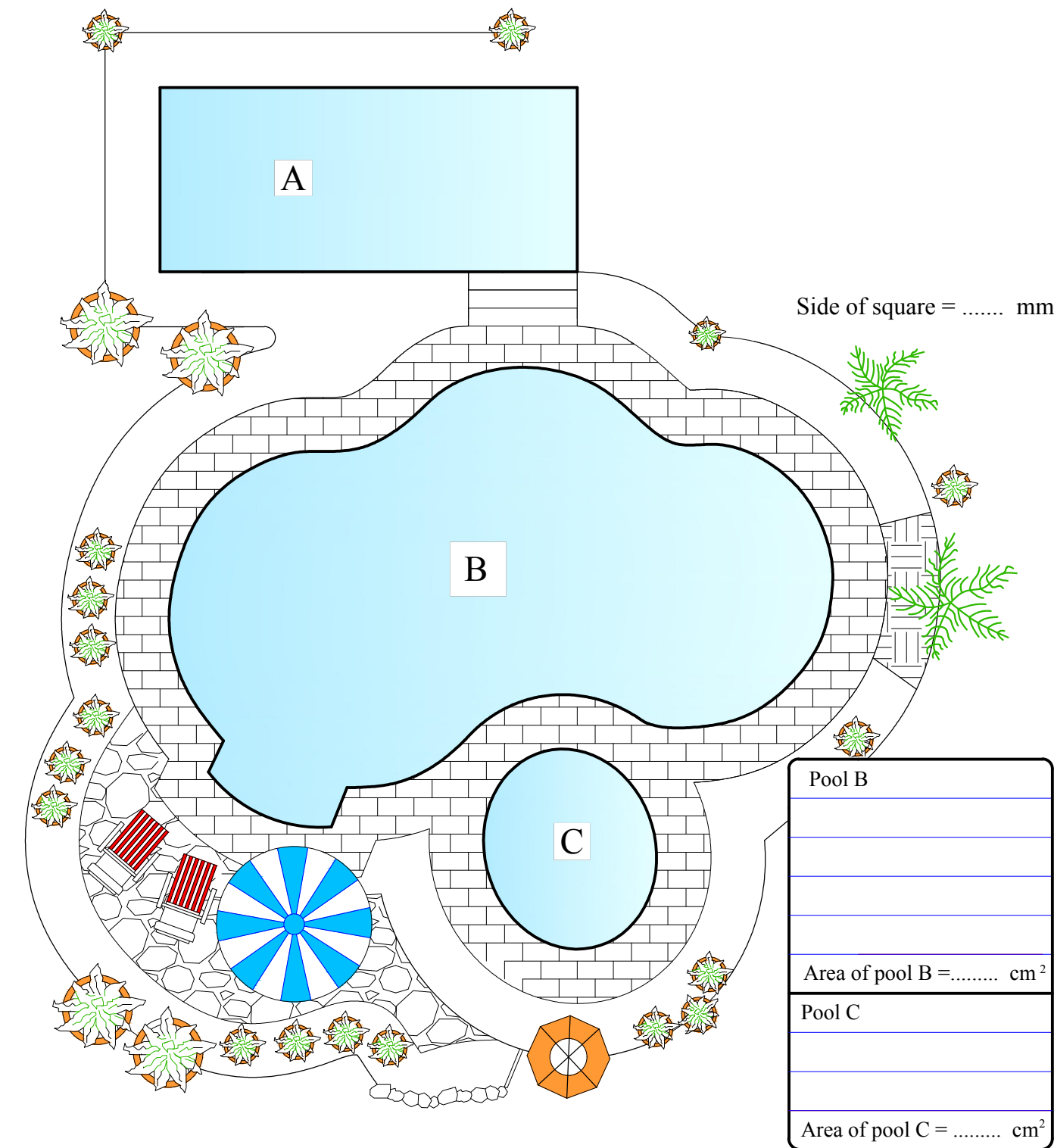A   B
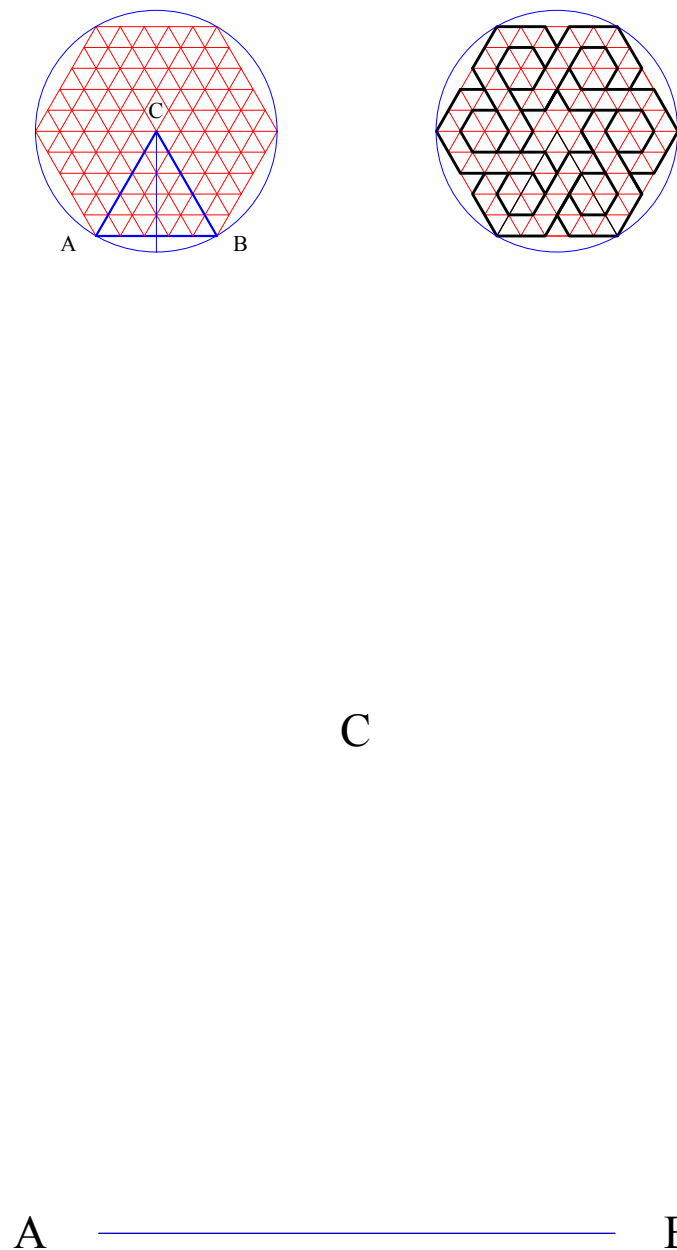
Question 3.
The drawing below shows a model of a swimming pool area of a hotel consisting of three differently shaped pools A, B and C. You are requested to:

a.   convert, by construction, the rectangular shape of pool A into a square of equal area;   (3)
b.   state the measurement of the side of the square;   (1)
c.   determine the area of pool B by using the counting squares method;   (7)
d.   determine the area of pool C by using the mid-ordinate method.   (4)

(Total: 15 marks)

A

Side of square = ... mm

B

C

Pool B
Area of pool B =......... cm^2

Pool C
Area of pool C = ... cm^2

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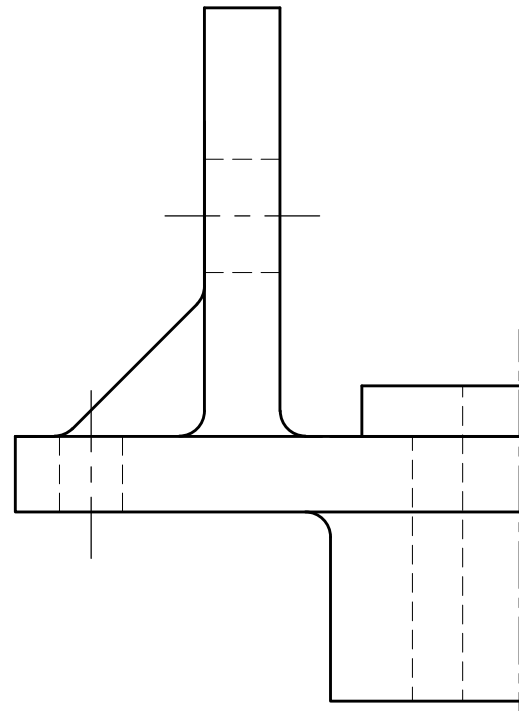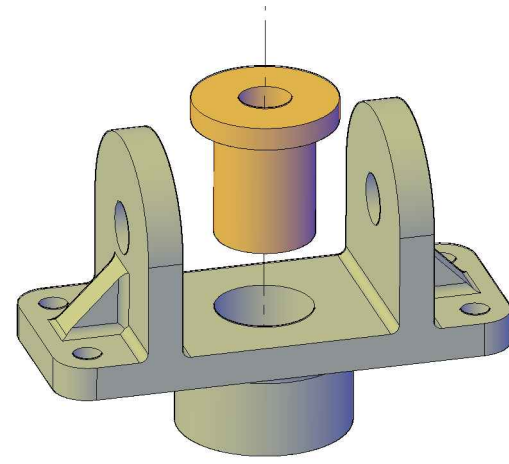
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Question 4.

An exploded view of a **Swivel Block** is shown on the right**.**

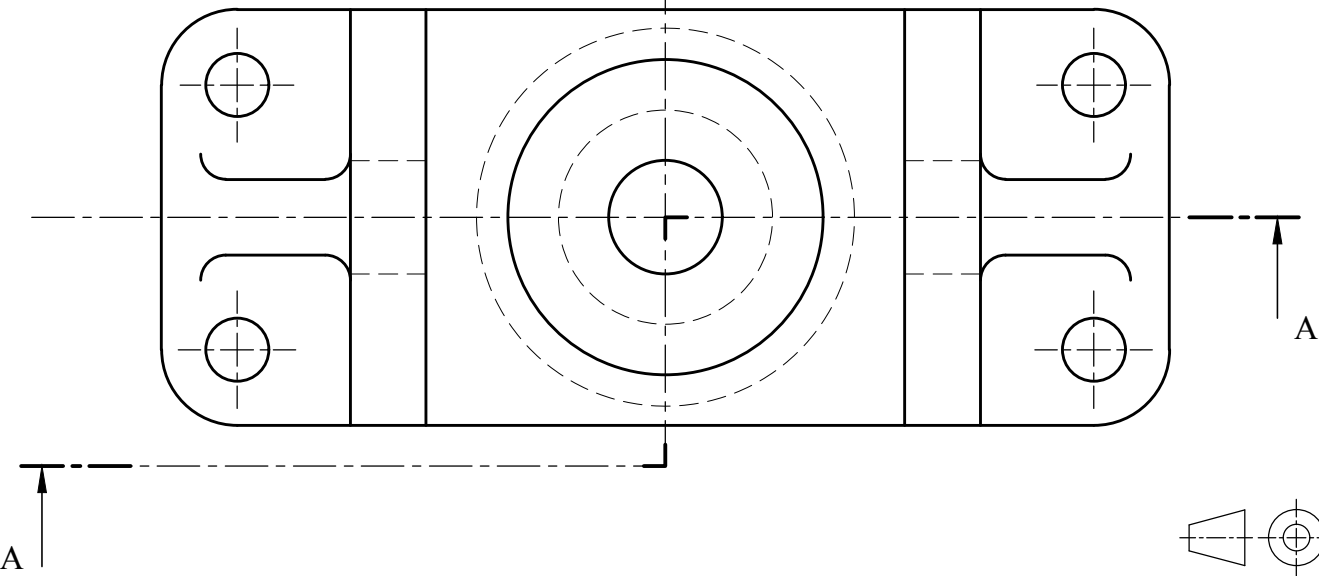A plan and a half front elevation of the swivel block assembly are given below.

In the space provided complete the Half Section A-A

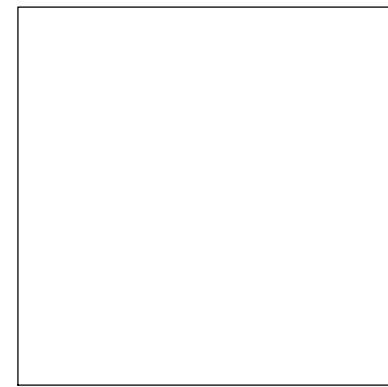*Note: Do not show hidden details.*

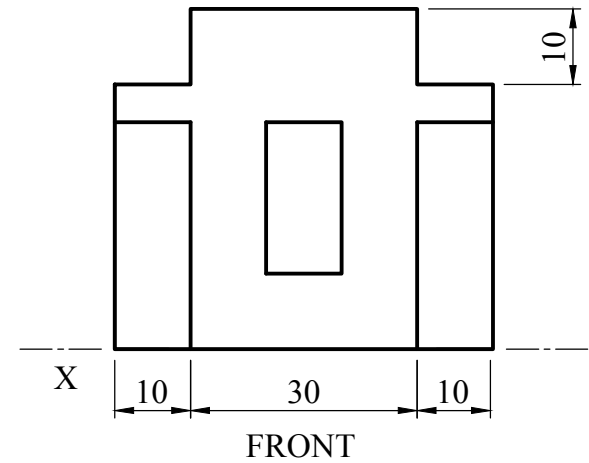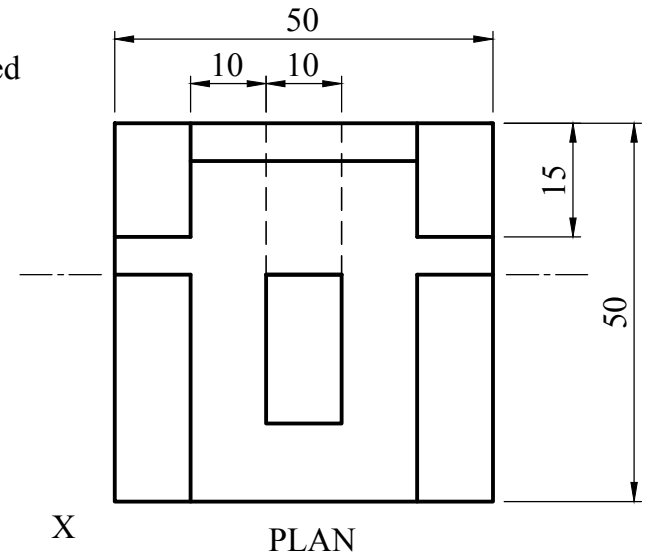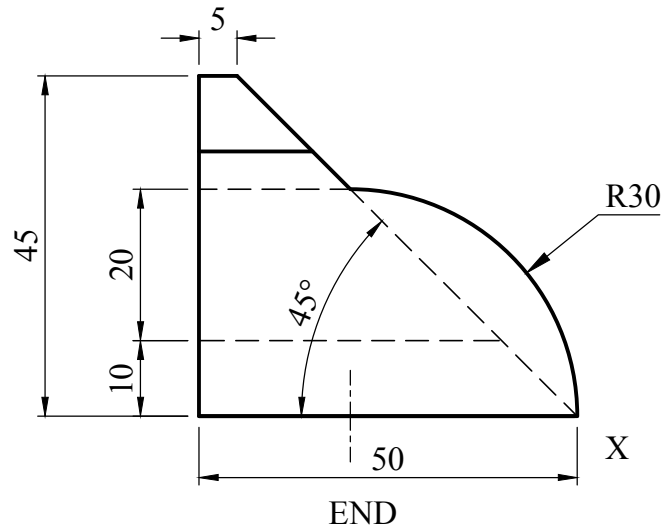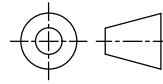**(Total: 15 marks)**

HALF SECTION A - A

A

A

Question 5.

Three full size orthographic views of a machined block are given. In the spaces provided:

a. draw a freehand sketch of the block;   (3)
b. construct an isometric view.   (15)

Note: Place corner X in the lowermost position.

(Total: 18 marks)

50

10   10

15

50

X

PLAN

10

X   X

10   30   10

FRONT

5

45

20

10

45°

50

R30

X

END

Freehand sketch

Isometric view

X

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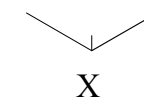
Question 6.

Two orthographic views and an illustration of a bunk bed are given.

Use the given vanishing points and start lines to produce an estimated two-point perspective drawing.

Notes:

- *Material thickness is 10 mm throughout.*
- *The orientation of the bed is to be similar to the pictorial illustration.*
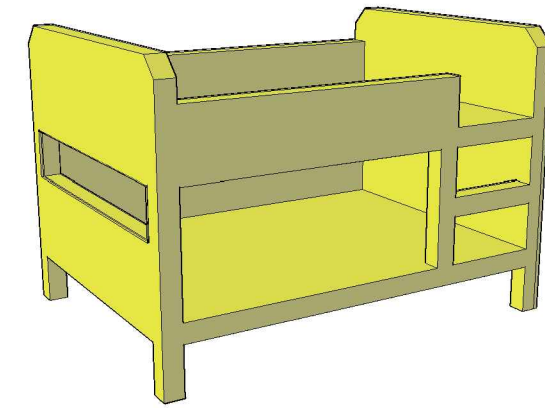
(Total: 20 marks)
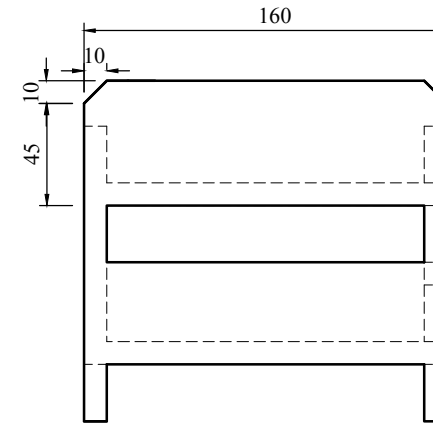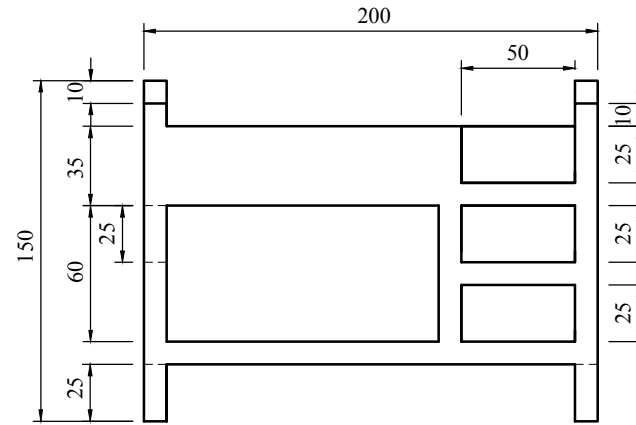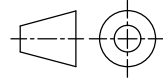
VP₁

VP₂

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Question 1.

The following computer programme is written to create a royalty icon.

DATA: A = 50; B = 100; C = 150; D = 200; E = 250; F = 300; G = 350; H = 400; I = 450; J = 500; K = 550; L= 600.

ACI 7:   MOVE H,A; DRAW D,A; DRAW D,B; DRAW H,B:
ACI 2:   MOVE H,B; DRAW G,A; DRAW F,B; DRAW E,A; DRAW D,B:
ACI 7:   MOVE H,C; DRAW D,C; DRAW B,I; DRAW E,G; DRAW H,J:
ACI 1:   MOVE G,E; DRAW F,D; DRAW E,E; DRAW F,F; DRAW G,E:
ACI 1:   MOVE A,I; DRAW B,I; DRAW B,J; DRAW A,J; DRAW A,I:
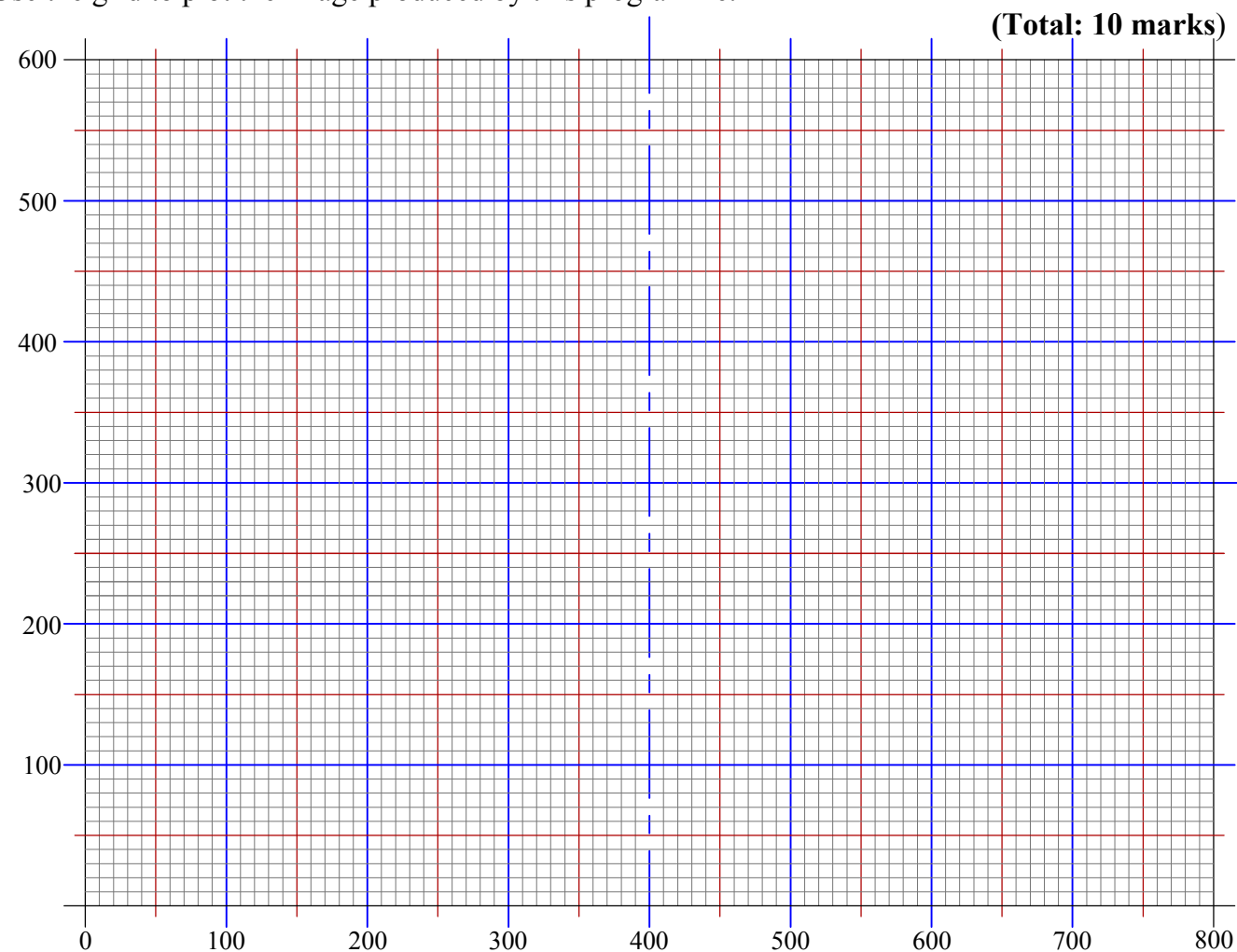ACI 5:   MOVE H,F; DRAW G,G; DRAW H,H:
ACI 3:   MOVE H,J; DRAW G,K; DRAW H,L.

MIRROR the plotted design, using the vertical centre line as the mirror line (line of symmetry).

*The **DATA** statement specifies the numeric values (in pixels) of given variables. **MOVE**, positions the cursor at a new location without drawing a line. **DRAW** draws a line from a current location to a new location. The instruction **ACI No:** makes the images that follow the instruction, appear in the colour associated with the number. The computer responds to the following colour commands:*

COLOUR	RED	YELLOW	GREEN	BLUE	BLACK
ACI No.	1	2	3	5	7

The starter sheet below shows a pre-printed grid representing an 800 x 600 graphical display.
Use the grid to plot the image produced by this programme.

(Total: 10 marks)

Question 2.

A survey conducted among visiting tourists indicate that 70% participate in outdoor activities. Their favourite activities are swimming (35%), diving (25%) and wind surfing (10%).

An incomplete information graphic chart to represent the statistical findings is given below.

In the spaces indicated, complete the chart by drawing and colouring the following:

a.   a planometric pie chart to illustrate the percentage of tourists who participate in outdoor activities and those who do not;   (5)

b.   a vertical bar graph to illustrate the percentage of tourists who participate in swimming, diving and wind surfing activities;   (3)

c.   a graphic symbol, similar to the given symbols, that represents the underwater diving activity using cylinders, diving mask and flippers.   (4)   **(Total: 12 marks)**

Tourist Participation in Sports and Outdoor Activities

a) Planometric Pie Chart

KEY		Symbol	Colour	Angle
Do not Participate	30%	✗		
Participate	70%	✓		

Calculations

b) Bar Chart

Type of activity: Swimming 35%, Diving 25%, Wind Surfing 10%

c) Draw a diving graphic symbol and colour the symbols to match with their respective bar.

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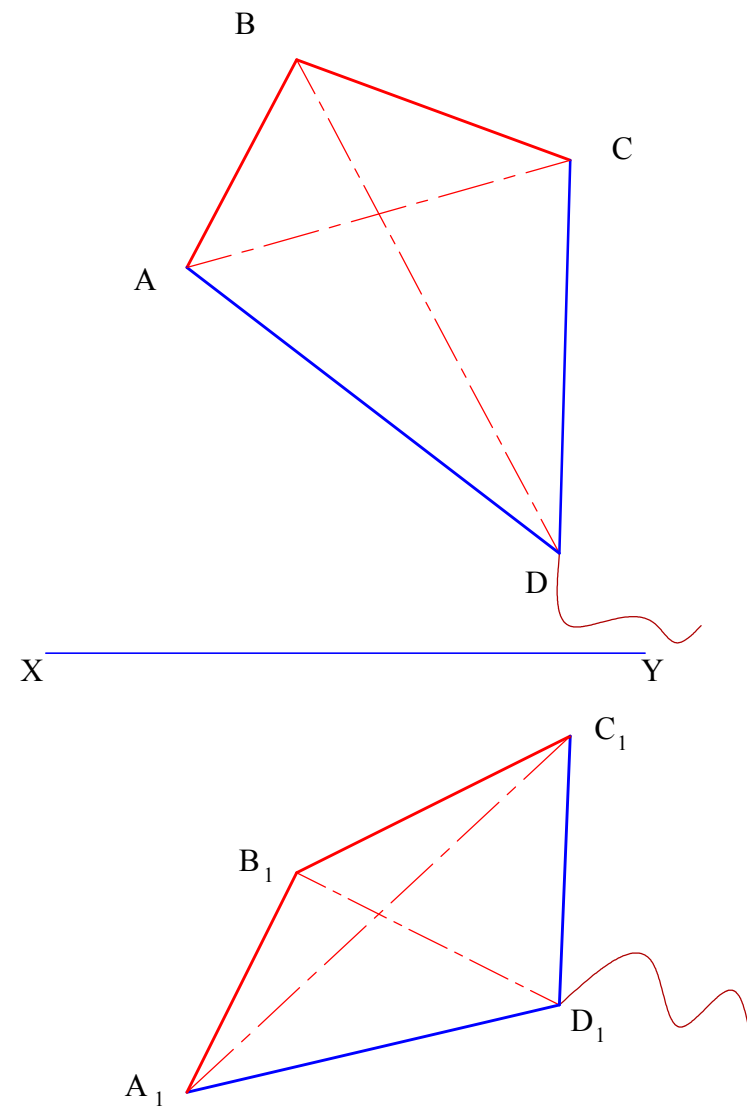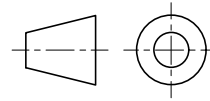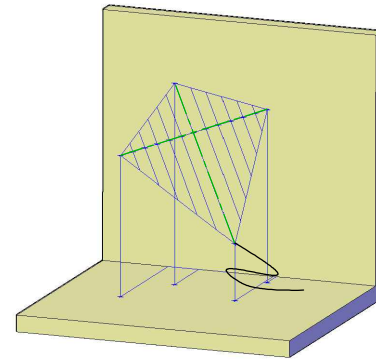
Question 3.
An illustration, a front elevation and a plan of a kite ABCD are given below. You are requested to construct:

a.   the true lengths of AB, AD and BD;   (8)
b.   the true shape of the kite ABCD (where indicated);   (3)
c.   measure and state AC.   (1)

Note: BD is the line of symmetry of the kite.

(Total: 12 marks)

AB = ... mm

AD = ... mm

BD = ... mm

B

B

C

A

D

X ——————— Y

C₁

B₁

D

A₁

D₁

True shape of kite

AC = ... mm

Question 4.
A schematic diagram of a circuit that operates a bulb and a bell is given below.
In the spaces indicated, draw:

a.   a pictorial sketch showing the circuit as seen in real life;   (3)
b.   a final coloured version of the illustration.   (12)

Notes:
- *Illustrations of a 1.5 V battery, light bulb with holder, bell, wire and a knife switch are given.*
- *The switch controlling the bulb is to be shown in the 'on' position.*
- *The switch controlling the bell is to be shown in the 'off' position.*
- *A typical illustration of a pictorial circuit diagram is given below.*
- *Drawing aids may be used.*

(Total: 15 marks)

ELECTRICAL CIRCUITS

Schematic diagram
of the circuit
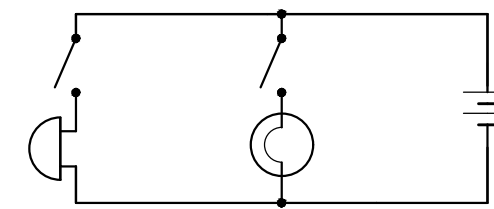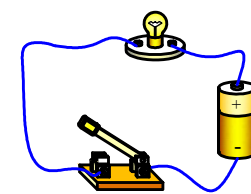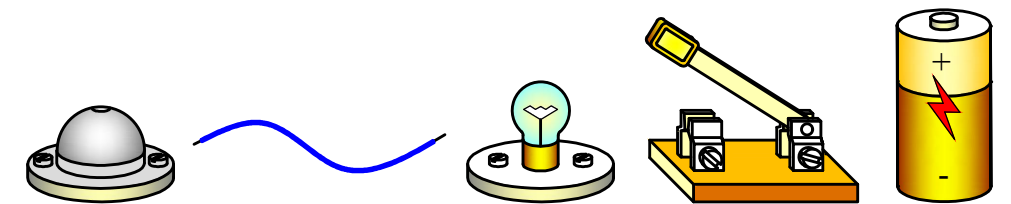
Sketch

Final pictorial diagram of the circuit

Typical illustration

Full size illustrations of the required components

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Question 5.

A graphic symbol of a pram is given below. Using the given start lines, complete the profile of the symbol by constructing the following loci:

a. the involute of a taut string being unwound from around the given square 'A'; (3)
b. the cycloid curve generated by point 'P' on the given generating circle as it rolls for one revolution without slipping along line X Y; (10 marks)
c. the loci of a set of points from 'R' to 'R₁' which have the same distance to point 'C'. (2)

(Total: 15 marks)
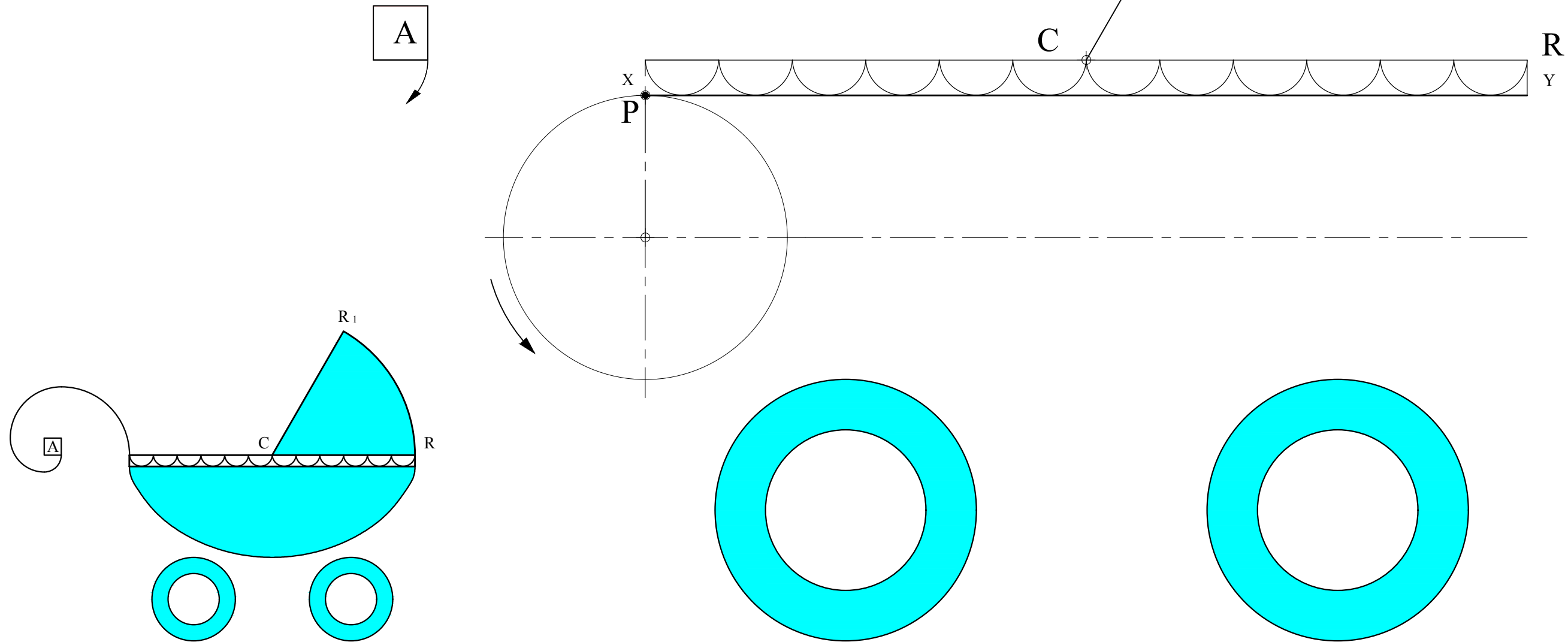
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Question 6.

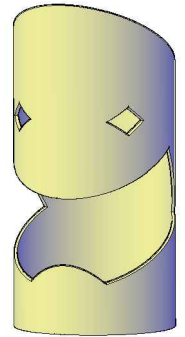A craftsman cut a cardboard cylinder, as shown in the given elevations and illustration, to produce a model of a Halloween tea light candle holder. Using the given start lines, project:

a.   the end elevation of the truncated cardboard cylinder (do not show hidden detail);   (10)

b.   the surface development.   (8)

Notes:

- *Place the joint line along J,J.*
- *The projections of the square holes have been completed in the end elevation and in the surface development.*

(Total: 18 marks)

J

J   J

END ELEVATION

J   J

SURFACE DEVELOPMENT

J,J

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Question 7.

Three orthographic views and an illustration of a Peace Monument model are given.

Project an auxiliary view of the model as seen from the direction of arrow M.

Note: AB is a line of symmetry. **One half of the view is to be projected, the other half may be reflected.**

(Total: 18 marks)

B

X₁

A

X   Y

Y₁

M

45°

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Question 1.

The following computer programme is written to create a royalty icon.

DATA: A = 50; B = 100; C = 150; D = 200; E = 250; F = 300; G = 350; H = 400; I = 450; J = 500; K = 550.

ACI 7:   MOVE H,A; DRAW D,A; DRAW D,B; DRAW H,B:
ACI 2:   MOVE H,B; DRAW F,A; DRAW D,B:
ACI 5:   MOVE D,B; DRAW B,H; DRAW E,F; DRAW H,I:
ACI 1:   MOVE F,C; DRAW E,D; DRAW F,E; DRAW G,D; DRAW F,C:
ACI 1:   MOVE B,H; DRAW A,H; DRAW A,I; DRAW B,I; DRAW BH:
ACI 2:   MOVE H,E; DRAW G,F; DRAW H,G:
ACI 3:   MOVE H,I; DRAW G,J; DRAW H,K.

MIRROR the plotted design, using the vertical centre line as the mirror line (line of symmetry).

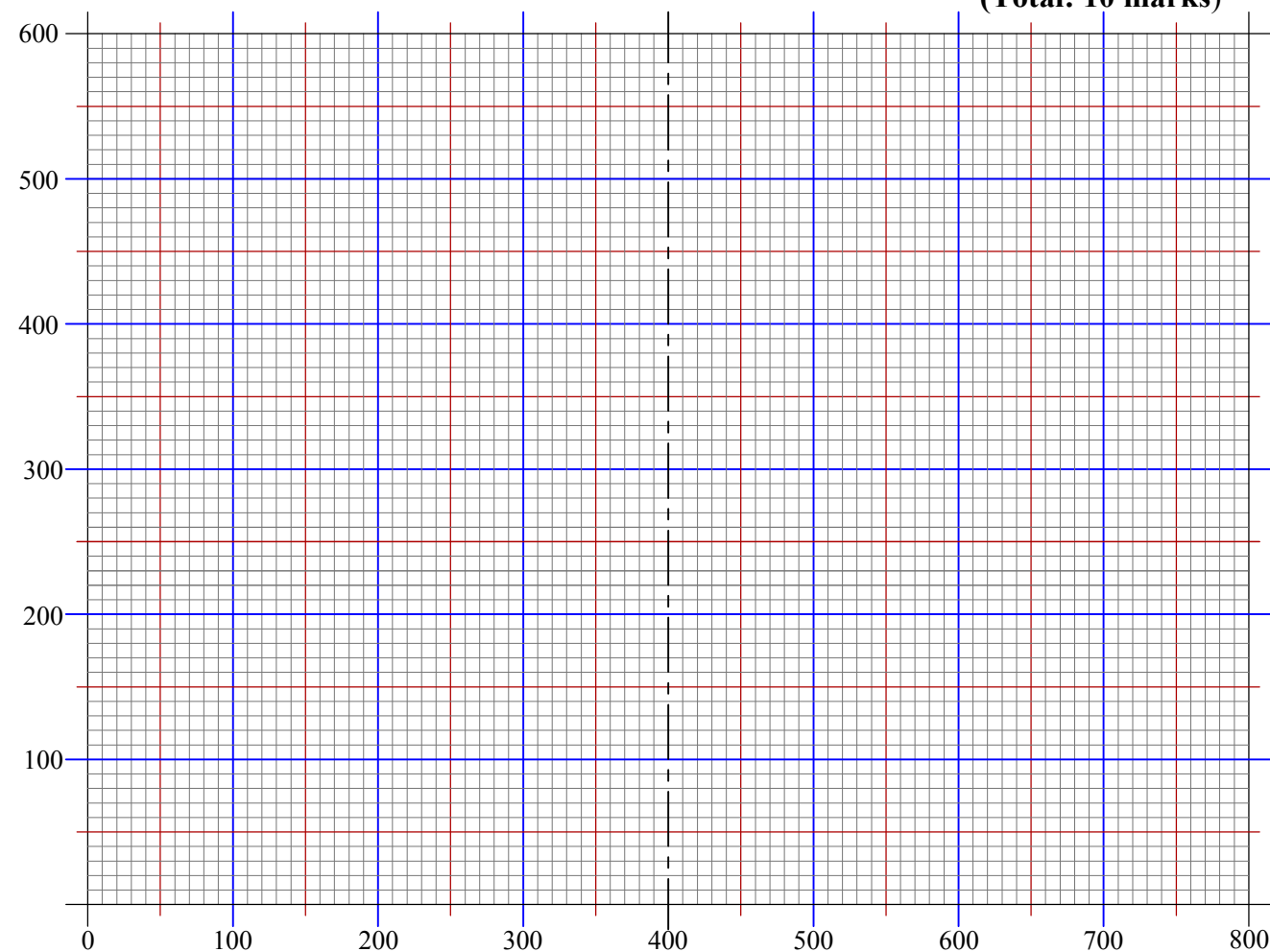*The **DATA** statement specifies the numeric values (in pixels) of given variables. **MOVE,** positions the cursor at a new location without drawing a line. **DRAW** draws a line from a current location to a new location. The instruction **ACI No**: makes the images that follow the instruction appear in the colour associated with the number. The computer responds to the following colour commands:*

COLOUR	RED	YELLOW	GREEN	BLUE	BLACK
ACI No.	1	2	3	5	7

The starter sheet below shows a pre-printed grid representing an 800 x 600 graphical display.
Use the grid to plot the image produced by this programme.

(Total: 10 marks)
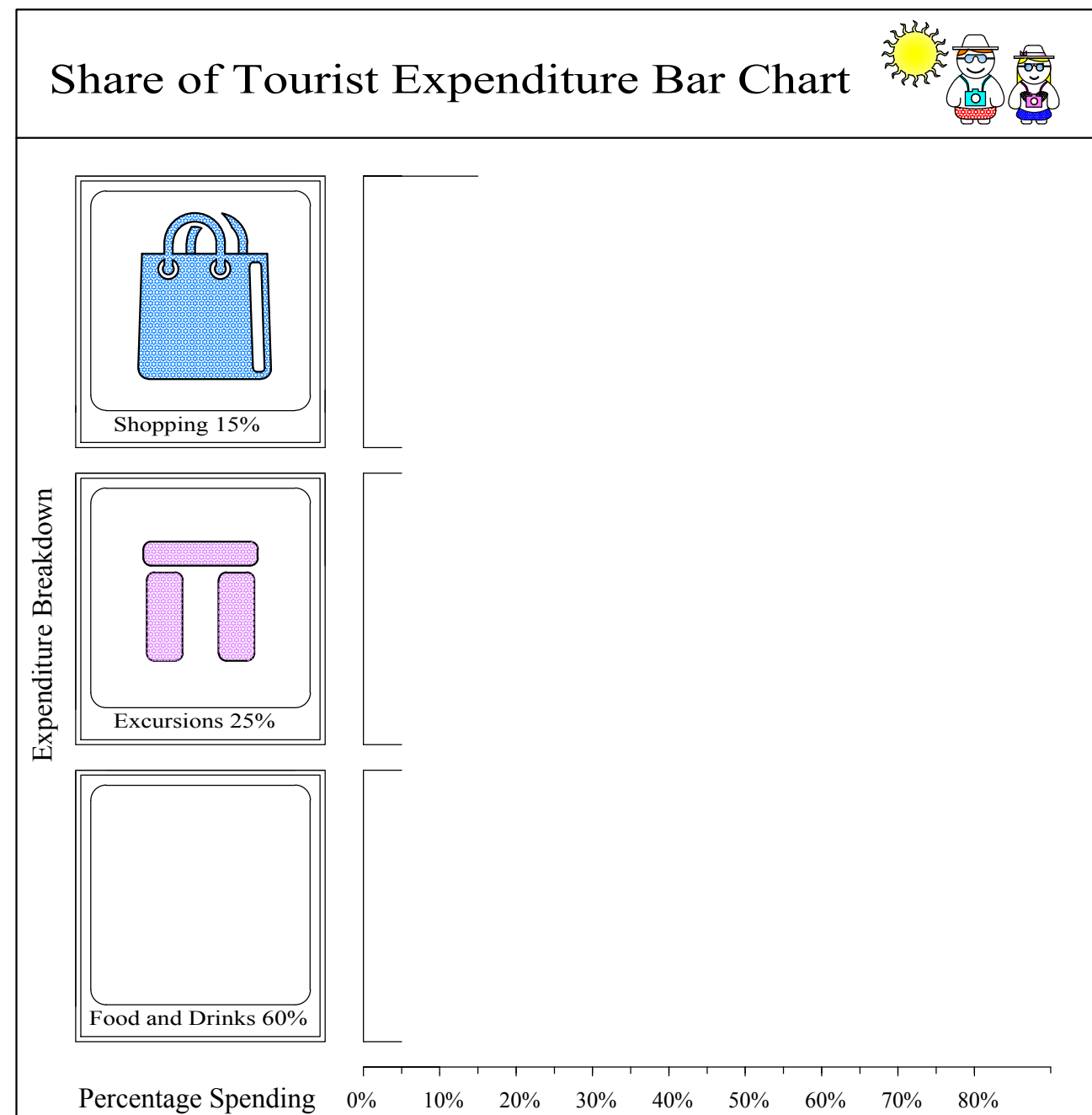

Question 2.

A survey conducted among tourists indicate that during their holiday they spend their money as follows:

- 15% for shopping clothing and souvenirs;
- 25% for recreation including excursions and site visits;
- 60% to buy food and drinks.

An incomplete information graphic chart representing the statistical findings is given below.
In the spaces indicated, complete the chart by drawing and colouring the following:

a.   a horizontal bar graph to illustrate the share of expenditure during the tourists' stay;   (4)
b.   a graphic symbol (similar in style to the given symbols) representing food and drink;   (4)
c.   colour the symbols and the bars. (4)

(Total: 12 marks)

Share of Tourist Expenditure Bar Chart

Shopping 15%

Excursions 25%

Food and Drinks 60%

Expenditure Breakdown

Percentage Spending   0%   10%   20%   30%   40%   50%   60%   70%   80%

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Question 3.
A front elevation and a plan of a lamina ABC are given below. You are requested to construct:
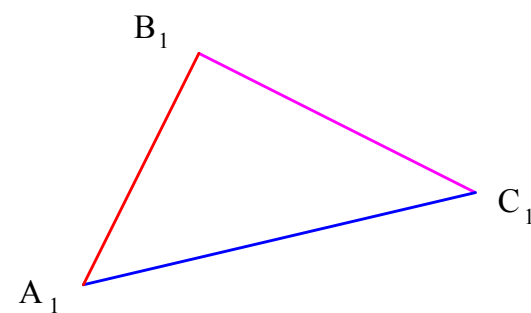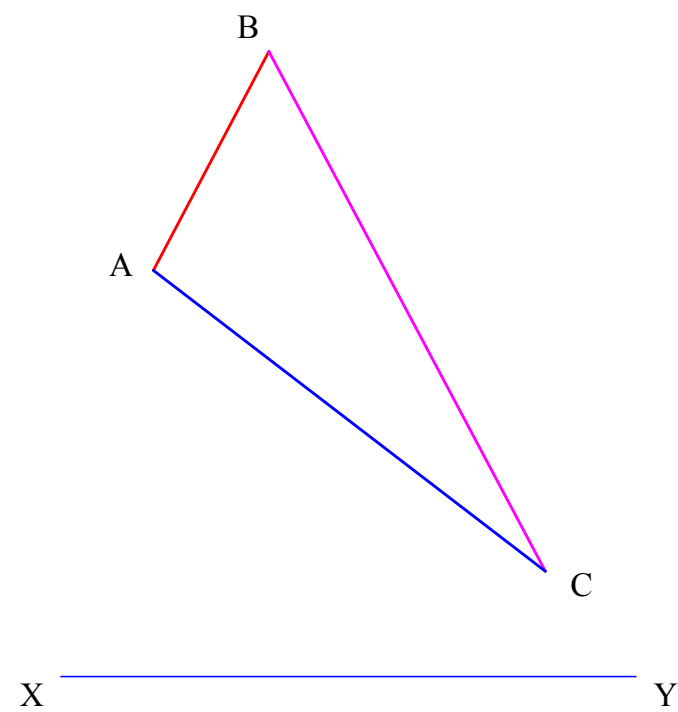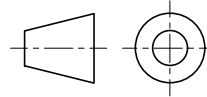a.   the true lengths of AB, BC and AC;   (9)
b.   the true shape of the lamina ABC (where indicated).   (3)

(Total: 12 marks)

AB = ...mm

BC = ...mm

AC = ...mm

B

A

C

X   Y

B

C

B₁

A₁   C₁

True shape of lamina

Question 4.
An incomplete classroom poster, which is intended to help students understand the basics of electrical circuits, is given below. The circuit diagrams shown are schematic.   In the spaces indicated draw:
a.   sketches of pictorial versions of the circuit diagrams as seen in real life;   (3)
b.   the final coloured pictorial diagrams.   (12)
Notes:
• *Illustrations of the battery, light bulb with holder, wire and a knife switch are given below.*
• *The switch in the series circuit is to be shown in the 'on' position.*
• *The switch in the parallel circuit is to be shown in the 'off ' position.*
• *Drawing aids may be used.*

(Total: 15 marks)

ELECTRICAL CIRCUITS

Schematic diagram of a series circuit	Sketch	Schematic diagram of a parallel circuit	Sketch

Pictorial diagram of a series circuit	Pictorial diagram of a parallel circuit

Typical illustration

Full size illustrations of the required components

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Question 5.

A graphic symbol of a pram is given below. Using the given start lines complete the profile of the symbol by constructing the following loci:

a.   the involute of a taut string being unwound from around the given equilateral triangle 'A';   (3)

b.   the cycloid curve generated by point 'P' on the given generating circle as it rolls for one revolution without slipping along line X Y. (12)

(Total: 15 marks)
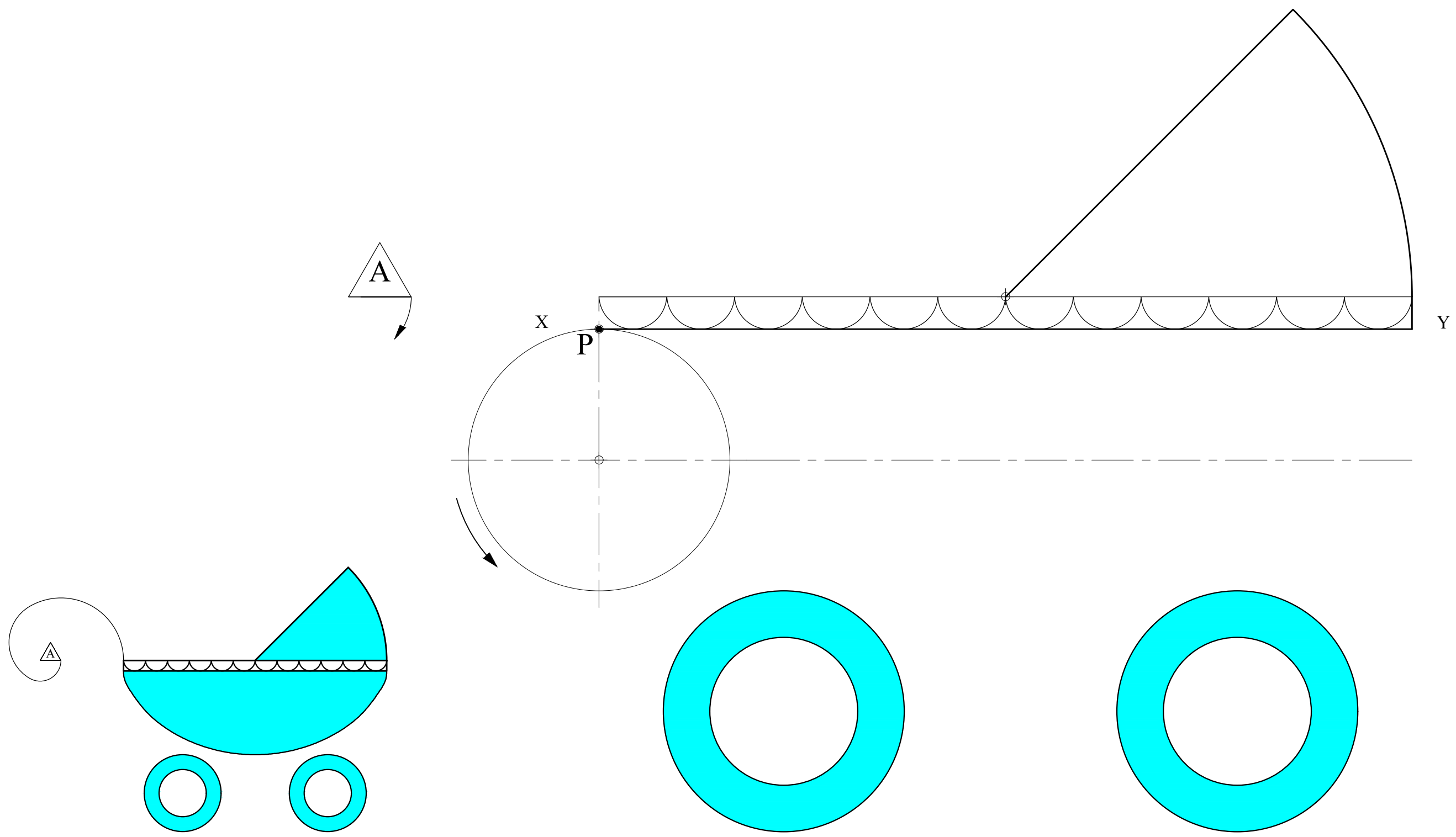
X

P

A

Y

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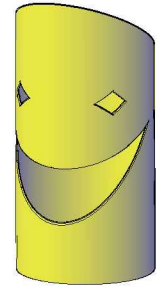
INDEX NUMBER : _____

Question 6.
A craftsman cut a cardboard cylinder, as shown in the given elevations and illustration, to produce a model of a tea light candle holder. Using the given start lines, project:
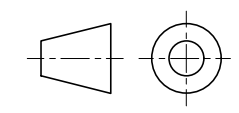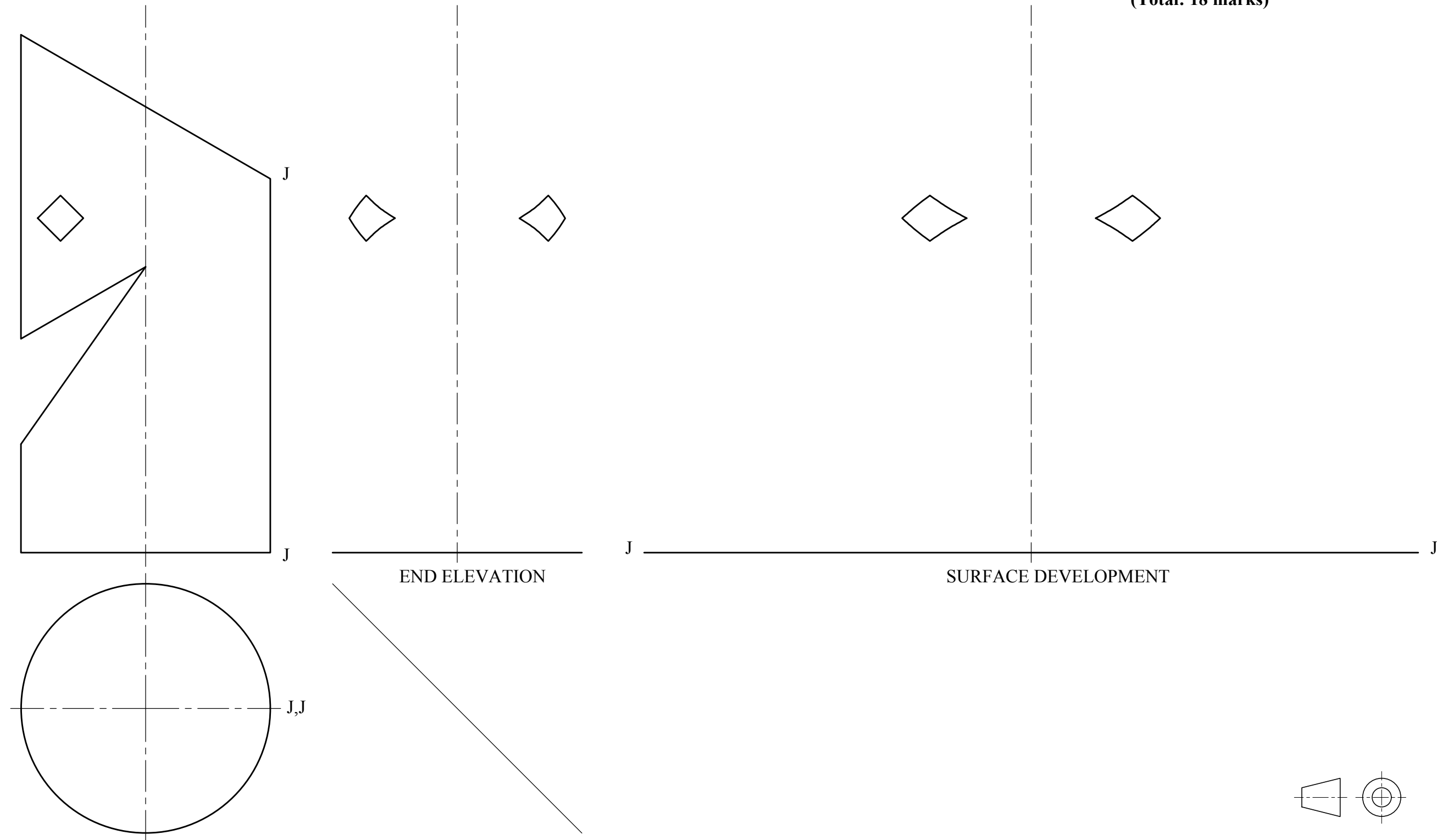a.   the end elevation of the truncated cardboard cylinder (do not show hidden detail);   (10)
b.   the surface development.   (8)
Notes:
- *Place the joint line along J,J.*
- *The projections of the square holes have been completed in the end elevation and in the surface development.*

(Total: 18 marks)

J

J   J

J   J   J

END ELEVATION   SURFACE DEVELOPMENT

J,J

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Question 7.
Three orthographic views and an illustration of a Peace Monument model are given.
Project an auxiliary view of the model as seen from the direction of arrow M.
Note: AB is a line of symmetry. **One half of the view is to be projected, the other half may be reflected.**

(Total: 18 marks)

X

Y

X₁

Y₁

A

B

M

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MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD, UNIVERSITY OF MALTA, MSIDA
GRAPHICAL COMMUNICATION - PAPER 2B (Page 5 of 5) - ATTEMPT ALL QUESTIONS - DATE: 3rd May 2017 - TIME : 4.00 p.m. to 6.05 p.m.

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