Question 1.
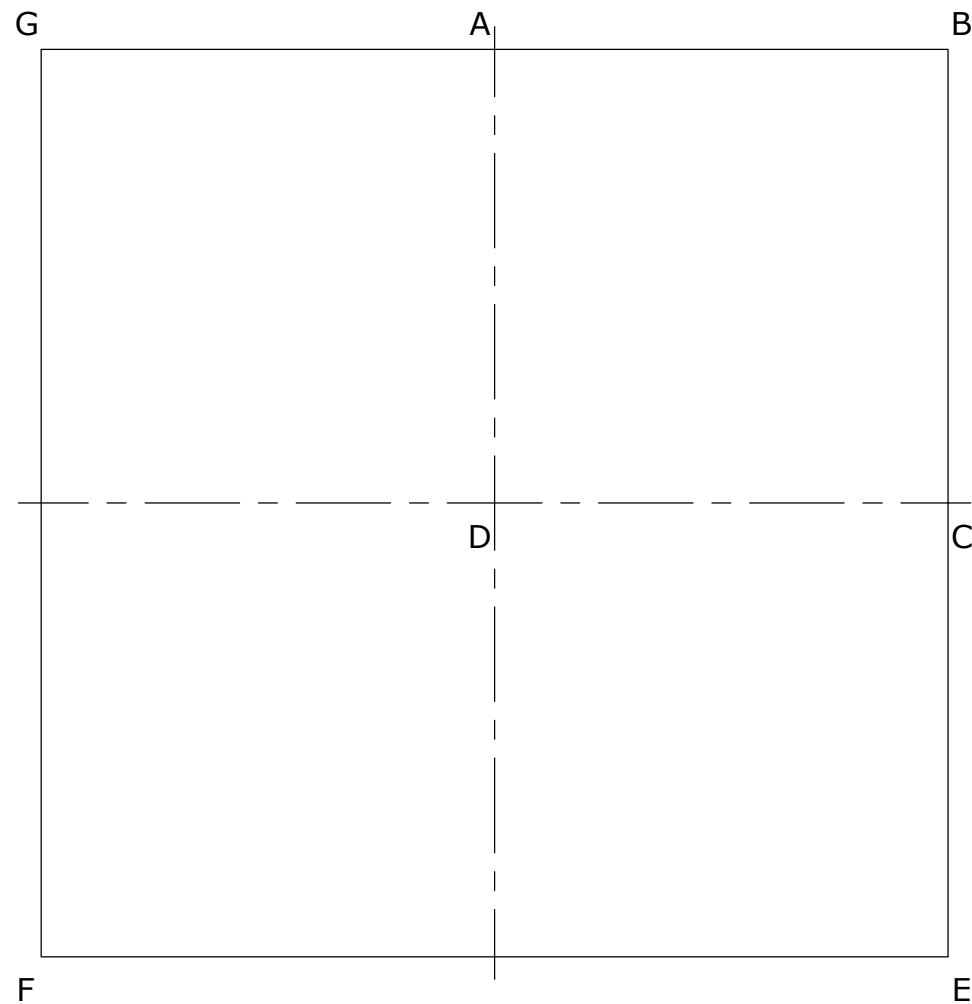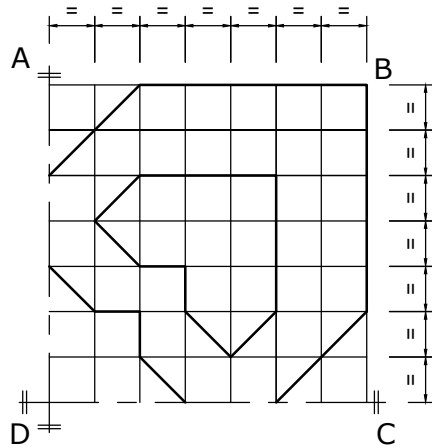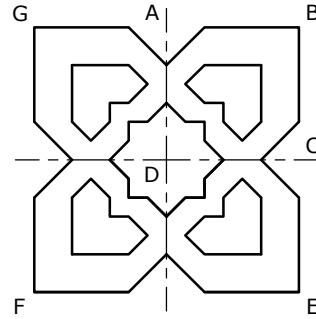A geometric design is shown on the right.

Using the given instructions, starting lines and dimensions:
a.   construct a quarter of the design in square ABCD;   (6)
b.   complete the design to form a whole tile in square BEFG. (4)
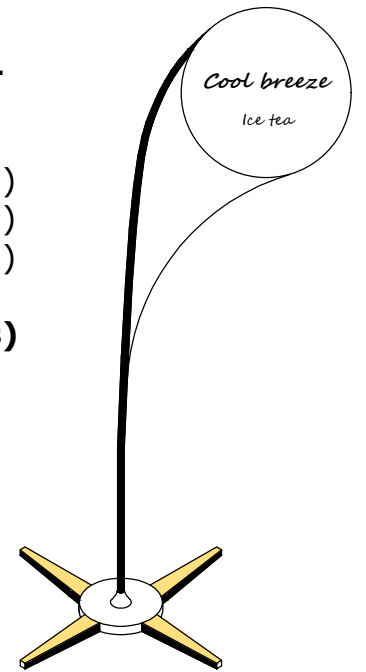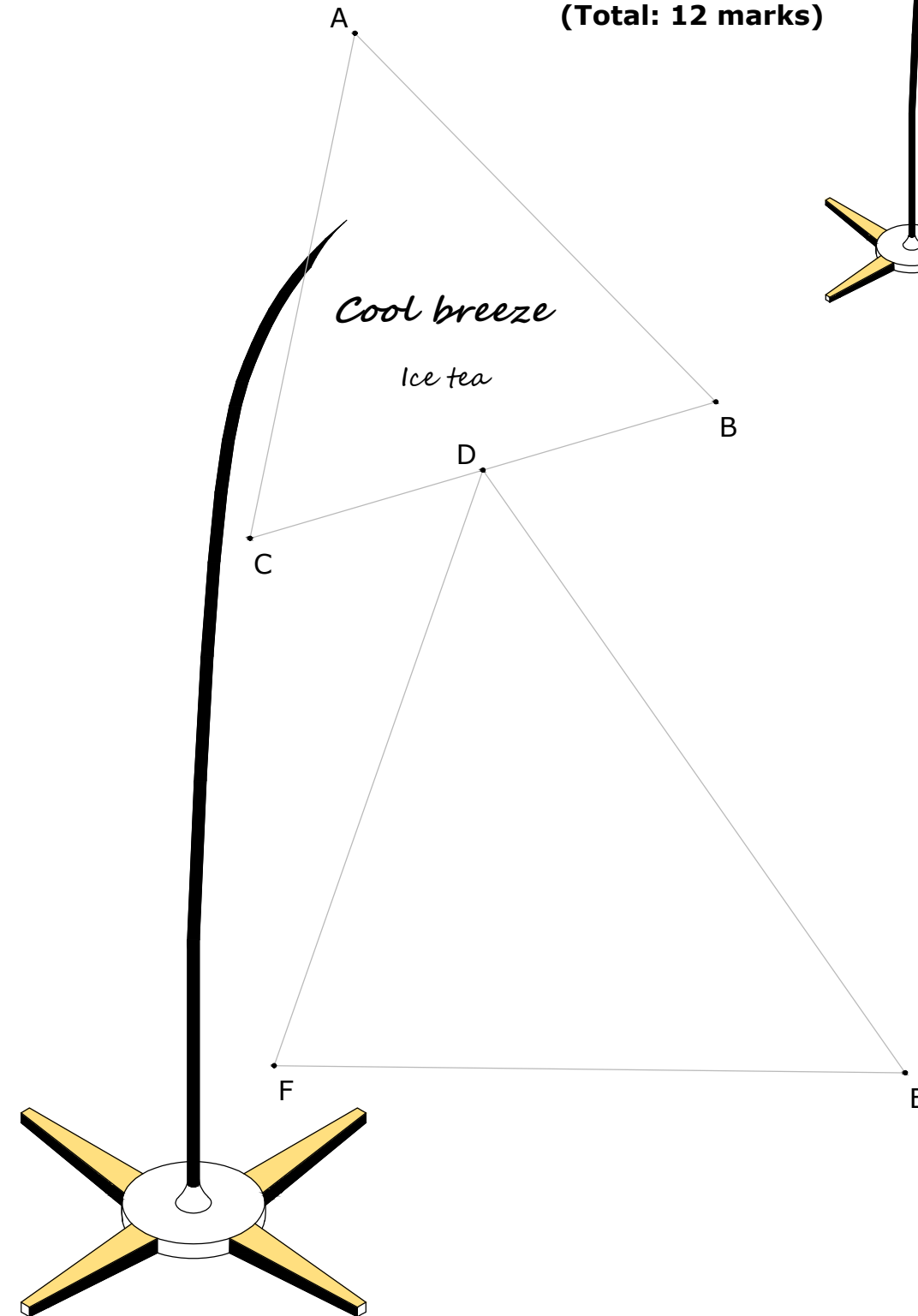
(Total: 10 marks)

Question 2.
A profile of an advertisement flag is shown on the right.
The profile features one inscribed and a part-circumscribed circle.

Complete the drawing by:
a.   constructing an inscribed circle in triangle ABC;   (5)
b.   constructing a circumscribed circle to triangle DEF;   (5)
c.   outlining the profile of the design.   (2)

(Total: 12 marks)

Cool breeze
Ice tea

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER I (Page 1 of 5) - ATTEMPT ALL QUESTIONS - DATE: 2nd July 2021 - TIME : 4.00 p.m. to 6.05 p.m.

INDEX NUMBER : _____

Question 3.

A profile of a dinosaur is shown on the right. The profile consists of a semi-ellipse, tangential arcs and lines.

Using the given starting lines and dimensions, construct:

a.   the semi-ellipse having major axis 78 mm, minor axis 60 mm and centre O;   (8)

b.   the missing tangential arcs and lines, showing clearly how the centres, tangents and points of
       tangencies were derived.   (12)

(Total: 20 marks)
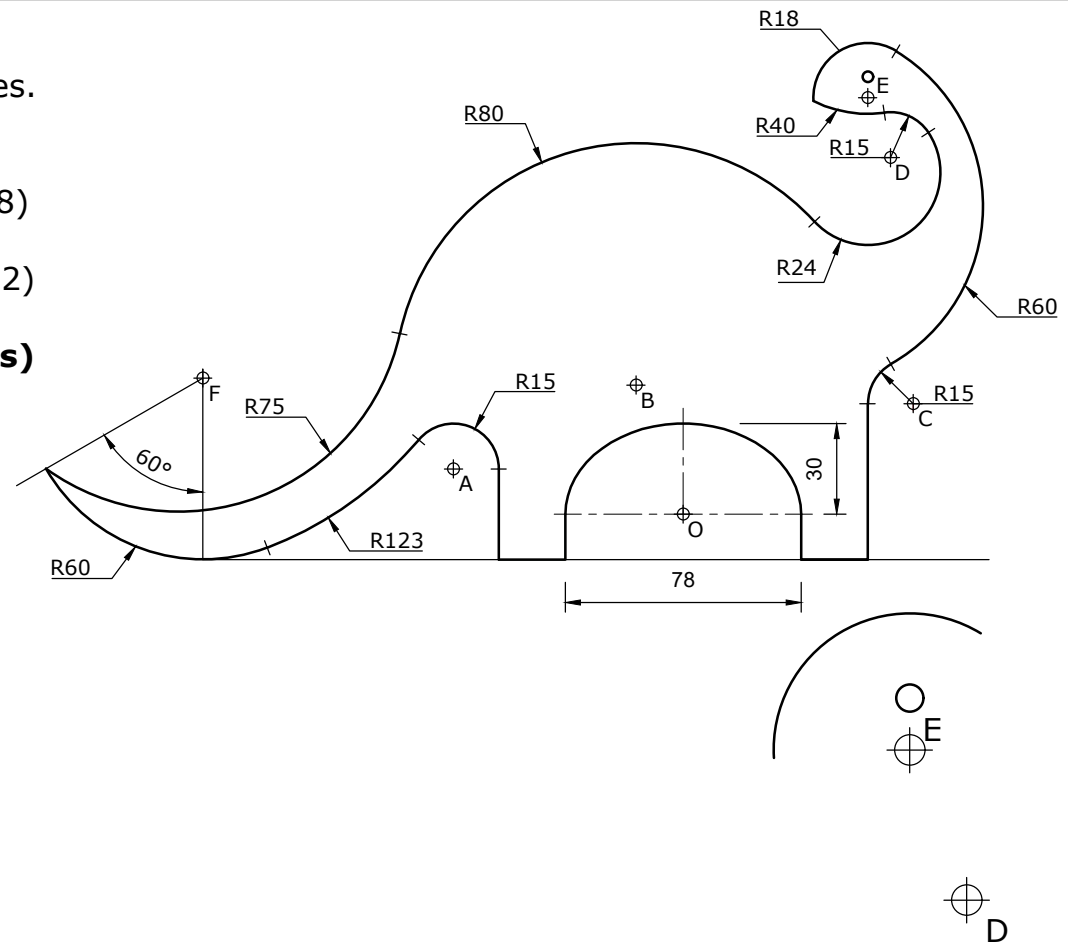
NOTES

- O is the center of the semi-ellipse.
- A, C and D are the centres of R15 arcs.
- B is the centre of the R80 arc.
- E is the centre of the R18 arc.
- F is the centre of the R60 arc.
- Points of tangencies are denoted by means of short dashes as shown. ⊢————⊣

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER I (Page 2 of 5) - ATTEMPT ALL QUESTIONS - DATE: 2nd July 2021 - TIME : 4.00 p.m. to 6.05 p.m.
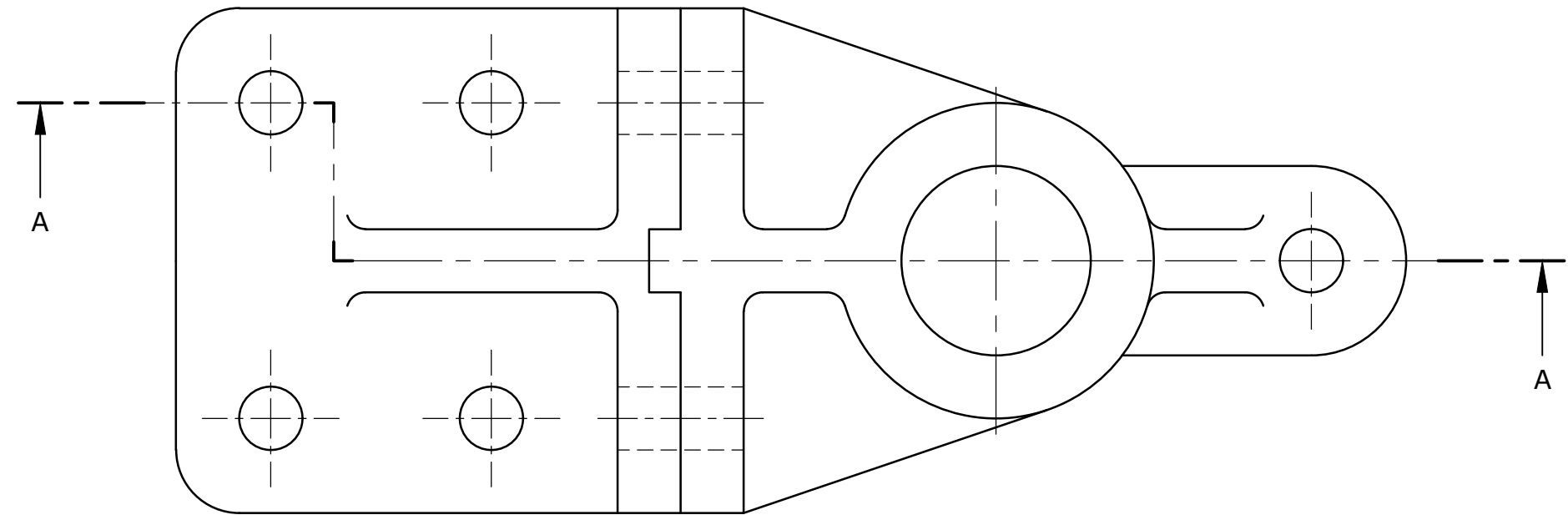
INDEX NUMBER : _____

Question 4.
An illustration of two cast support brackets is given below. The plan and the profile of the front elevation are also given.

a. In the space provided, complete a sectional front elevation of the assembled brackets on the cutting plane A-A. (16)
b. Insert **TWO** radial and **TWO** linear dimensions on the orthographic views. (4)

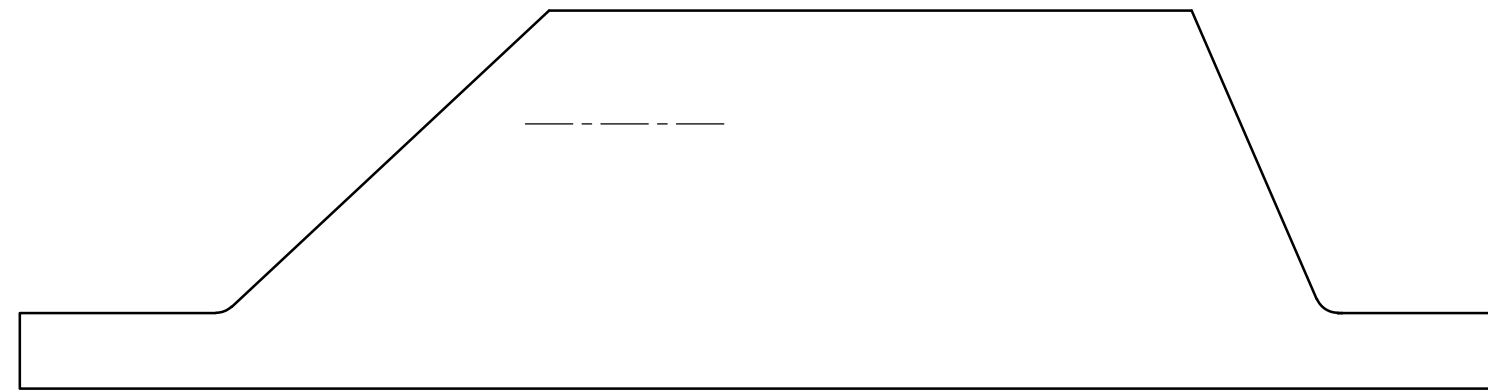Notes:
- Show **all** centre lines.
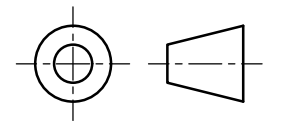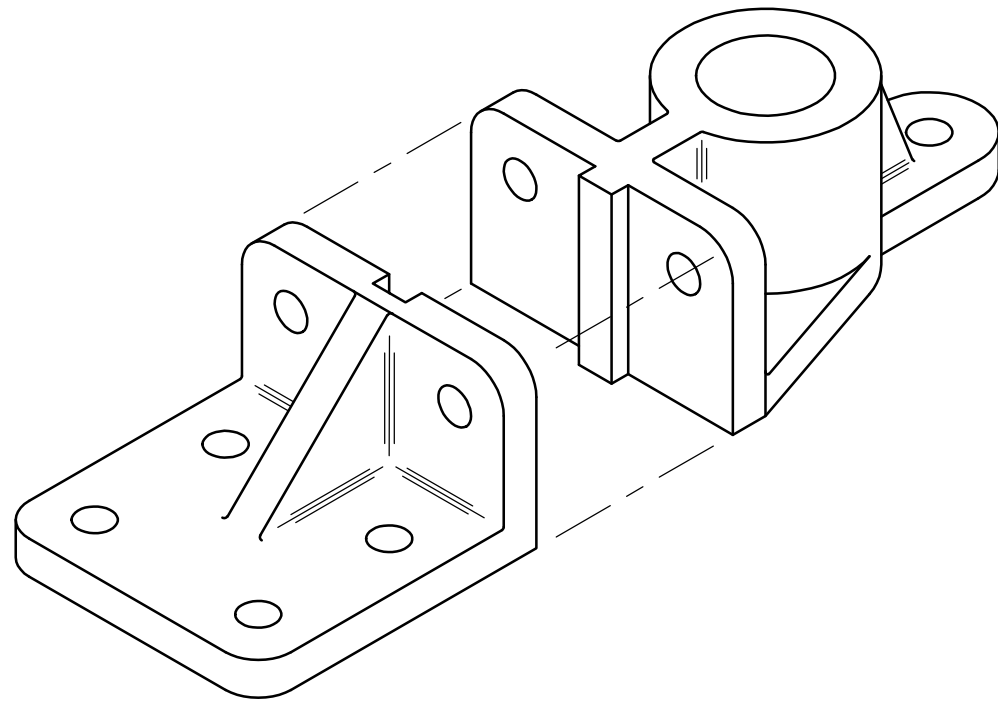- Do **not** show hidden details.

(Total: 20 marks)

A

A

PLAN

A-A

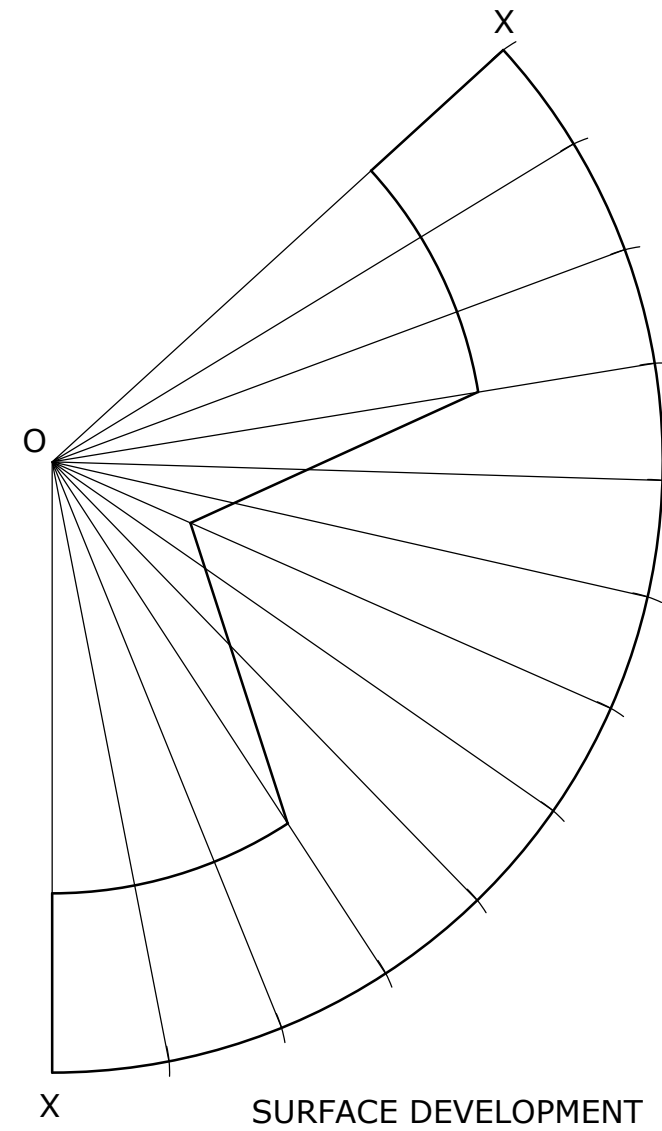MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD, UNIVERSITY OF MALTA, MSIDA

GRAPHICAL COMMUNICATION - PAPER I (Page 3 of 5) - ATTEMPT ALL QUESTIONS - DATE: 2nd July 2021 - TIME : 4.00 p.m. to 6.05 p.m.
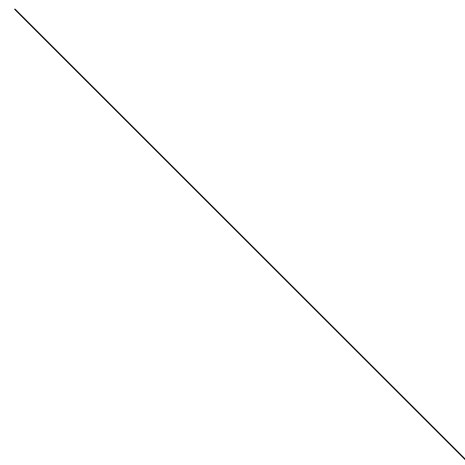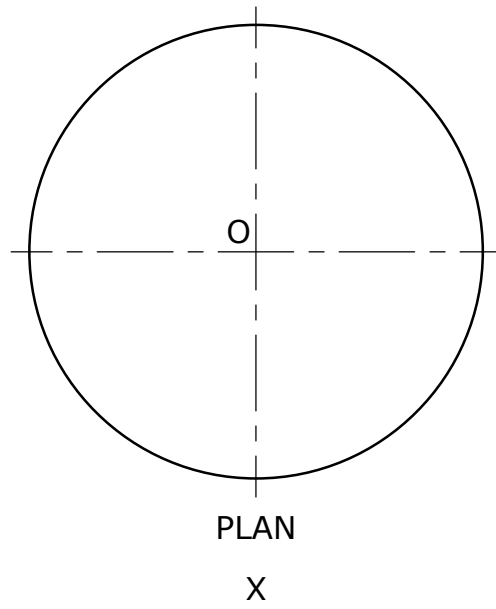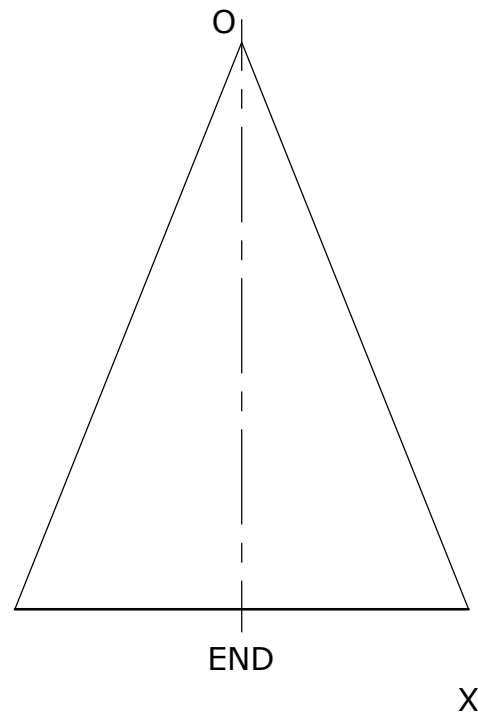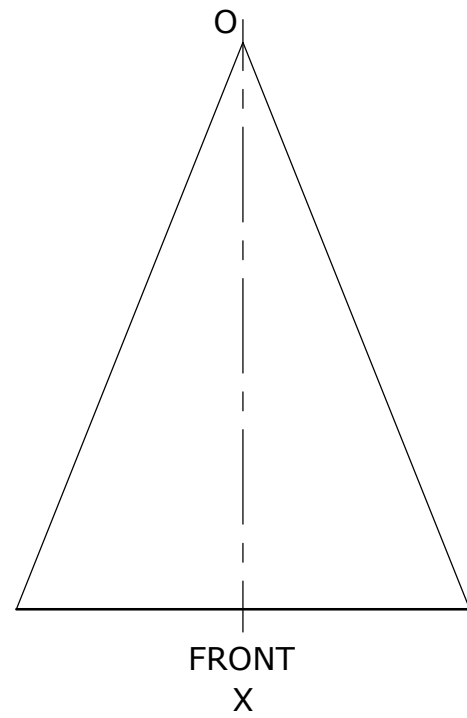
INDEX NUMBER : _____

Question 5.
The surface development and an incomplete orthographic projection of a truncated cone are given below. By construction, complete:

a.   the truncation on the front elevation;   (7)
b.   the truncation on the plan;   (7)
c.   the truncation on the end elevation.   (4)

(Total: 18 marks)

O

O

FRONT
X

END
X

X

X

PLAN
X

O

X

SURFACE DEVELOPMENT

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER I (Page 4 of 5) - ATTEMPT ALL QUESTIONS - DATE: 2nd July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____
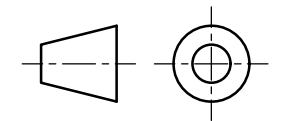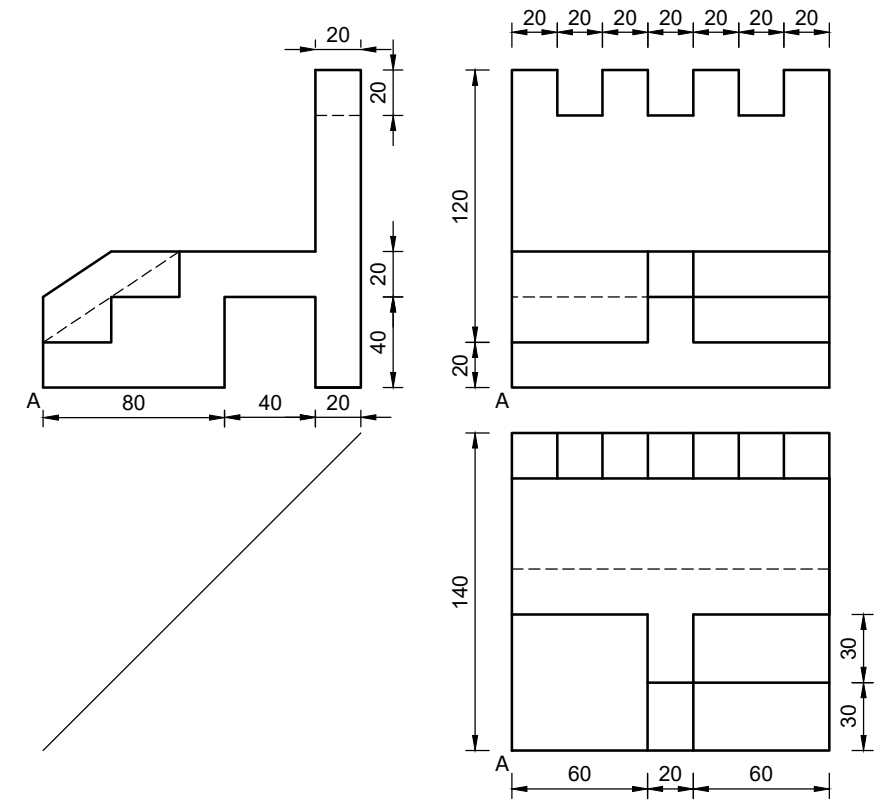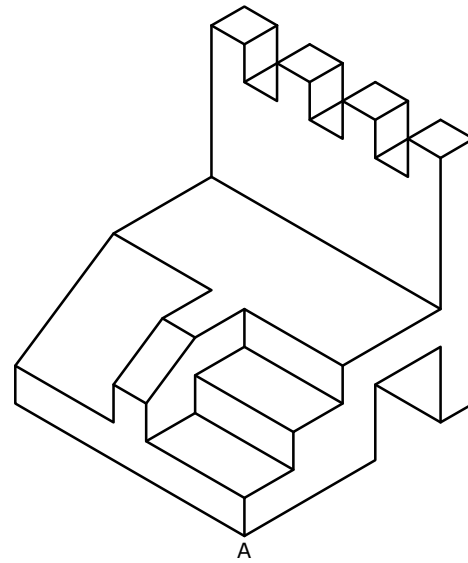
Question 6.

Three orthographic views and one pictorial projection of an indoor playground equipment are given.

Using the given starting lines, VP1 and VP2, draw an estimated two-point perspective view of the indoor playground equipment.
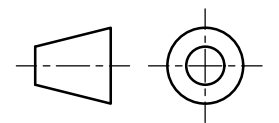
Note:
- starting point A has been given.
- estimate any missing dimension.

(Total: 20 marks)

VP1

VP2
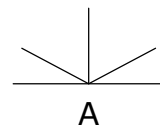
A

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER I (Page 5 of 5) - ATTEMPT ALL QUESTIONS - DATE: 2nd July 2021 - TIME : 4.00 p.m. to 6.05 p.m.

INDEX NUMBER : _____

Question 1.
The following computer programme is written to create the design layout of a trophy.

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; M = 650; N = 700;
     O = 750; P = 800; Q = 850; R = 900; S = 950.

ACI 7:   MOVE C,D; DRAW A,B; DRAW A,A; DRAW P,A; DRAW P,B; DRAW A,B:
ACI 7:   MOVE P,A; DRAW R,C; DRAW R,D; DRAW Q,D:
ACI 7:   MOVE R,D; DRAW P,B:
ACI 7:   MOVE K,D; DRAW I,D:

ACI 5:   MOVE H,C; DRAW C,C; DRAW C,F:
ACI 5:   MOVE G,F; DRAW B,F; DRAW B,O; DRAW G,O; DRAW G,N; DRAW C,N;
          DRAW C,G; DRAW F,G; DRAW F,I; DRAW D,I; DRAW D,J; DRAW G,J;
          DRAW G,F:

ACI 1:   MOVE O,F; DRAW J,F; DRAW J,O; DRAW O,O; DRAW O,N; DRAW K,N;
          DRAW K,G; DRAW O,G; DRAW O,F:
ACI 1:   MOVE P,C; DRAW K,C; DRAW K,F:

ACI 3:   MOVE P,C; DRAW Q,D; DRAW Q,I; DRAW M,I; DRAW M,N:
ACI 3:   MOVE P,C; DRAW P,G; DRAW O,F:
ACI 3:   MOVE O,G; DRAW Q,I:
ACI 3:   MOVE K,G; DRAW M,I:
ACI 3:   MOVE O,N; DRAW Q,P; DRAW Q,Q; DRAW O,O:
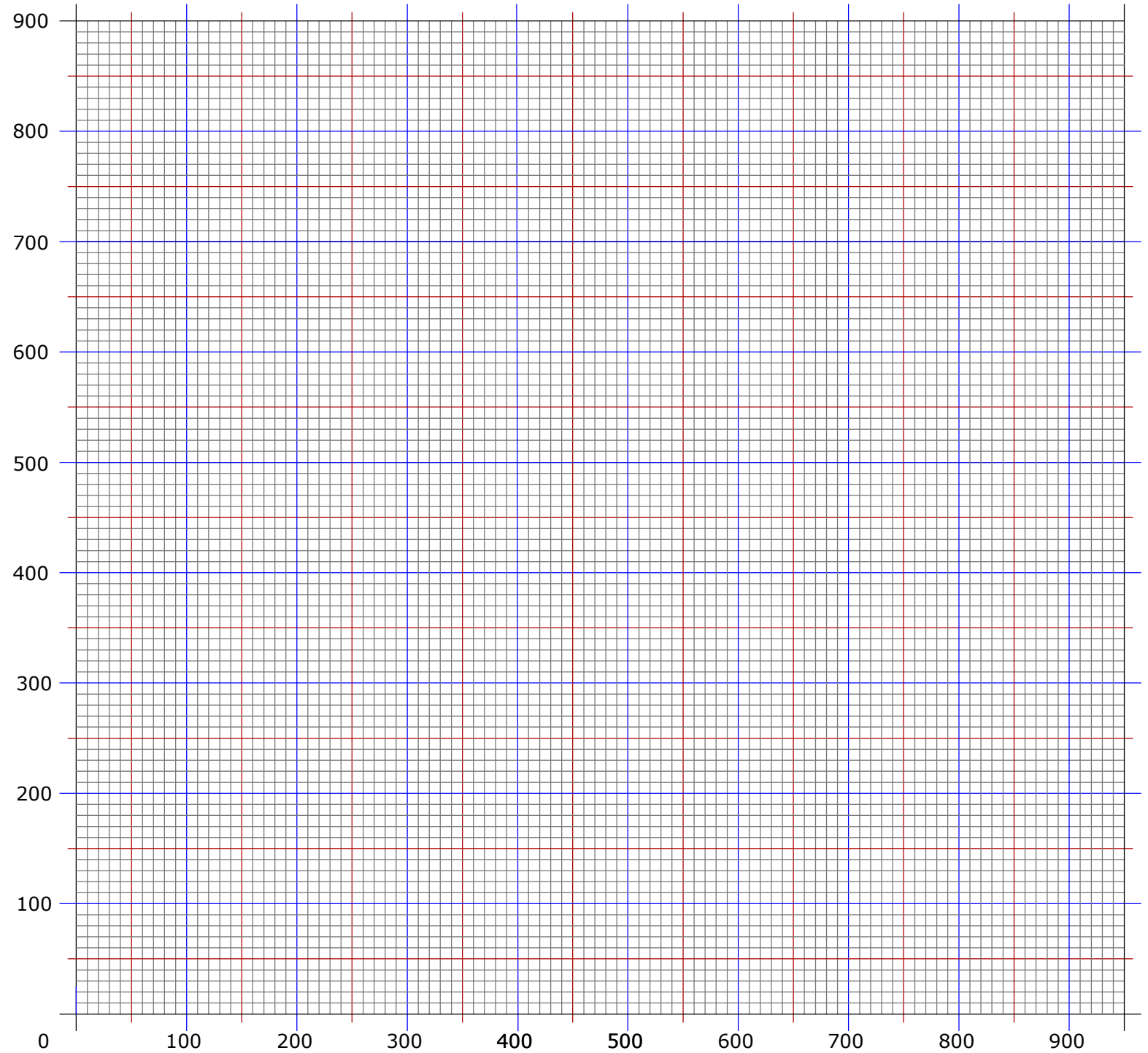ACI 3:   MOVE Q,Q; DRAW L,Q; DRAW J,O:

ACI 30:   MOVE G,F; DRAW H,G; DRAW H,C; DRAW I,D; DRAW I,L; DRAW G,J:
ACI 30:   MOVE D,J; DRAW F,L; DRAW I,L:
ACI 30:   MOVE C,G; DRAW E,I:
ACI 30:   MOVE E,K; DRAW E,N:
ACI 30:   MOVE B,O; DRAW D,Q; DRAW I,Q; DRAW I,P; DRAW G,N:
ACI 30:   MOVE G,O; DRAW I,Q.

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	GREEN	BLUE	BLACK	ORANGE
ACI No.	1	3	5	7	30

The starter sheet shows a pre-printed grid representing a 950 x 900 graphical display. Complete the programme by using the grid to plot the image produced by this programme.
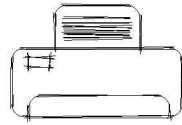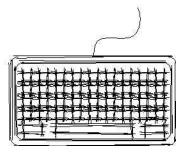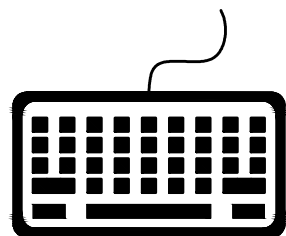
                              (Total: 12 marks)

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIA (Page 1 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____
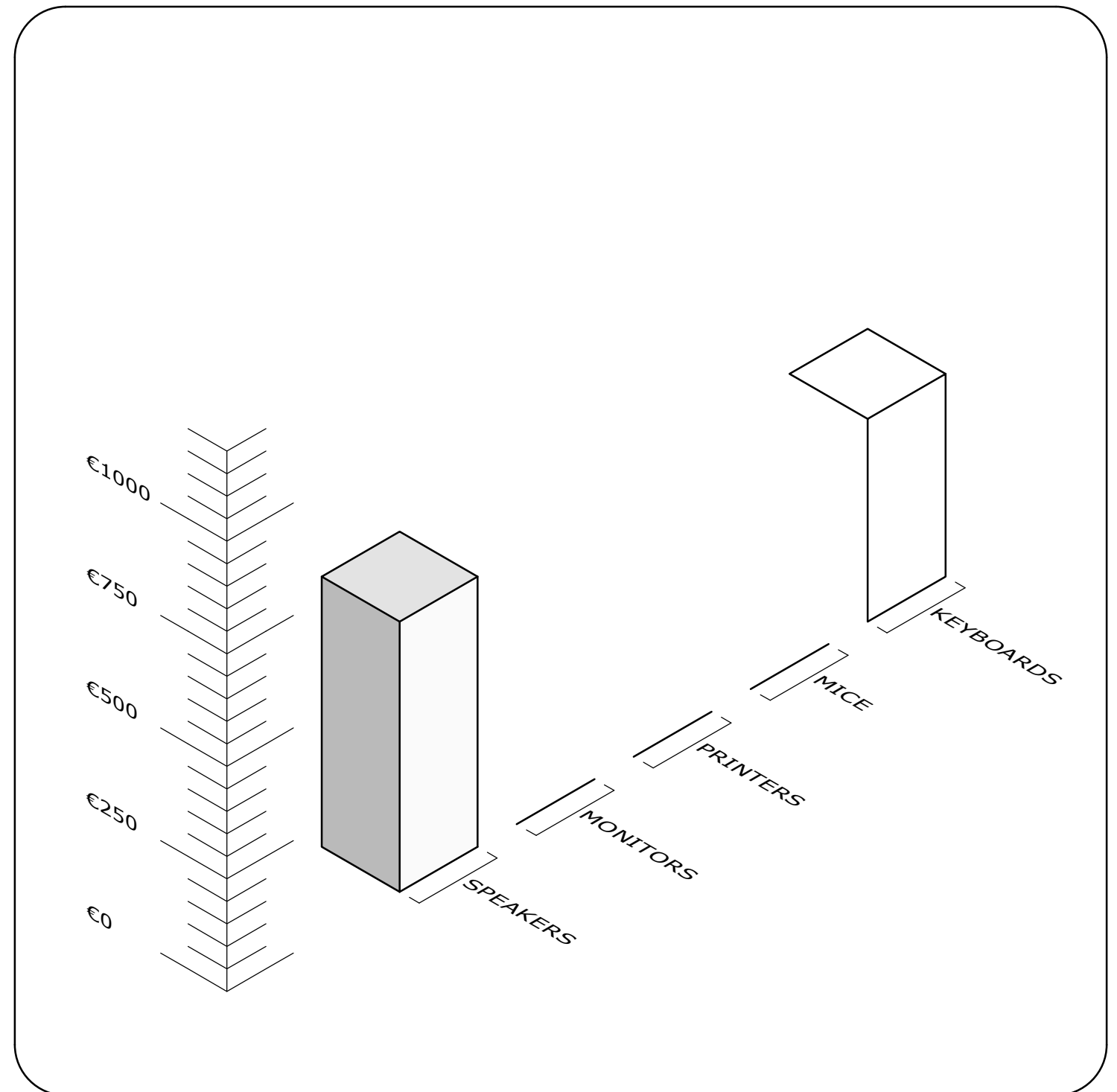
Question 2.

In a computer shop, among some popular peripherals, five particular items make the most profit. The table and graph below need to represent this information. The owner needs eye catching ideograms to be placed within the shop so that customers can easily find the products they are looking for. You are requested to complete the missing information and shade the graph as per the indicated colours.

(Total: 14 marks)

ITEM	PROFIT	SKETCH	IDEOGRAM	LEGEND
SPEAKERS	€			GREY
MONITORS	€1200			RED
PRINTERS	€950			GREEN
MICE	€300			BLUE
KEYBOARDS	€			YELLOW

TABLE

GRAPH

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD, UNIVERSITY OF MALTA, MSIDA

GRAPHICAL COMMUNICATION - PAPER IIA (Page 2 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.
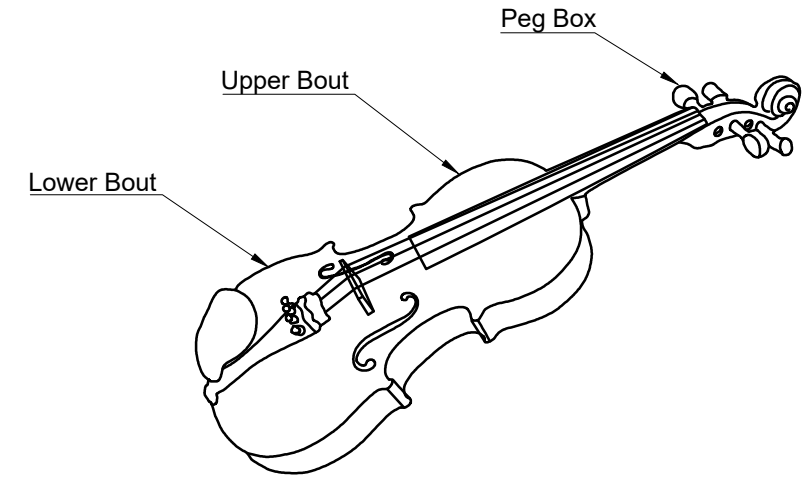
INDEX NUMBER : _____

Question 3.

A pictorial view of a violin is shown on the right. Three parts of this violin are labeled. The upper bout is formed from the involute of a square, while the lower bout from that of an equilateral triangle. The peg box, on the other hand, is formed from one third involute of a circle rotating in a clockwise direction.
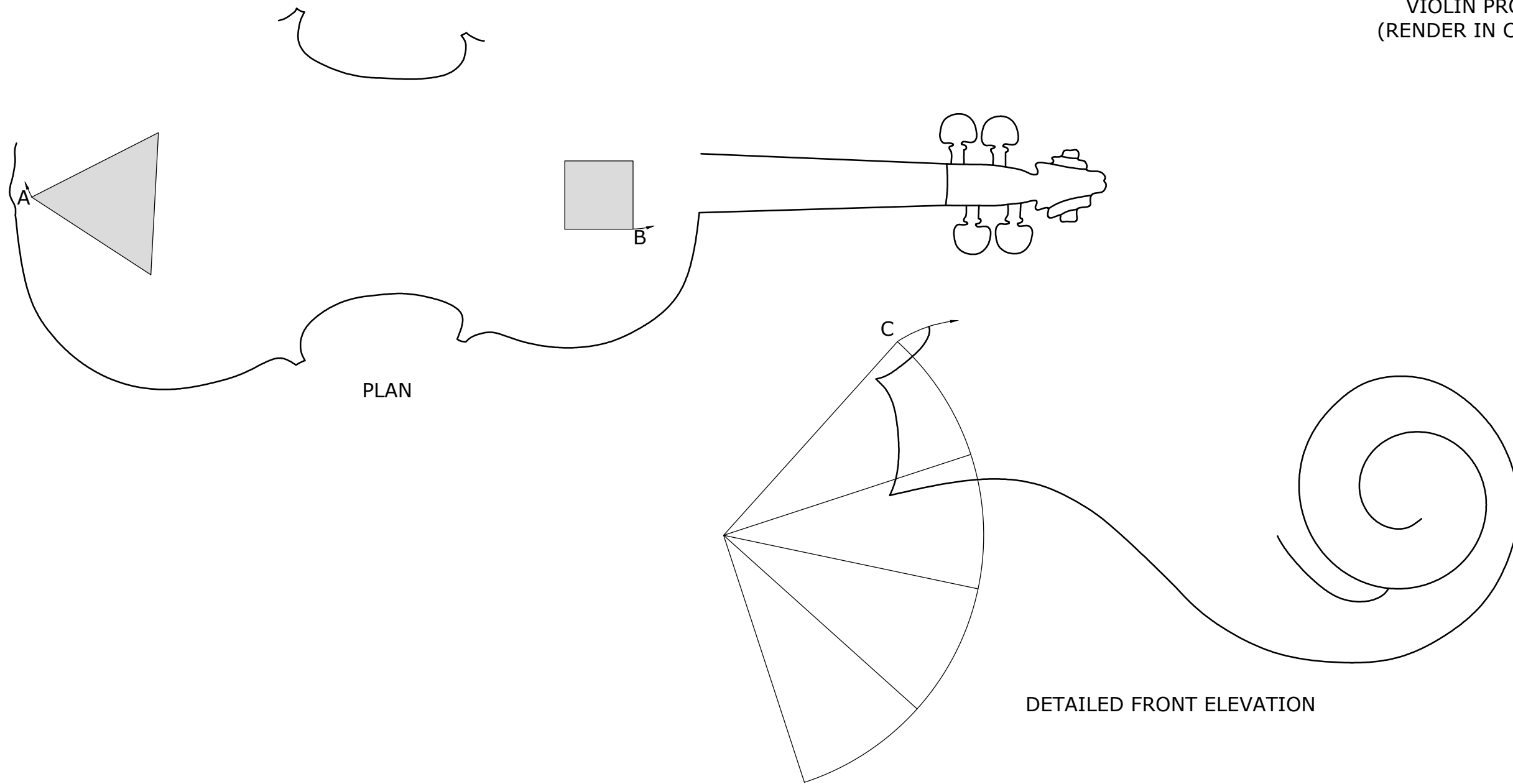
Using the given starting lines:

a.   construct the involutes of the square and the triangle to complete the profile of the violin on the **plan**;   (7)
b.   construct the involute of one third of a circle on the **detailed front elevation**;   (4)
c.   render the **violin profile** on the right, material: wood.   (4)

Note: leave all construction lines visible.

(Total: 15 marks)

Peg Box

Upper Bout

Lower Bout

VIOLIN PROFILE
(RENDER IN COLOUR)

A

B

PLAN

C

DETAILED FRONT ELEVATION

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIA (Page 3 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.
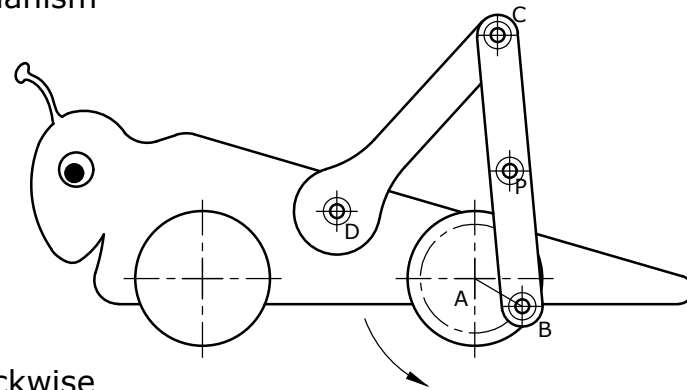
INDEX NUMBER : _____

Question 4.

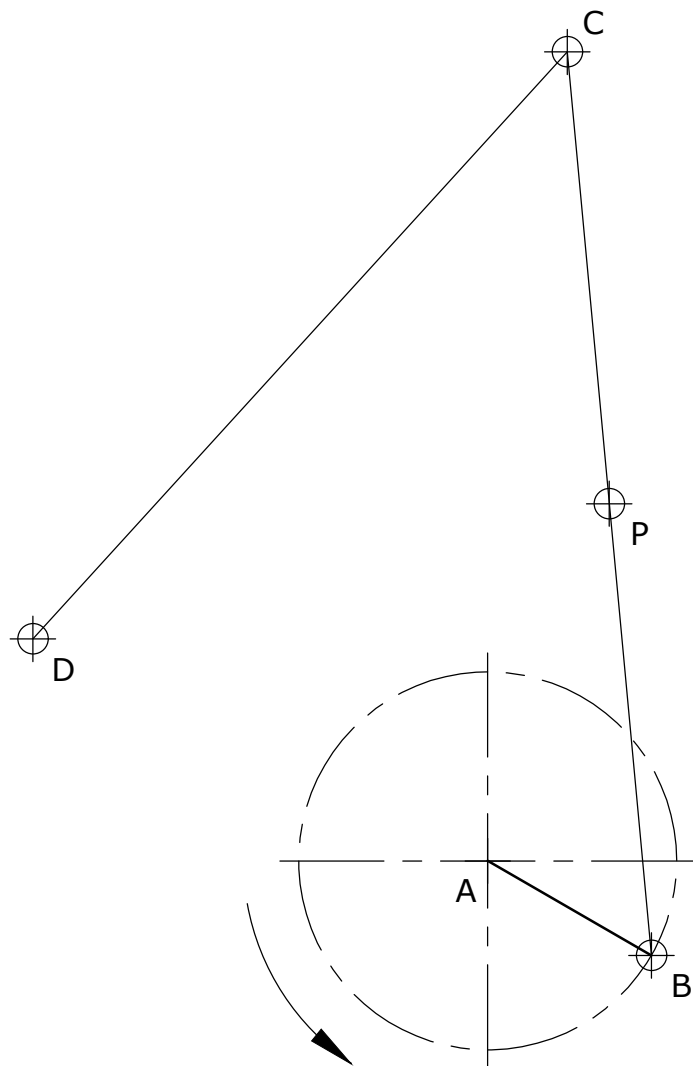A profile of a toy grasshopper mechanism is shown on the right.

It consists of:

a. a crank AB;
b. a linkage CB;
c. an oscillating arm CD.

Crank AB rotates in an anti-clockwise direction about point A, while point D is a fixed pivot. Point C is a free pivot. Using the starting points provided, plot the locus of point P for **ONE** complete revolution of the crank.
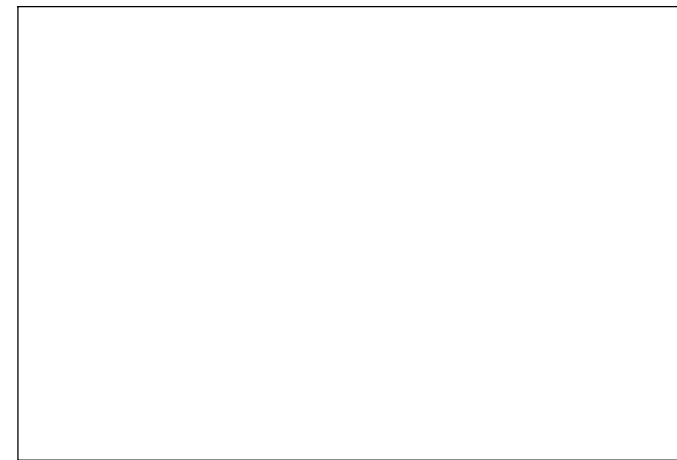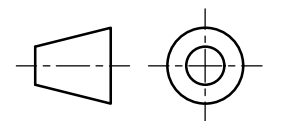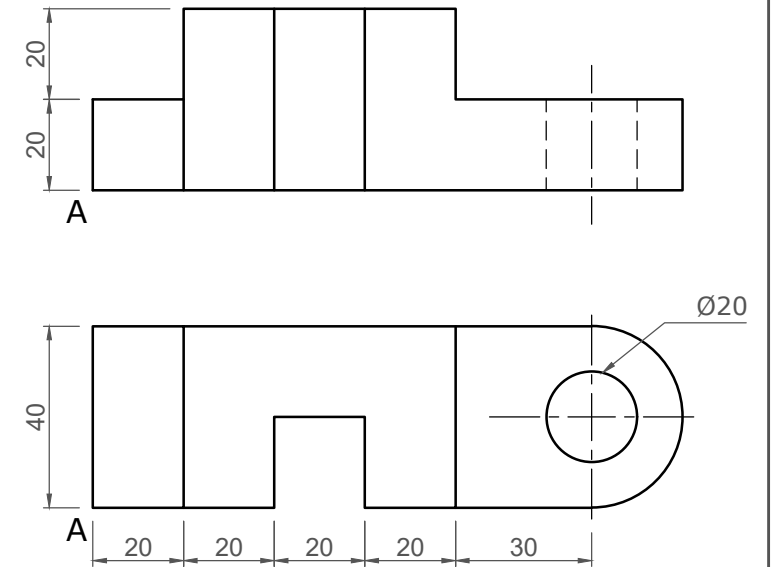
(Total: 12 marks)

Question 5.

A front elevation and a plan of a solid block are given below. Draw a freehand sketch and an isometric drawing of the block using the given starting lines. Place A at the lowest point. Estimate any missing dimension.

(Total: 14 marks)

Freehand sketch

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD, UNIVERSITY OF MALTA, MSIDA

GRAPHICAL COMMUNICATION - PAPER IIA (Page 4 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.

INDEX NUMBER : _____

Question 6.

A pictorial view of a toy crane is shown on the right. Detail drawings of the separate parts and an items list are given.

Use the given starting lines to draw:
(i) the front elevation;
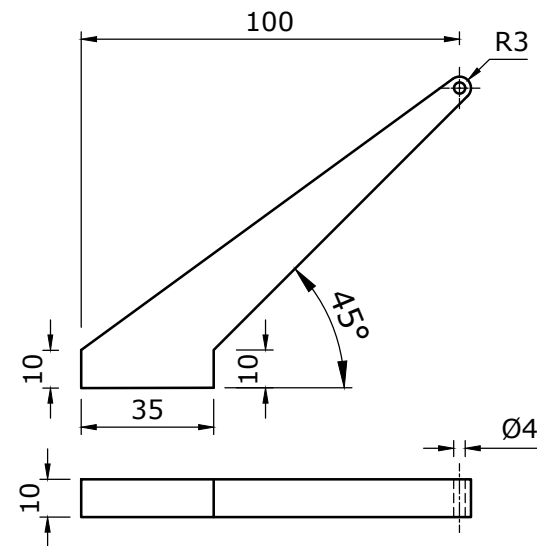(ii) the plan of the assembled crane.

Note: Show **all** hidden detail.
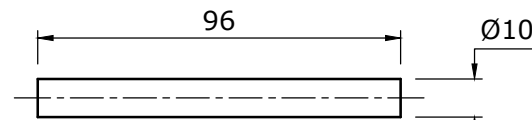
(Total: 18 marks)

ITEMS LIST

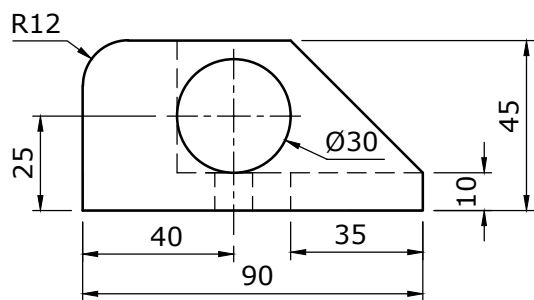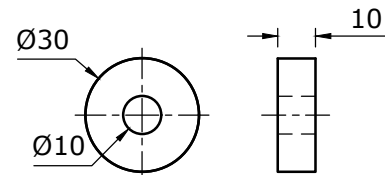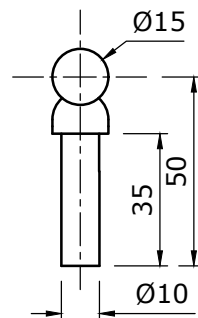| ITEM No.	DESCRIPTION	QUANTITY
1	CHASSIS	1 off
2	CABIN	1 off
3	CRANE JIB	2 off
4	WHEEL SHAFT	2 off
5	WHEEL	4 off
6	JIB SPACER	1 off
7	DRIVER	1 off
8	HOOK	1 off
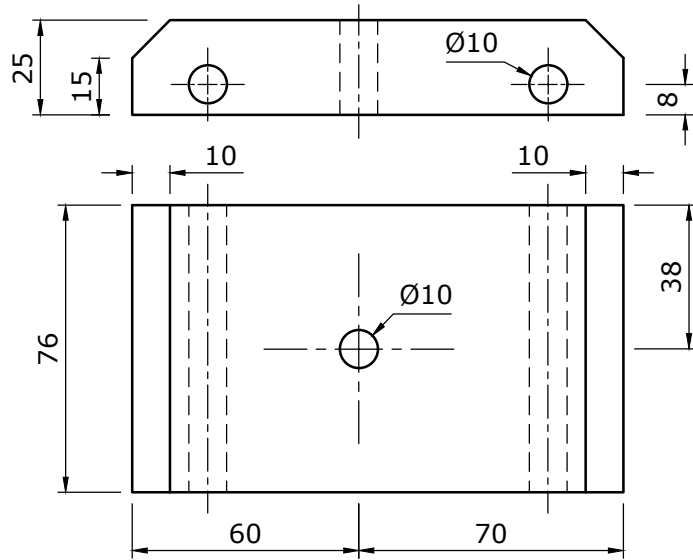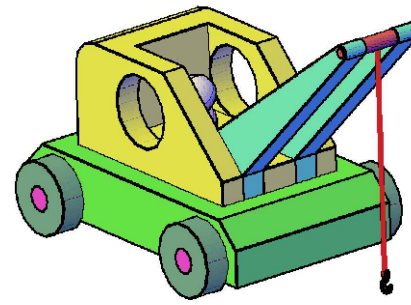
ITEM 1 CHASSIS

ITEM 3 CRANE JIB

ITEM 4 WHEEL SHAFT

ITEM 5 WHEEL
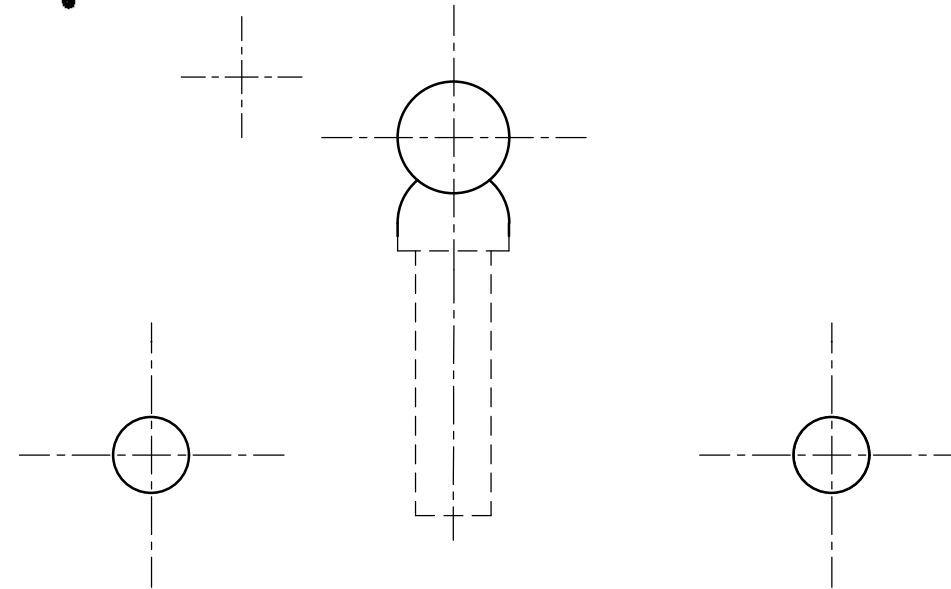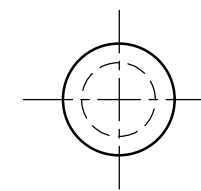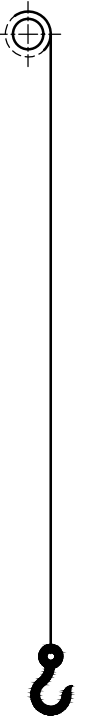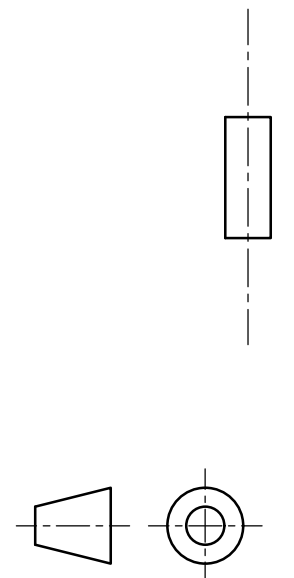
ITEM 2 CABIN

ITEM 6 JIB SPACER

ITEM 7 DRIVER

FRONT ELEVATION

PLAN

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD, UNIVERSITY OF MALTA, MSIDA

GRAPHICAL COMMUNICATION - PAPER IIA (Page 5 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.
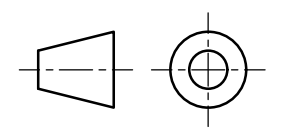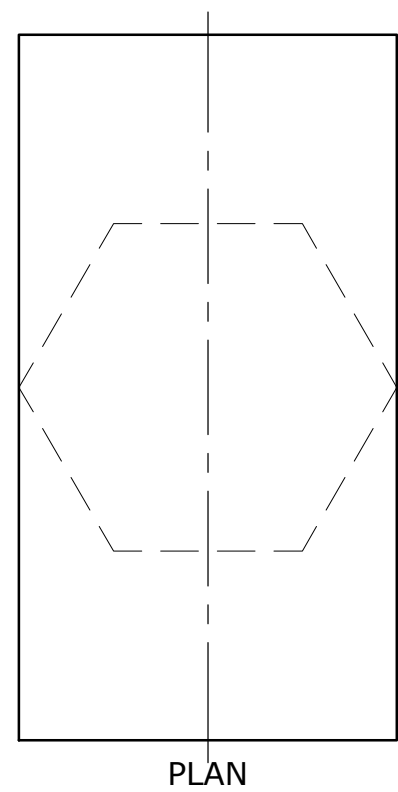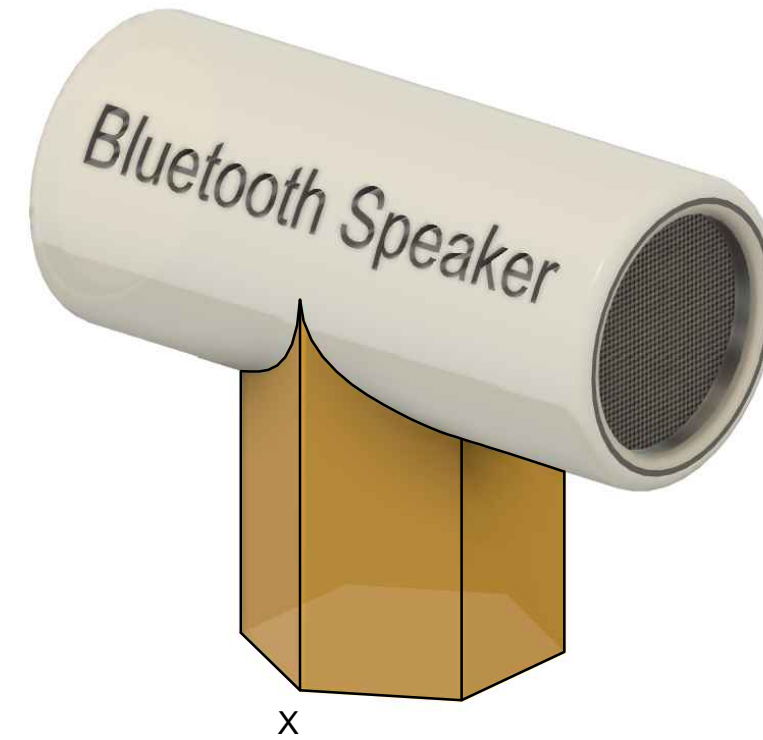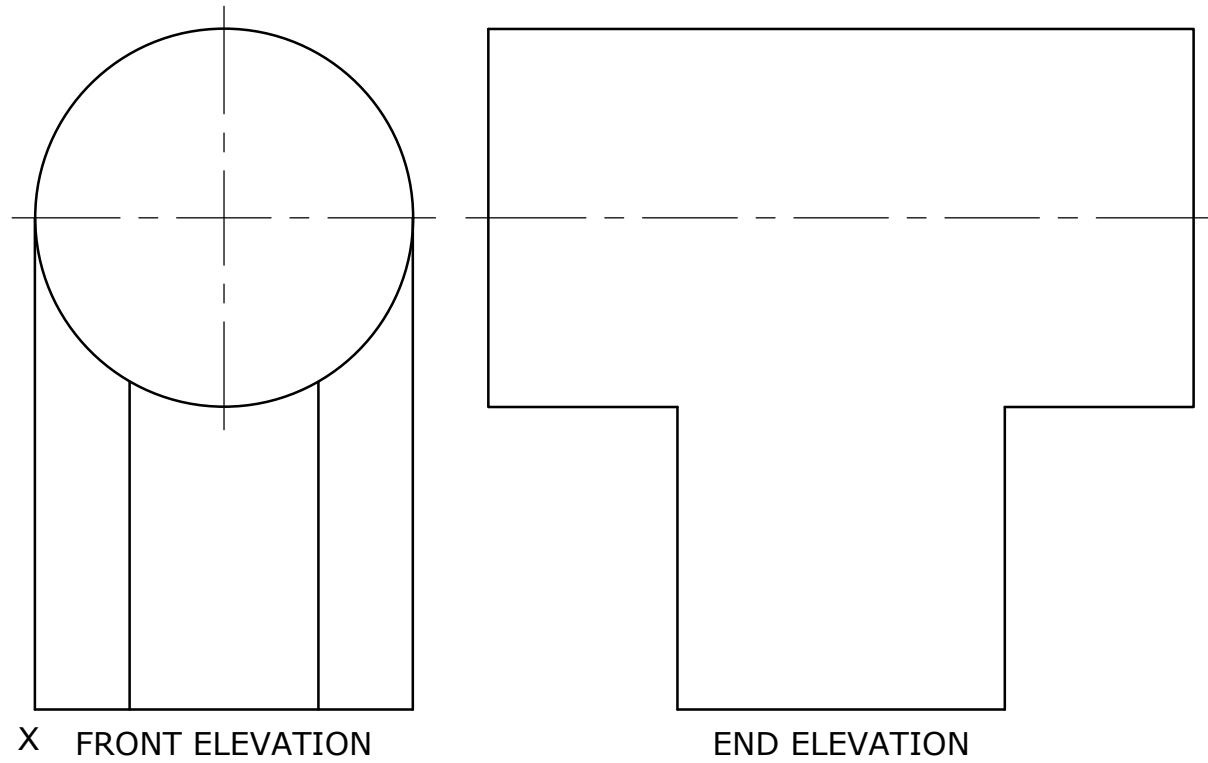
INDEX NUMBER : _____

Question 7.
The plan, the front elevation and a pictorial view of a bluetooth speaker are shown. The shape of the speaker is made up of a hexagonal prism intersecting a cylinder.
An incomplete end elevation of the speaker is also given below.

Using the given starting lines and dimensions:
a.   project the curve of intersection on the end elevation;   (7)
b.   construct the full development of the hexagonal prism, taking the seam line at point X.   (8)

(Total: 15 marks)

X   FRONT ELEVATION

END ELEVATION

X

PLAN

X

DEVELOPMENT OF THE HEXAGONAL PRISM

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIA (Page 6 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____

Question 1.
The following computer programme is written to create the design layout of a trophy.

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; M = 650; N = 700;
      O = 750; P = 800; Q = 850; R = 900; S = 950.

ACI 7:   MOVE C,F; DRAW A,D; DRAW A,C; DRAW P,C; DRAW R,E; DRAW R,F;
        DRAW Q,F:
ACI 7:   MOVE R,F; DRAW P,D; DRAW P,C:
ACI 7:   MOVE P,D; DRAW A,D:
ACI 7:   MOVE K,F; DRAW I,F:

ACI 5:   MOVE I,F; DRAW H,E; DRAW C,E; DRAW C,N; DRAW H,N; DRAW H,M;
        DRAW D,M; DRAW D,F; DRAW G,F; DRAW G,H; DRAW F,H; DRAW F,I;
        DRAW H,I; DRAW H,E:
ACI 5:   MOVE I,F; DRAW I,J; DRAW G,J; DRAW F,I:
ACI 5:   MOVE I,J; DRAW H,I:
ACI 5:   MOVE G,G; DRAW E,G; DRAW E,M:
ACI 5:   MOVE E,G; DRAW D,F:
ACI 5:   MOVE C,N; DRAW D,O; DRAW I,O; DRAW I,N; DRAW H,M:
ACI 5:   MOVE I,O; DRAW H,N:

ACI 1:   MOVE Q,F; DRAW P,E; DRAW K,E; DRAW K,N; DRAW P,N; DRAW P,M;
        DRAW L,M; DRAW L,F; DRAW P, F; DRAW P,E:
ACI 1:   MOVE Q,F; DRAW Q,G; DRAW M,G; DRAW M,M:
ACI 1:   MOVE Q,G; DRAW P,F:
ACI 1:   MOVE M,G; DRAW L,F:
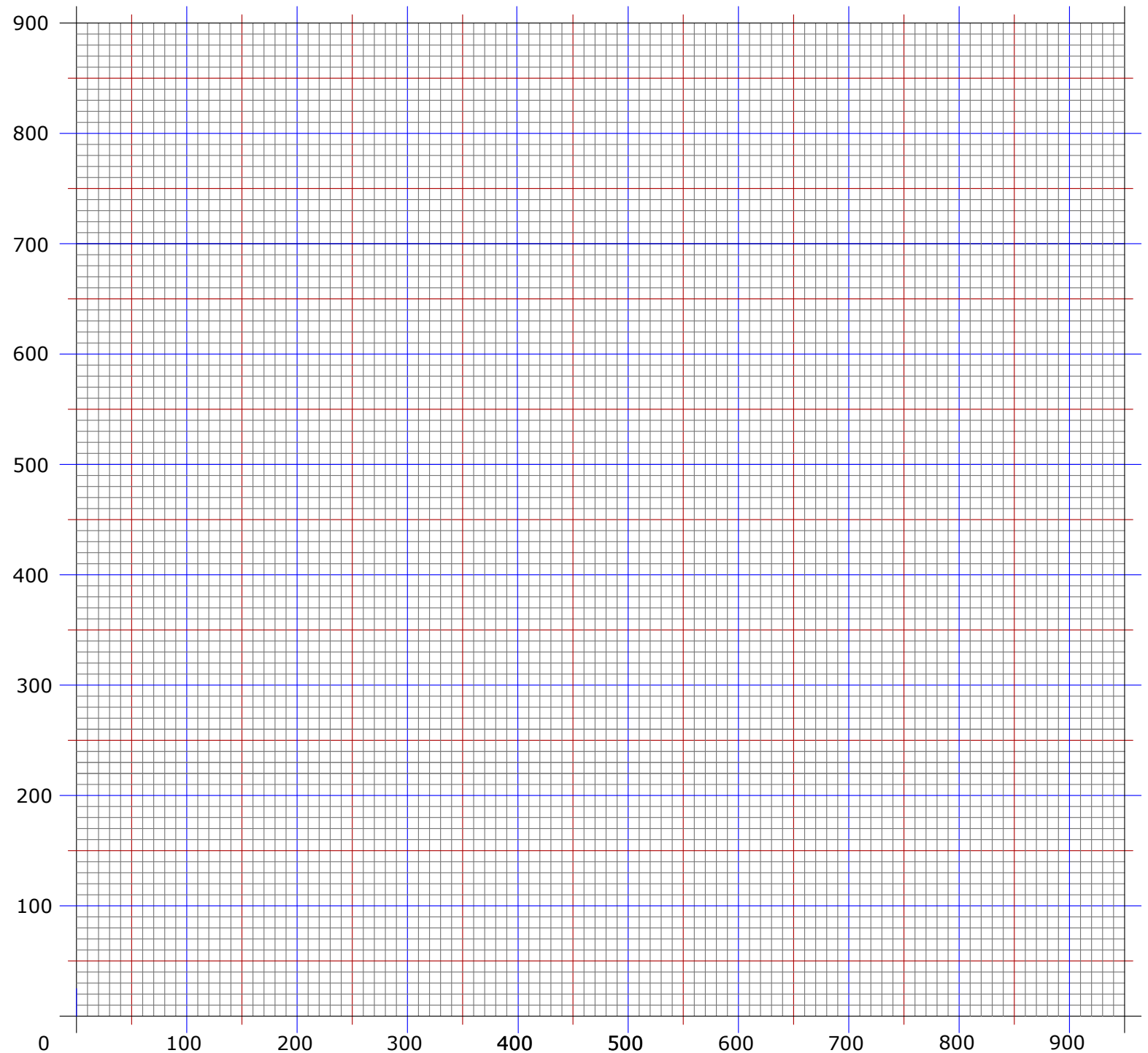ACI 1:   MOVE K,N; DRAW L,O; DRAW Q,O; DRAW Q,N; DRAW P,M:
ACI 1:   MOVE Q,O; DRAW P,N.

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	BLUE	BLACK
ACI No.	1	5	7

The starter sheet shows a pre-printed grid representing a 950 x 900 graphical display. Complete the programme by using the grid to plot the image produced by this programme.
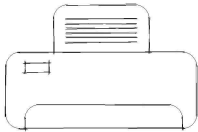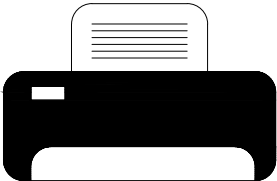
(Total: 12 marks)

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIB (Page 1 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____
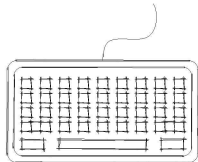
Question 2.

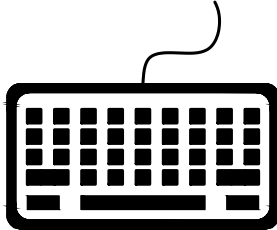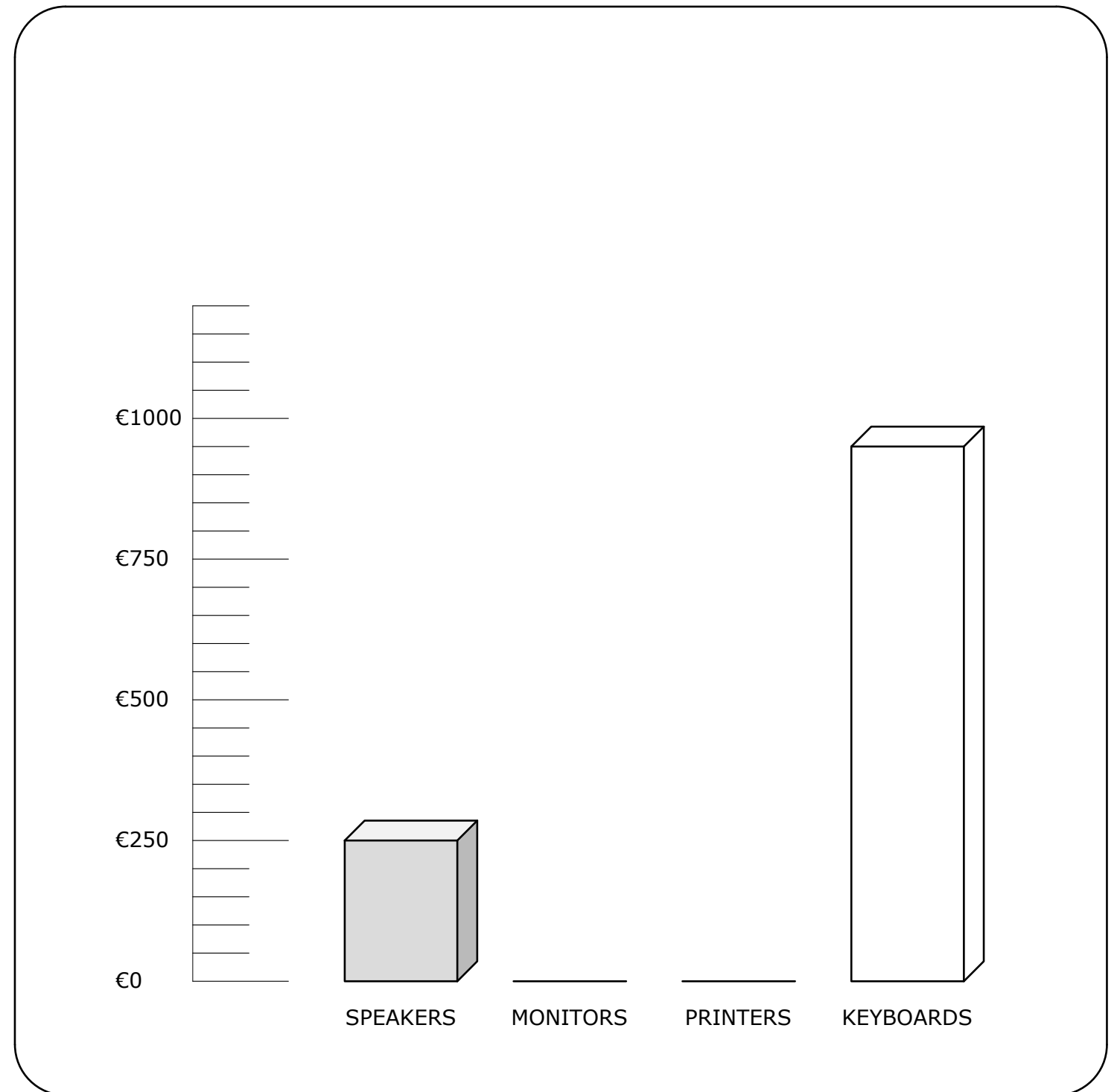In a computer shop, among some popular peripherals, four particular items make the most profit. The table and graph below need to represent this information. The owner needs eye catching ideograms to be placed within the shop so that customers can easily find the products they are looking for. You are requested to complete the missing information and shade the graph as per the indicated colours.

(Total: 14 marks)

ITEM	PROFIT	SKETCH	IDEOGRAM	LEGEND
SPEAKERS	€			GREY
MONITORS	€500			RED
PRINTERS	€1200			GREEN
KEYBOARDS	€			YELLOW

TABLE

GRAPH

€1000

€750

€500

€250

€0

SPEAKERS   MONITORS   PRINTERS   KEYBOARDS

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIB (Page 2 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____
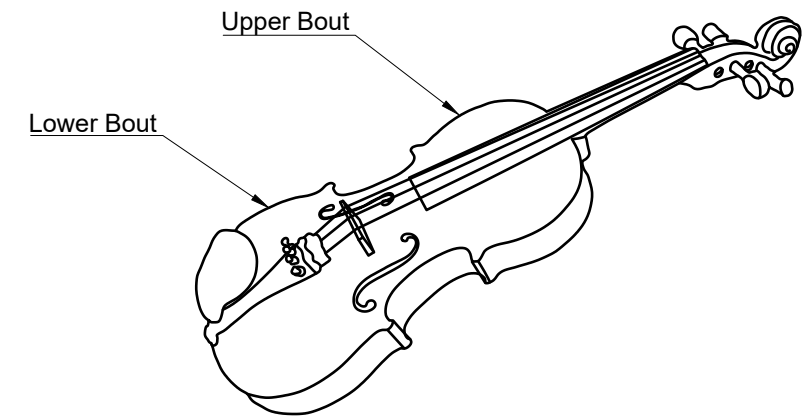
Question 3.
A pictorial view of a violin is shown on the right. Two parts of this violin are labeled. The upper bout is formed from the involute of a square, while the lower bout from that of an equilateral triangle.
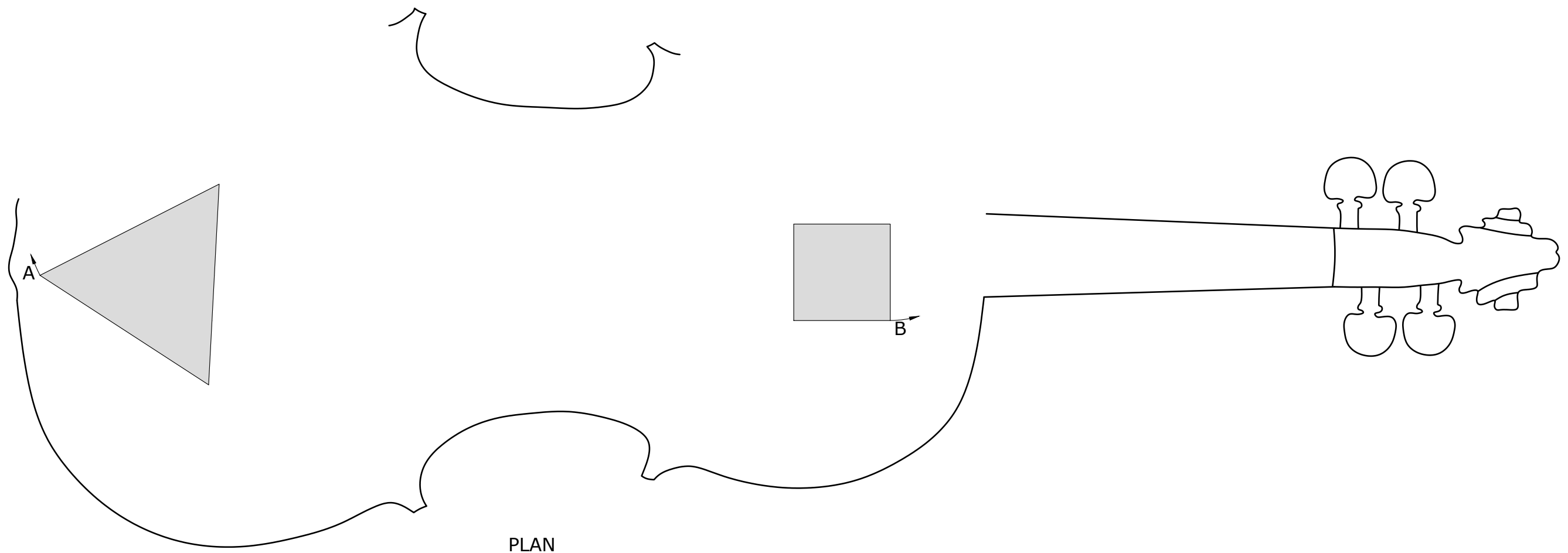
Using the given starting lines:

a.   construct the involute of the square;   (6)
b.   construct the involute of the triangle to complete the profile of the violin on the **plan**;   (5)
c.   render the **violin profile** on the right, material: wood.   (4)

Note: Leave all construction lines visible.

(Total: 15 marks)

Upper Bout

Lower Bout

VIOLIN PROFILE
(RENDER IN COLOUR)

A

B

PLAN

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIB (Page 3 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____
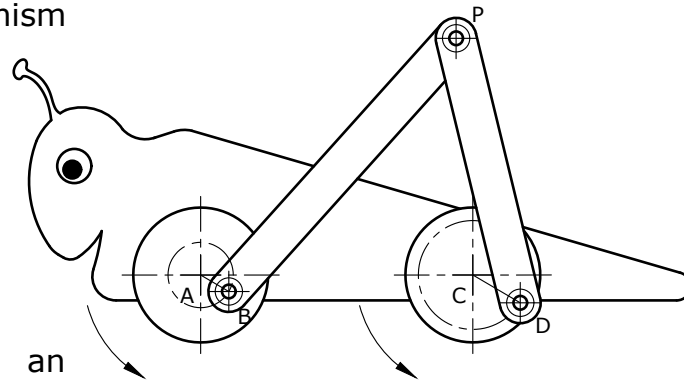
Question 4.

A profile of a toy grasshopper mechanism is shown on the right.
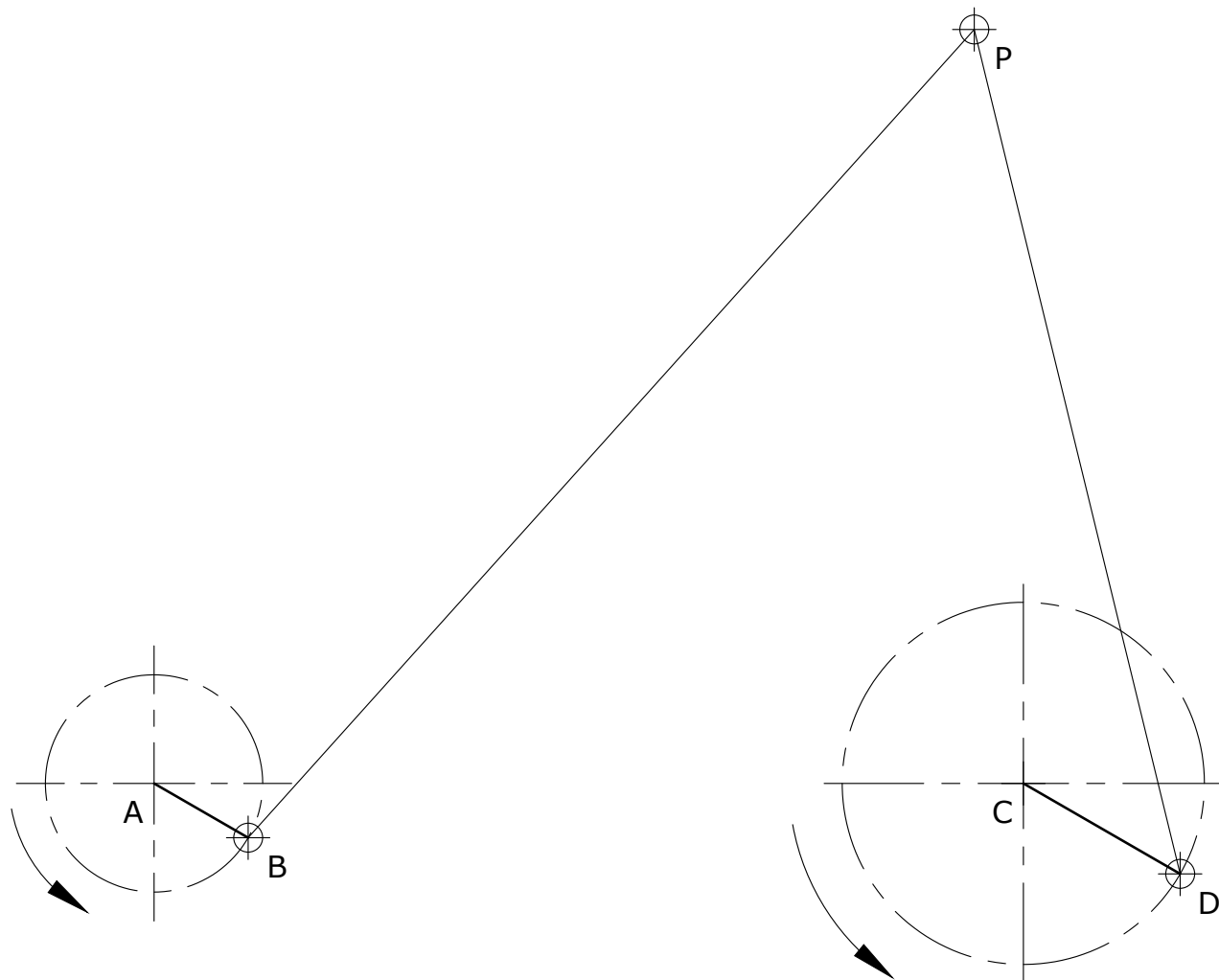
It consists of:

a.   two cranks, AB and CD;
b.   two linkages, BP and PD.

Cranks AB and CD rotate in an anti-clockwise direction about points A and C. Point P is a free pivot. Using the starting points provided, plot the locus of point P for **ONE** complete revolution of the cranks.
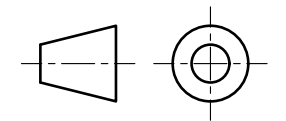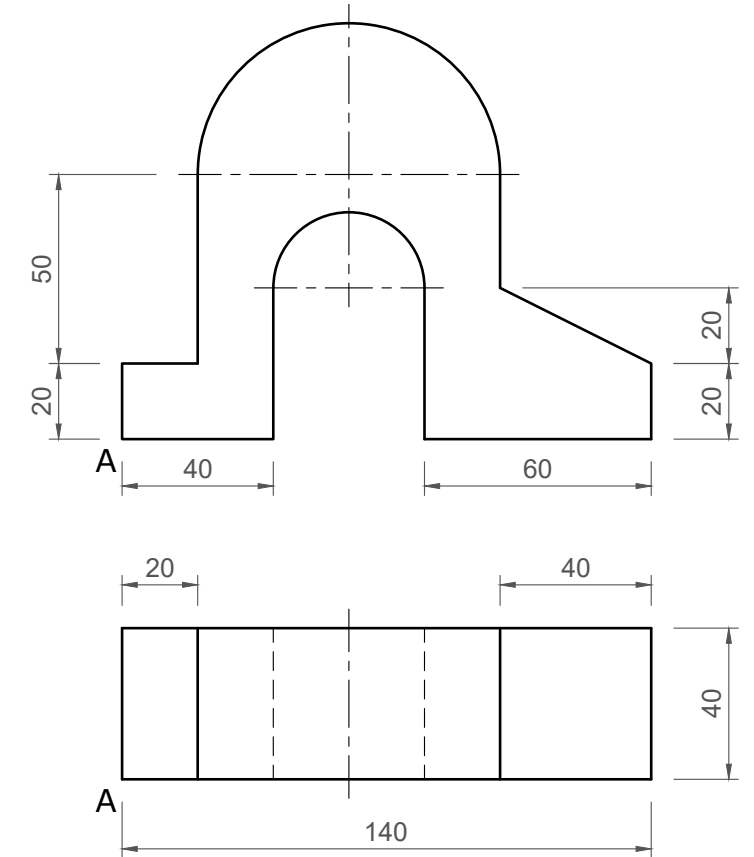
(Total: 12 marks)

Question 5.

A front elevation and a plan of a solid block are given on the right. Draw a freehand sketch and a cabinet oblique drawing of the block using the given starting lines. Place A at the lowest point. Estimate any missing dimension.

(Total: 14 marks)

Freehand sketch

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIB (Page 4 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____
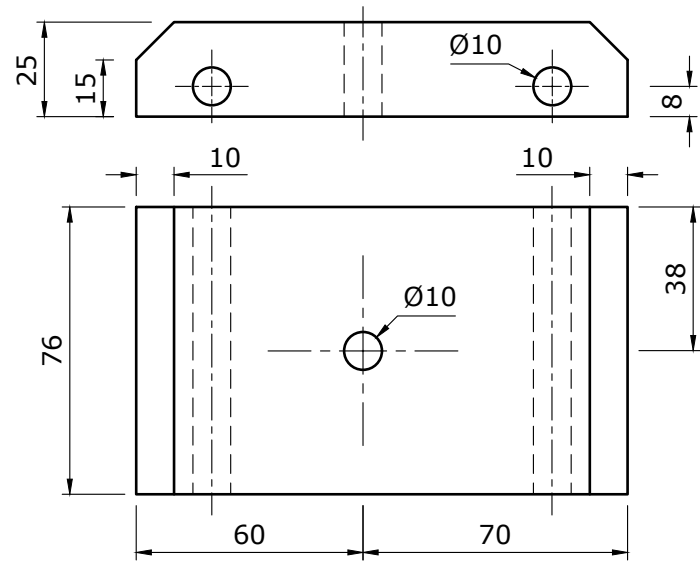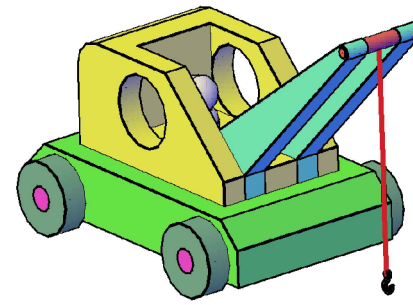
Question 6.

A pictorial view of a toy crane is shown on the right. Detail drawings of the separate parts and an items list are given.

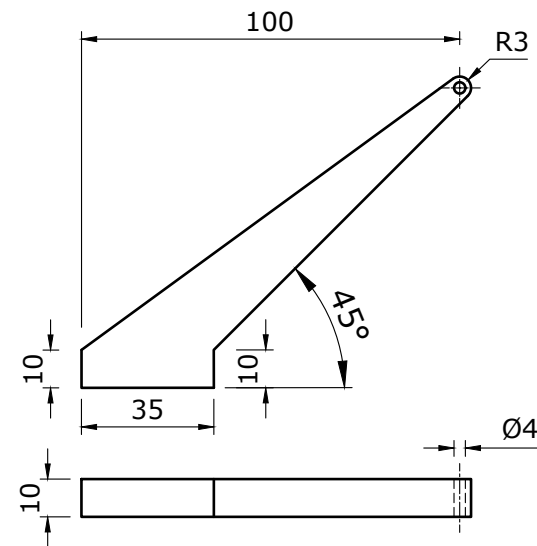Use the given starting lines to draw the front elevation of the assembled crane.

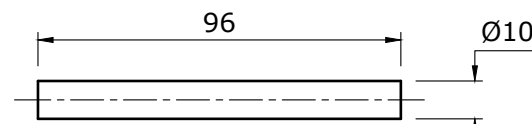Note: Show **all** hidden detail.

(Total: 18 marks)

ITEMS LIST		
ITEM No.	DESCRIPTION	QUANTITY
1	CHASSIS	1 off
2	CABIN	1 off
3	CRANE JIB	2 off
4	WHEEL SHAFT	2 off
5	WHEEL	4 off
6	JIB SPACER	1 off
7	DRIVER	1 off
8	HOOK	1 off

ITEM 1 CHASSIS

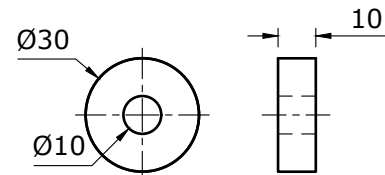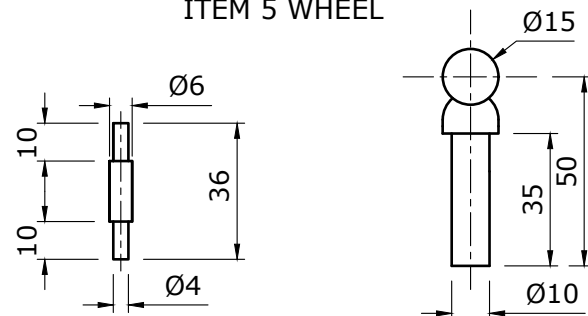ITEM 2 CABIN

ITEM 3 CRANE JIB

ITEM 4 WHEEL SHAFT

ITEM 5 WHEEL

ITEM 6 JIB SPACER

ITEM 7 DRIVER

FRONT ELEVATION

PLAN

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIB (Page 5 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____
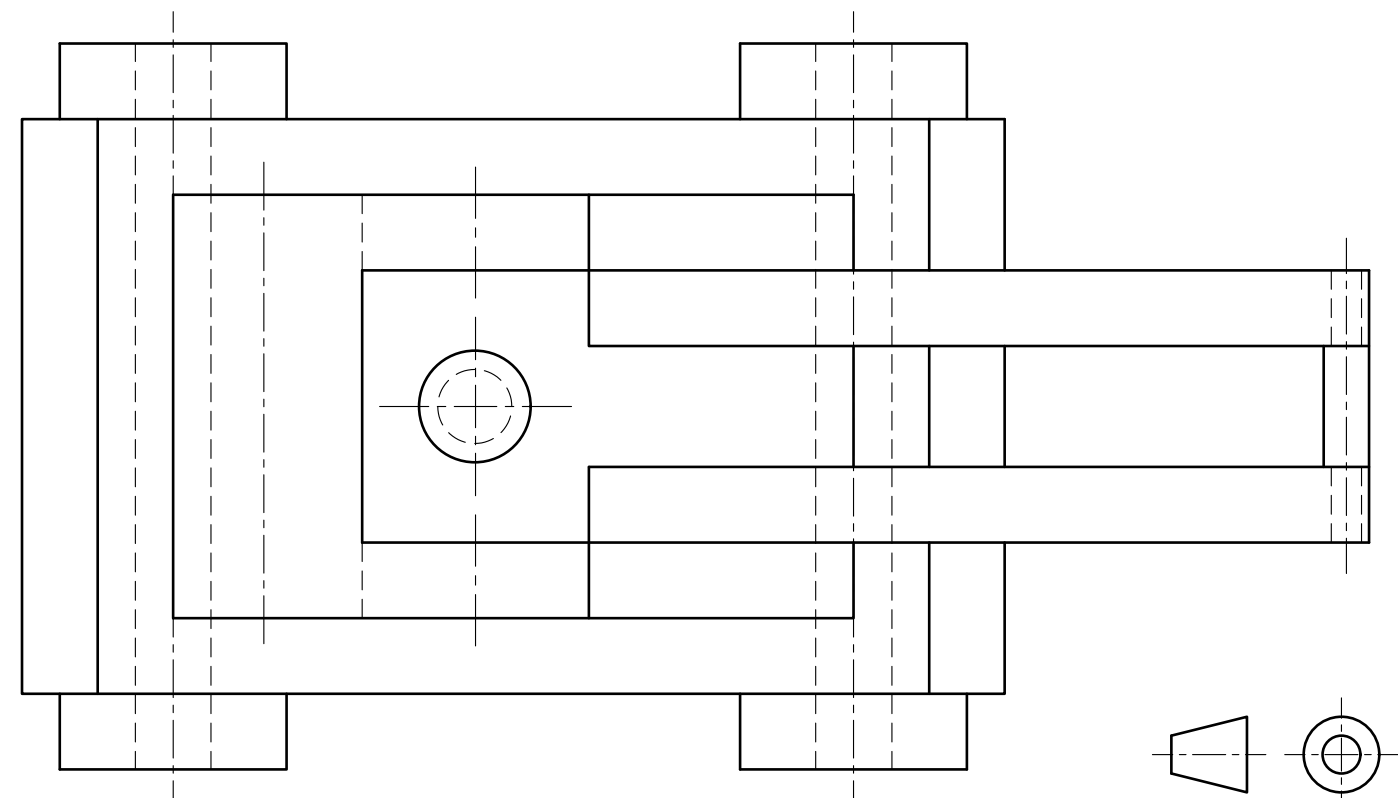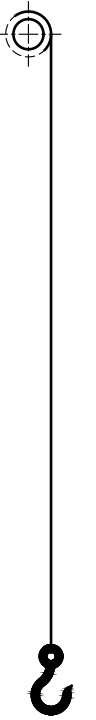
Question 7.

The plan, the front elevation and a pictorial view of a bluetooth speaker are shown. The shape of the speaker is made up of a hexagonal prism intersecting a cylinder.
An incomplete end elevation of the speaker is also given below.

Using the given starting lines and dimensions:
a.   project the curve of intersection on the end elevation;   (7)
b.   construct the full development of the hexagonal prism, taking the seam line at point X.   (8)

(Total: 15 marks)

FRONT ELEVATION

X   END ELEVATION

PLAN

X

DEVELOPMENT OF THE HEXAGONAL PRISM

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD,   UNIVERSITY OF MALTA,   MSIDA

GRAPHICAL COMMUNICATION - PAPER IIB (Page 6 of 6) - ATTEMPT ALL QUESTIONS - DATE: 5th July 2021 - TIME : 4.00 p.m. to 6.05 p.m.   INDEX NUMBER : _____