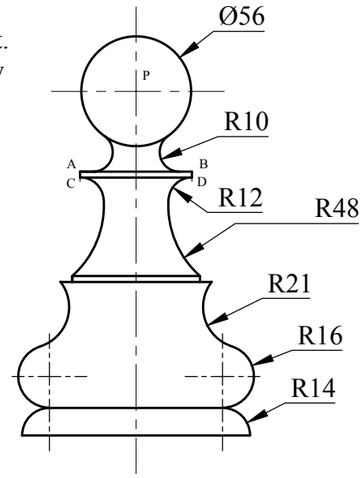
Question 1.

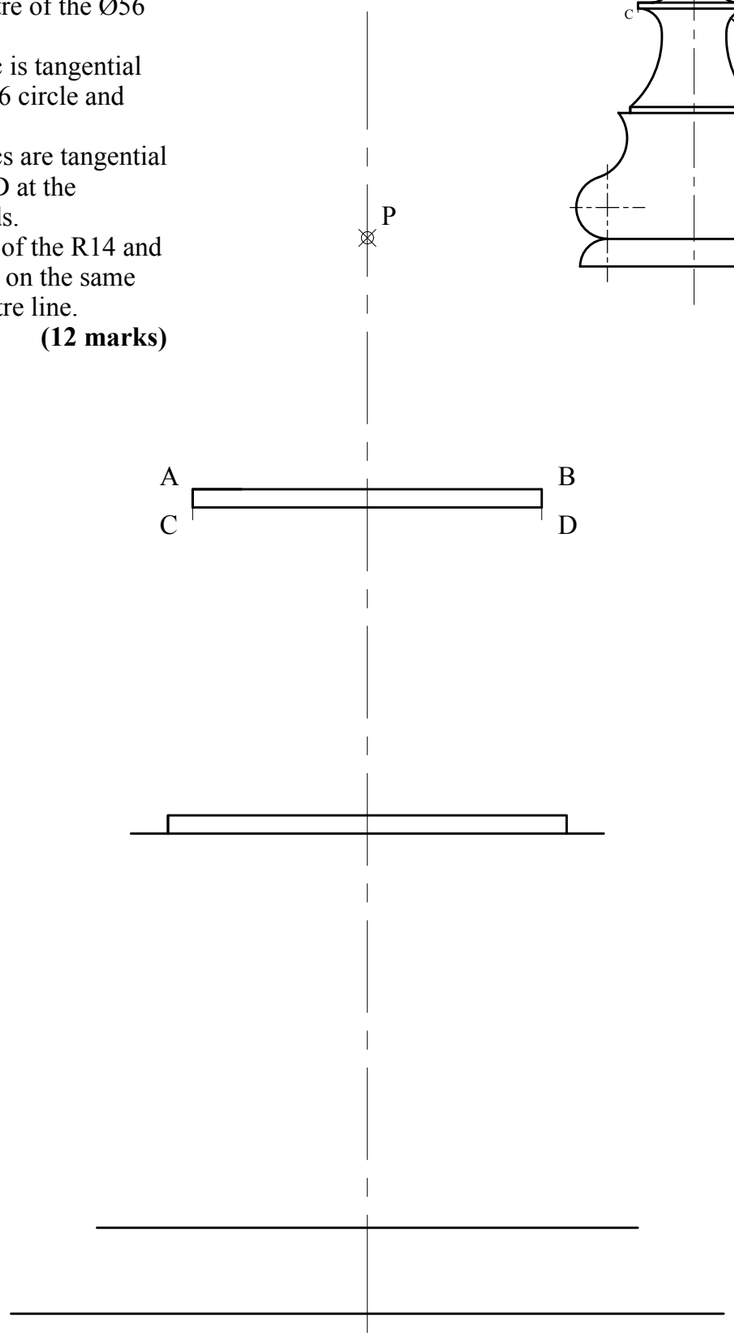
The symmetrical outline of a Chess Pawn is shown on the right. Using the given start lines construct its profile showing clearly how the **centres** and **points of tangencies** were located.

Notes:

- P is the centre of the Ø56 circle.
- The R10 arc is tangential with the Ø56 circle and line AB.
- The R12 arcs are tangential with line CD at the extreme ends.
- The centres of the R14 and R16 arcs lie on the same vertical centre line.

(12 marks)



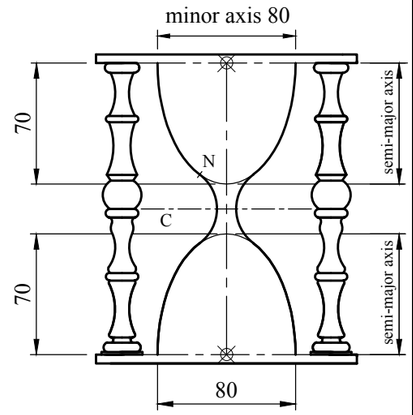


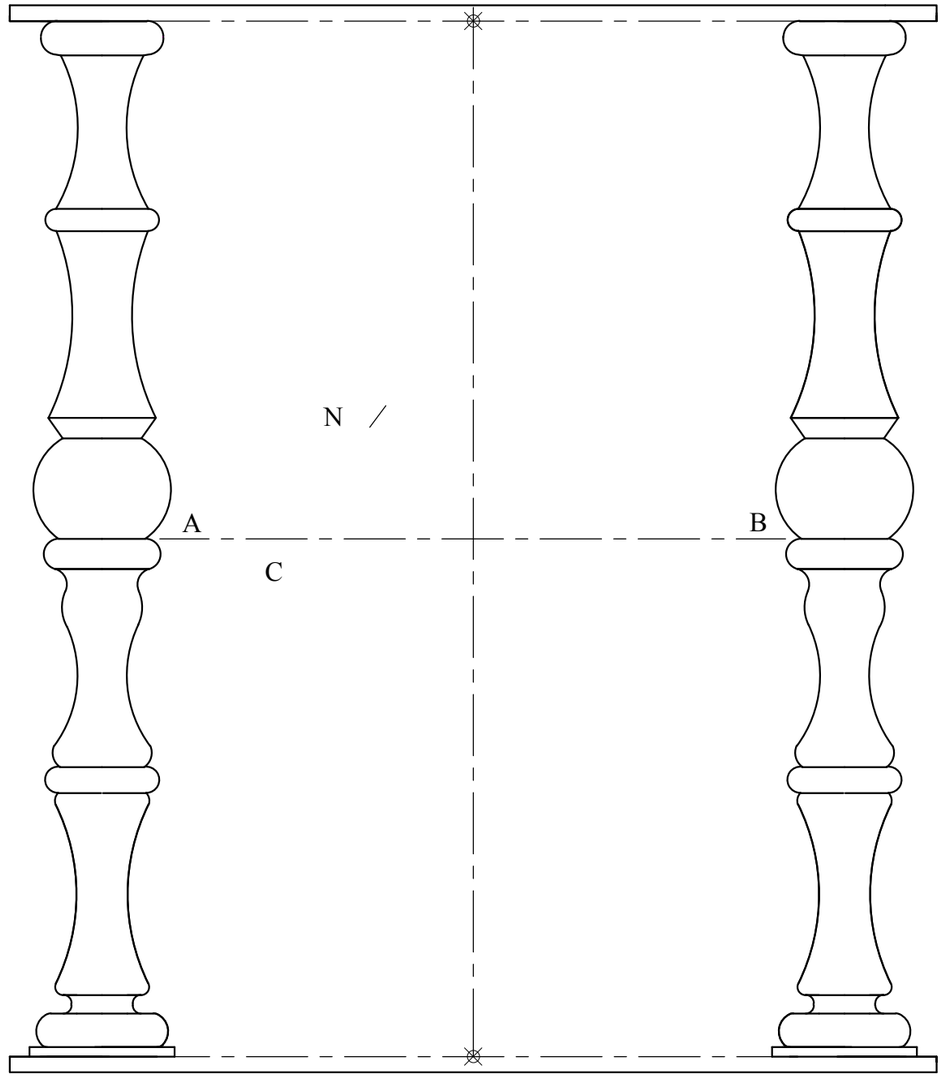
Question 2.

The outline of an hour glass consists of two semi-ellipses connected by two tangential arcs. On the given start lines and dimensions:

a. construct the two semi-ellipses;
b. locate and label the focal points of the upper semi-ellipse;
c. construct a normal at point N and extend to the centre line AB to locate centre C;
d. use centre C to draw the arc that is tangential to both semi-ellipses;
e. reflect the other arc.

(12 marks)





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

GRAPHICAL COMMUNICATION - PAPER 1 (Page 1of 4) - ATTEMPT ALL QUESTIONS - DATE: 25th April 2016 - TIME : 9.00 a.m. to 11.05 a.m.

INDEX NUMBER : _____

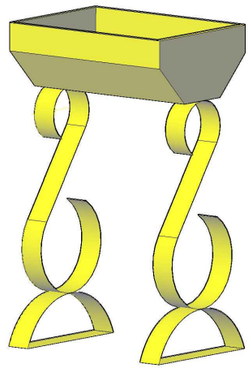
Question 3.

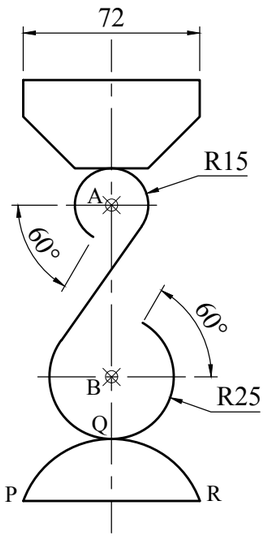
An elevation and an illustration of a wrought iron flower pot are shown below. Use the given start lines to construct **geometrically** the profile of the decorative ironwork.

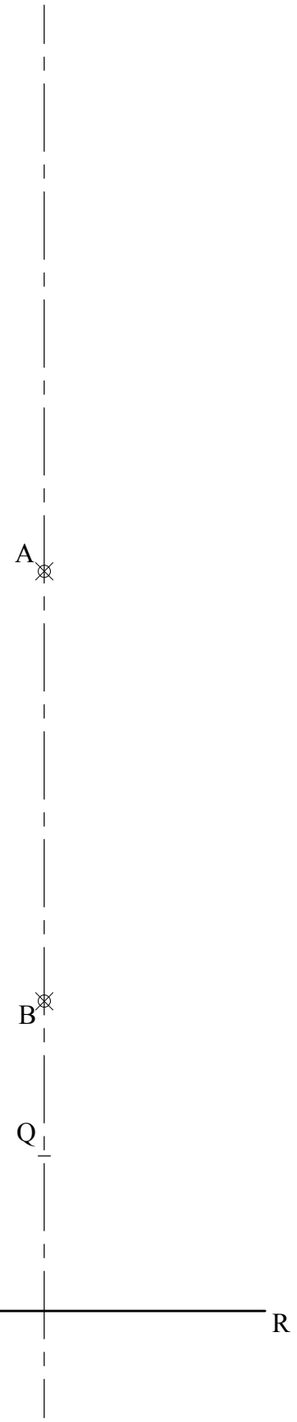
Notes:

- A and B are the centres of R15 and R25 arcs respectively.
- The internal tangent between the two circles and the radius of arc PQR are to be found by construction.
- The flower pot has a semi-octagonal profile which has to be constructed.

(14 marks)







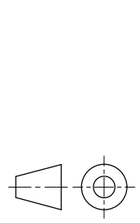
Question 4.

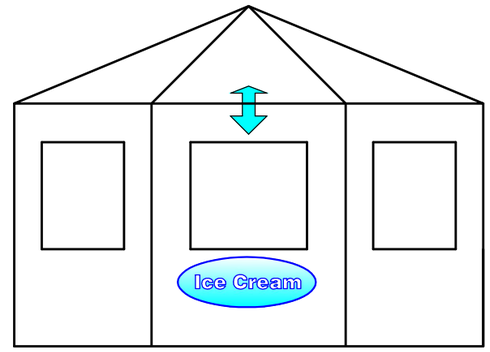
A cardboard model of an Ice-Cream Kiosk has a shape of a semi-octagonal combined prism and pyramid. An illustration and two orthographic views are given. Using the given start lines, construct the surface developments of the **prismatic** and the **pyramidal** parts of the kiosk.

Notes:

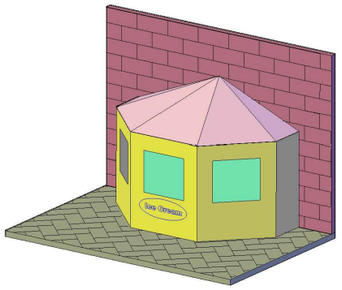
- *Do not include the base and the back in your development.*
- *The two developments are to be joined where indicated by the arrows in order to be cut from one piece of cardboard.*

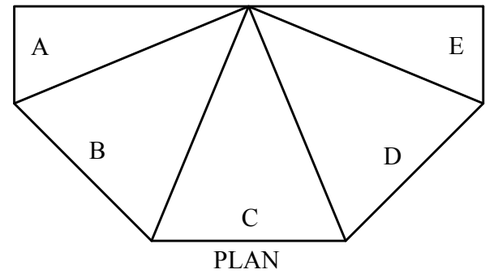
(14 marks)





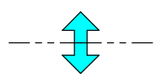
FRONT ELEVATION





PLAN

SURFACE DEVELOPMENT
OF PART PYRAMID (Faces A, B, C, D, E)



SURFACE DEVELOPMENT OF PRISM ICLUDING THE FIVE FACES AND THE THREE WINDOWS

INDEX NUMBER : _____

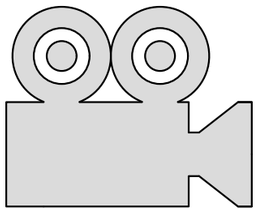
Question 5.

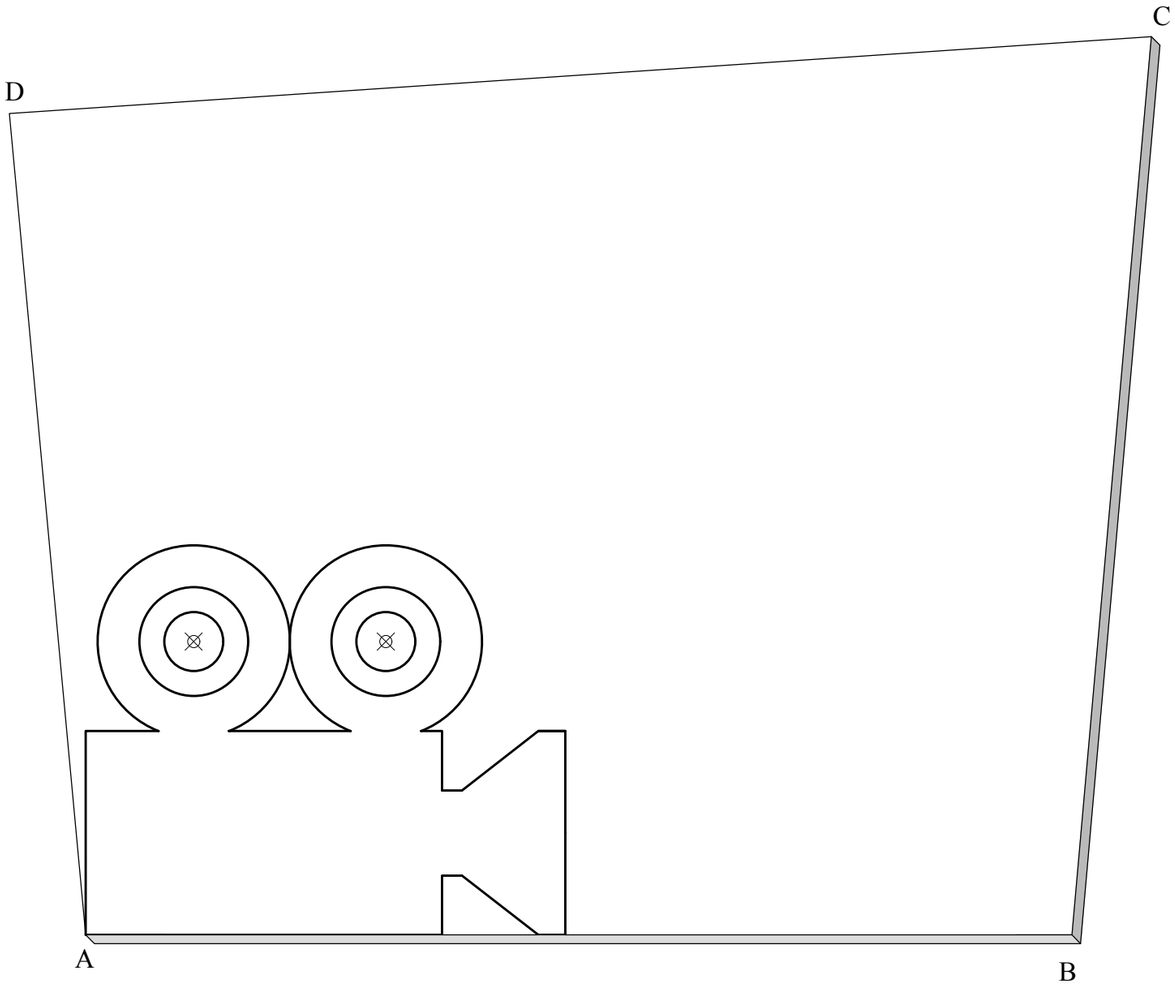
A cardboard profile of a Movie Camera graphic symbol is placed on a plastic sheet ABCD.

By using appropriate construction, draw the largest similar figure to be cut from the plastic sheet.

Note: Corner A is to remain common and is to be used as the pole of enlargement.

(15 marks)





Question 6.

An illustration, end elevation, plan and incomplete front elevation of a **Guide Block** are given.

In the space provided:

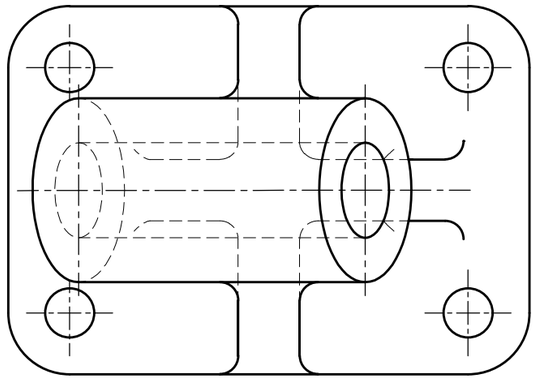
a. draw a 3D freehand sketch of the solution (section X-X);

b. complete a sectional front elevation on the cutting plane X-X;

Note: Do not show hidden details.

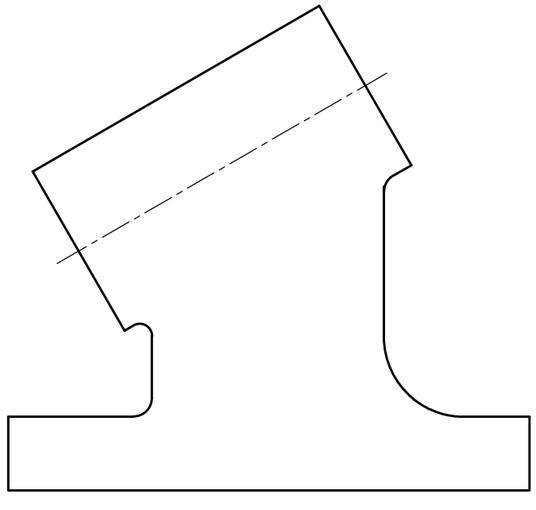
(15 marks)

GUIDE BLOCK

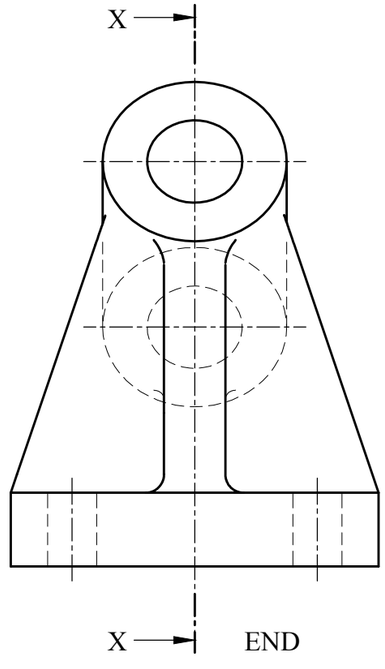


PLAN

3D FREEHAND SKETCH



SECTIONAL FRONT X - X



END

INDEX NUMBER : _____

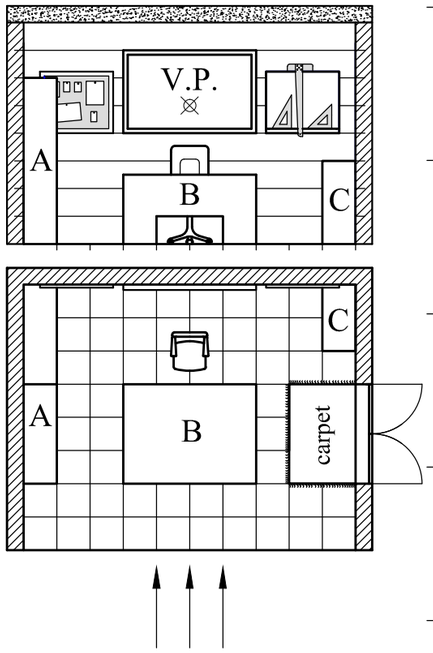
Question 7.

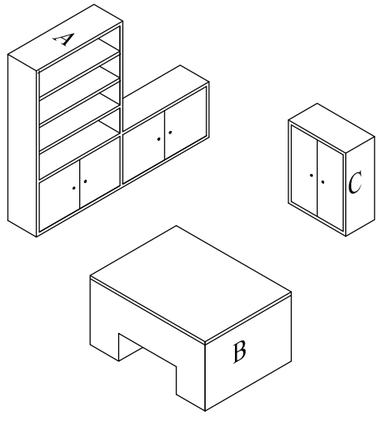
Two orthographic views of a draughting office and isometric drawings of the furniture are given below. The room is **10 tiles wide, 8 tiles deep and 8 courses high**.
Using the given start lines below, project an estimated **single-point perspective** drawing of the office.

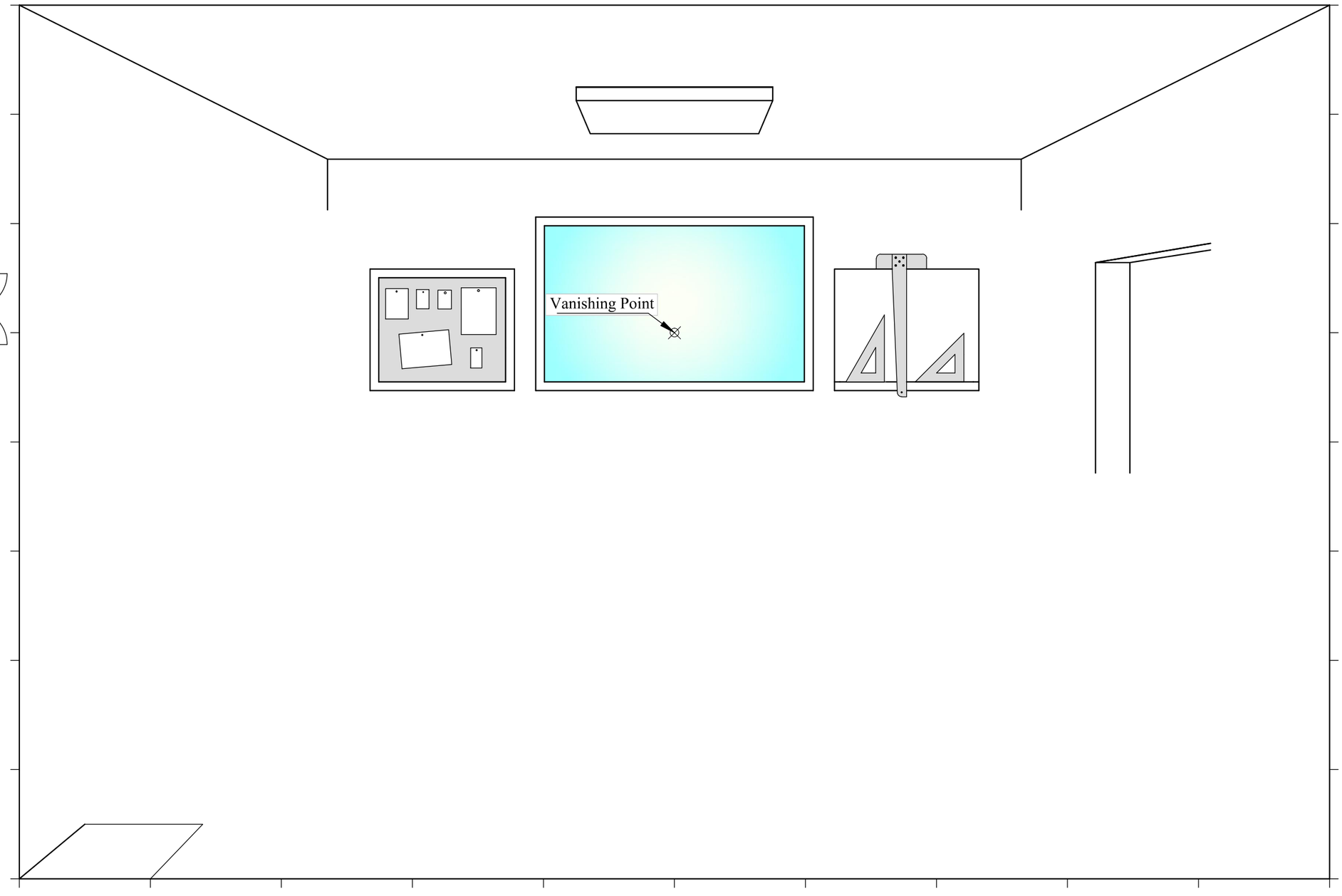
Notes:

- *The vanishing point and the viewing direction are indicated.*
- *One corner tile is given.*
- *The door is to be drawn in the closed position.*
- *Estimate the dimensions of the material thickness.*

(18 marks)







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INDEX NUMBER : _____

Question 1.

The following computer programme is written to create a CCTV camera icon.

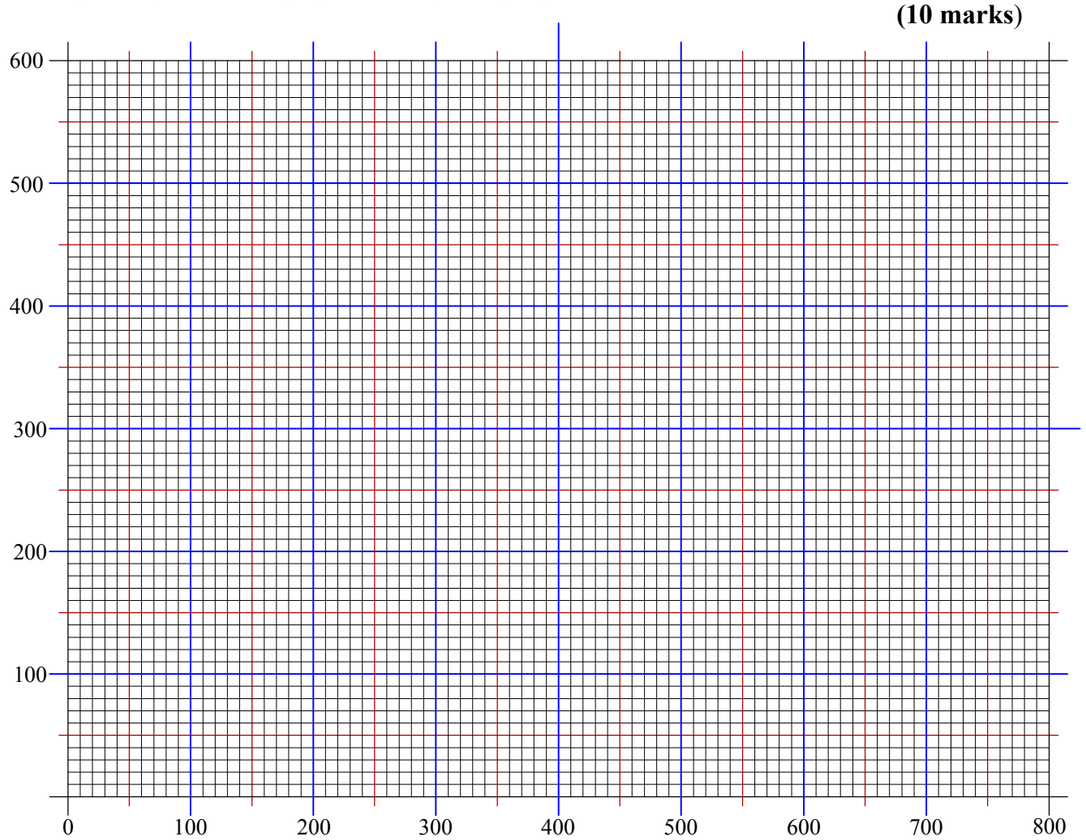
DATA: A = 50; B = 100; C = 150; D = 200; E = 250; F = 300; G = 350; H = 400; J = 450; K = 500; L = 550:
M= 600; N = 650; O = 700.
ACI 7: MOVE N,A; DRAW O,A; DRAW O,G; DRAW N,G; DRAW N,A:
ACI 5: MOVE N,E; DRAW L,E; DRAW J,G:
ACI 5: MOVE N,C; DRAW L,C; DRAW H,F:
ACI 1: MOVE F,D; DRAW L,J; DRAW J,L; DRAW D,F; DRAW F,D:
ACI 3: MOVE D,B; DRAW D,C; DRAW E,D; DRAW D,E; DRAW C,D; DRAW B,D; DRAW D,B:
ACI 3: MOVE D,C; DRAW C,D.

*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	ACI No.
RED	1
GREEN	3
BLUE	5
BLACK	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.

(10 marks)



Question 2.

A system of four concurrent forces acting on a body is shown.

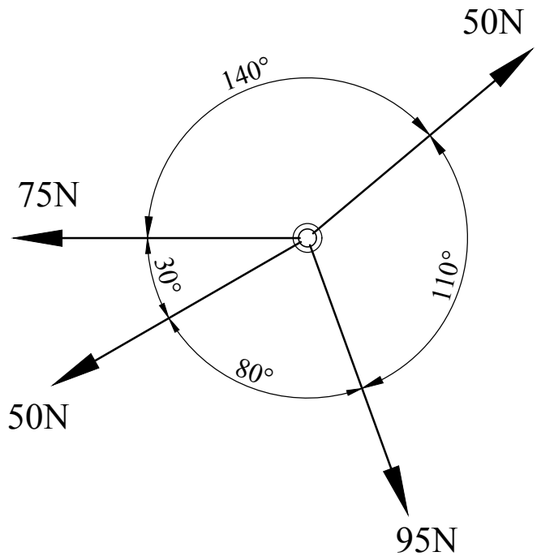
a. Determine the resultant force and draw an arrowhead to indicate how it acts.
b. State the magnitude and angle to the horizontal plane.

Notes:

- *Use a scale of 10mm representing 10N.*
- *Use the square below to draw a freehand sketch of the vector diagram.*

(10 marks)

Freehand sketch



Magnitude of resultant = ... at ..... ° to the horizontal

SEC 29 / 2A. 2016 M - GRAPHICAL COMMUNICATION - PAPER IIA - PAGE 1 of 4

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD, UNIVERSITY OF MALTA, MSIDA
GRAPHICAL COMMUNICATION - PAPER 2A (Page 1 of 4) - ATTEMPT ALL QUESTIONS - DATE: 25th April 2016 - TIME : 4.00 p.m. to 6.05 p.m.

INDEX NUMBER : _____

Question 3.

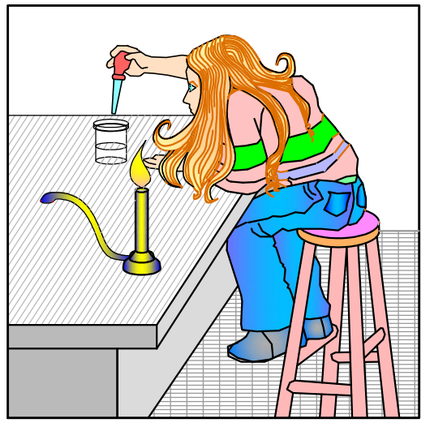
One of the science laboratory safety rules states that: "**Before you work with flames, tie back loose hair**". You are requested to draw two safety signs to:

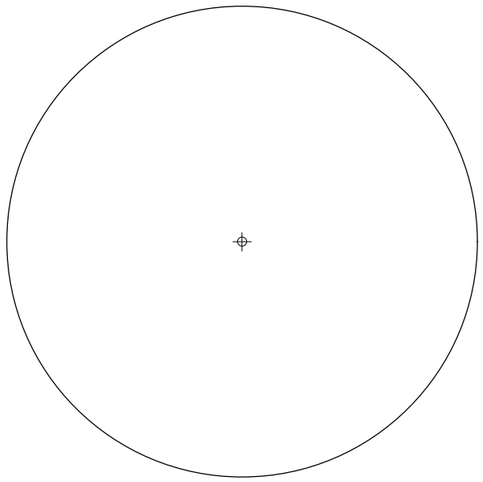
a. **Prohibit** long loose hair in the laboratory;

b. **Order** the lab user to tie back loose hair.

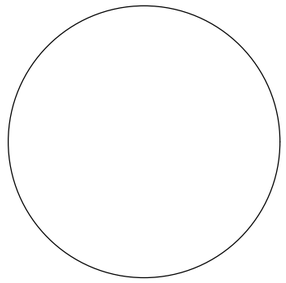
Notes:

- *The geometric shapes and colours of the signs are to conform with BS and ISO regulations.*
- *Use the small circles to draw the preparatory sketches.* **(15 marks)**

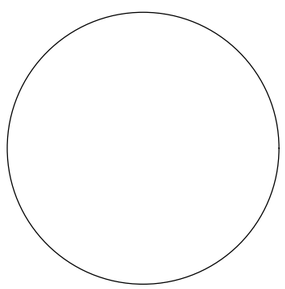




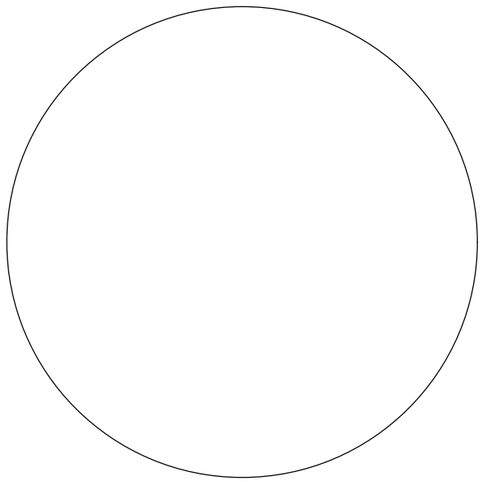
PROHIBITION SIGN FINAL DRAWING



PROHIBITION SIGN SKETCH



MANDATORY SIGN SKETCH



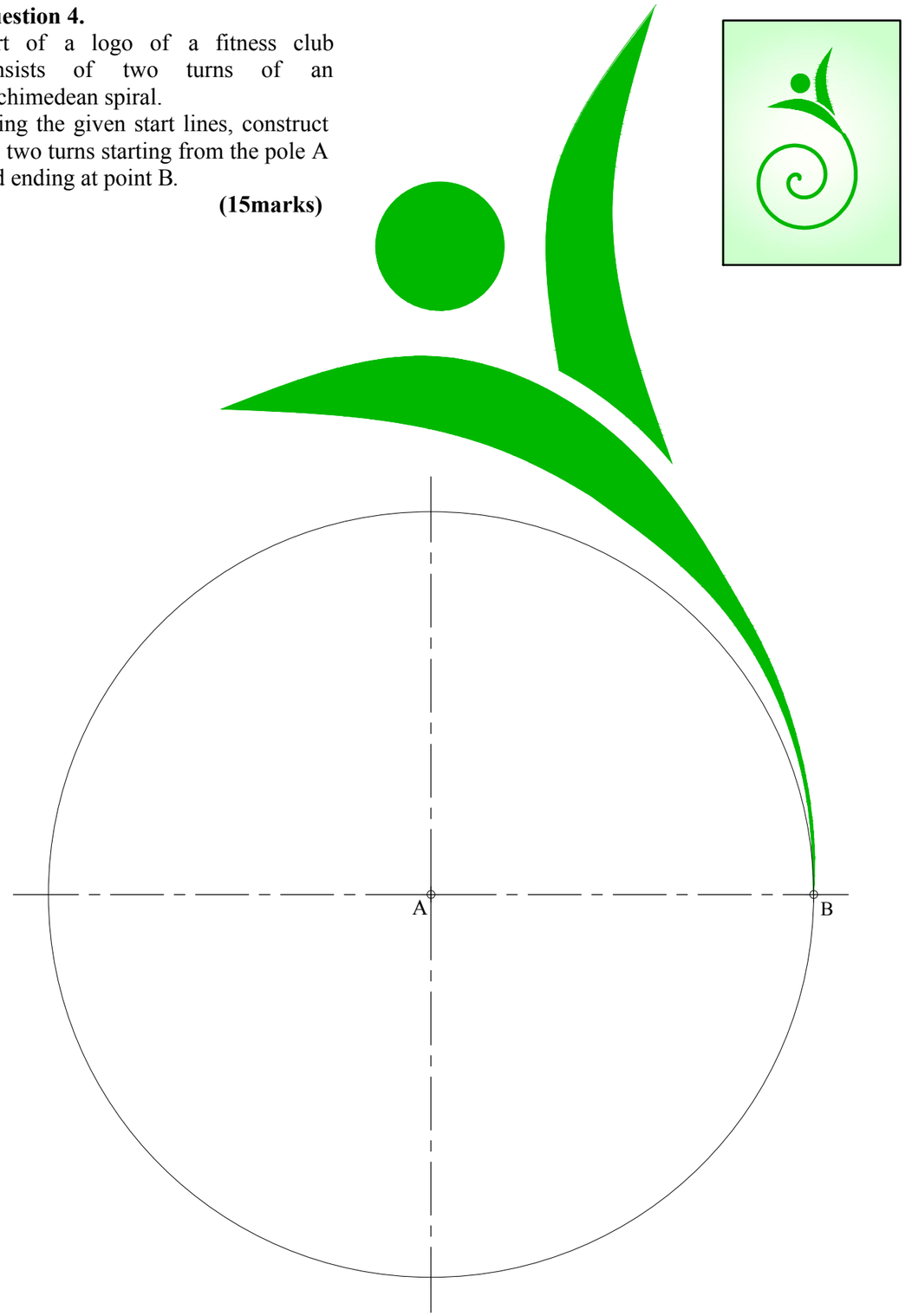
MANDATORY SIGN FINAL DRAWING

Question 4.

Part of a logo of a fitness club consists of two turns of an Archimedean spiral.

Using the given start lines, construct the two turns starting from the pole A and ending at point B.

(15marks)



INDEX NUMBER : _____

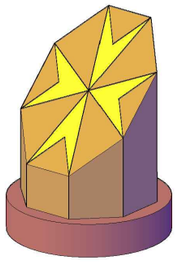
Question 5.

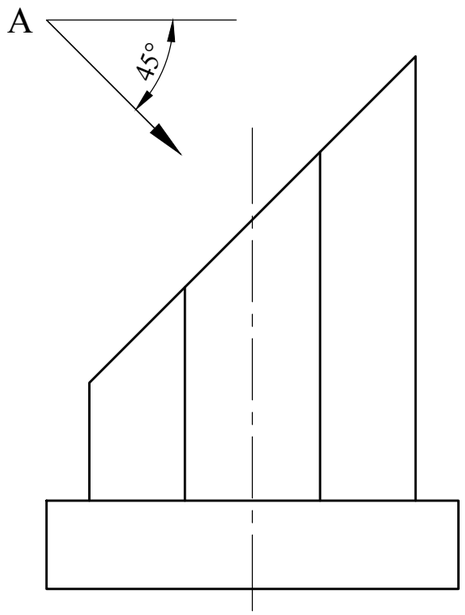
An illustration and three orthographic views of a wooden souvenir are shown. The cylindrical base, the octagonal prism and the inlaid Maltese Cross are made of different types of wood.

Using the given start lines project an auxiliary view of the souvenir as viewed from the direction of arrow A.

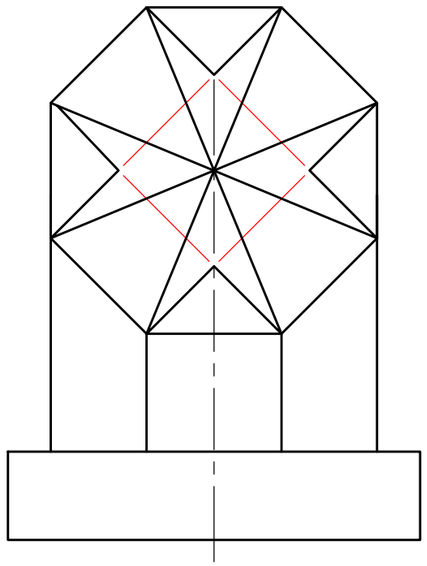
Note: Do not include hidden details.

(16 marks)

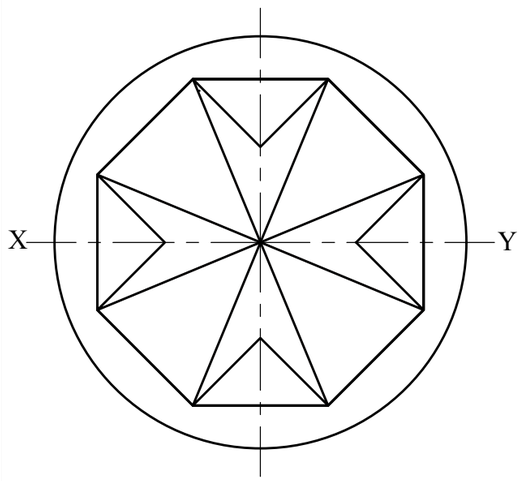




FRONT ELEVATION



END ELEVATION



PLAN

AUXILIARY VIEW

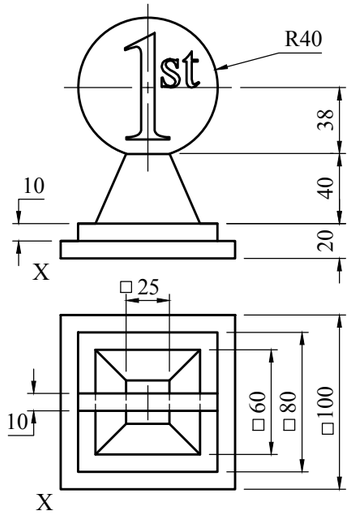
Question 6.

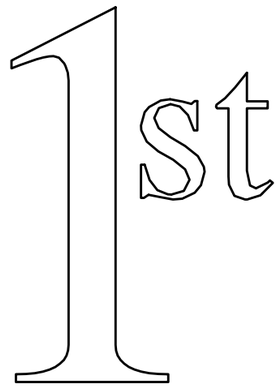
A sports trophy consists of wooden square stepped base, a marble truncated square pyramid and a gold plated medal partly inserted in the pyramid.

a. In the window provided, draw a **freehand** pictorial sketch of the trophy.
b. Colour the sketch to distinguish between the materials and to create texture .
c. Using the given dimensions and your instruments, draw a cabinet oblique view of the trophy placing corner X in the bottom left hand corner.

Note: Do not include hidden details.

(16 marks)





FREEHAND SKETCH

X

CABINET OBLIQUE VIEW

INDEX NUMBER : _____

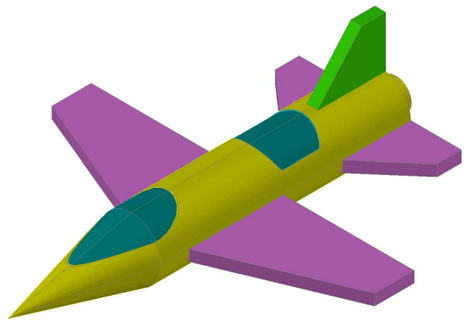
Question 7.

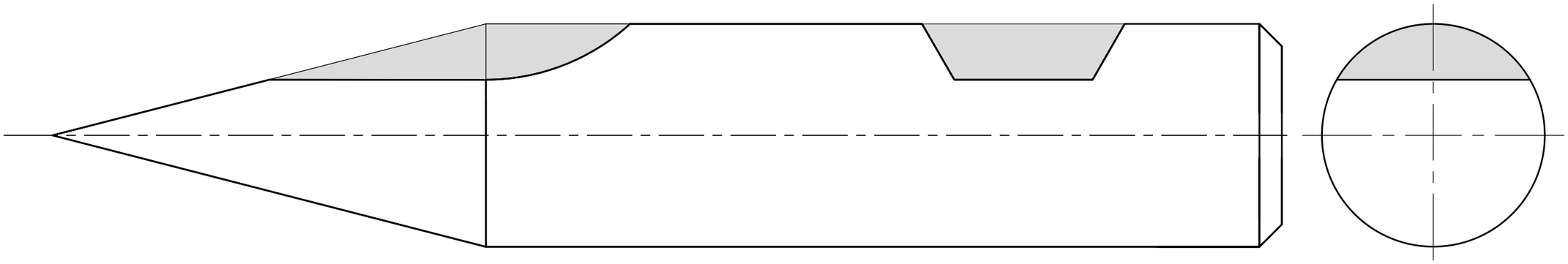
The main body of a wooden toy airplane consists of a combination of cylindrical and conical solids. Both solids were truncated to accommodate the cockpit and the passengers' window (as shown in the front elevation and in the illustration). The truncated portion was replaced by part cylindrical and part conical transparent coloured plastic sheets to represent glass (shown shaded).

Using the given start lines:

a. complete the plan by projecting the curves of intersections resulting from the truncation to form the cockpit and the passengers' window;
b. name the conic section of the cut cone;
c. construct the three surface developments of the shaded plastic sheets (one conical and two cylindrical).

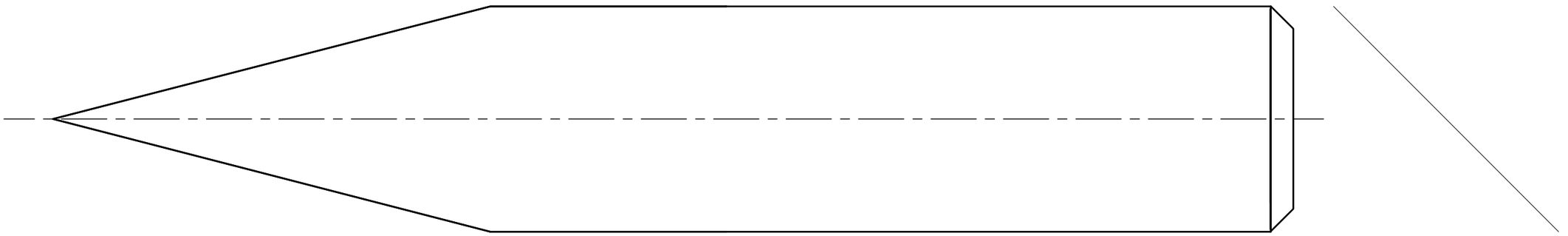
(18 marks)



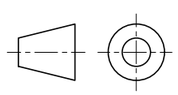


FRONT ELEVATION

END ELEVATION



PLAN



DEVELOPMENT OF CONICAL PORTION

DEVELOPMENT OF CYLINDRICAL PORTIONS

NAME OF CONIC SECTION: _____

INDEX NUMBER : _____

Question 1.

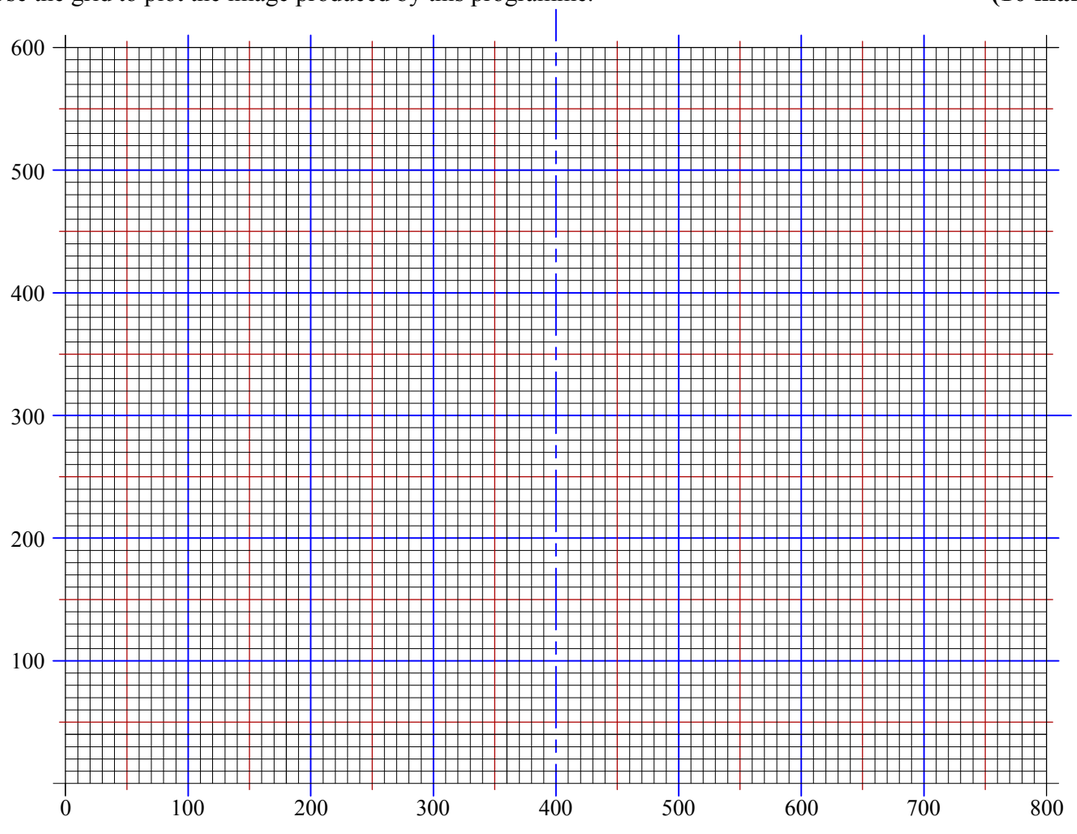
The following computer programme is written to create a Law Court symbol.

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 B, A; DRAW B, B; DRAW H, B:
ACI 7: Move C, B; Draw C, C; Draw H, C:
ACI 7: Move H, H; Draw C, H; Draw C, I; DRAW H, K:
ACI 7: Move H, I; Draw C, I:
ACI 5: Move G, C; Draw G, H:
ACI 5: Move F, C; Draw F, H:
ACI 5: Move E, C; Draw E, H:
ACI 5: Move D, C; Draw D, H:
Mirror the resulting design using the vertical centre line as the mirror line.

*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. **MIRROR:** creates a mirror image (reflection) of the original. 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	ACI No.
BLUE	5
BLACK	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. **(10 marks)**



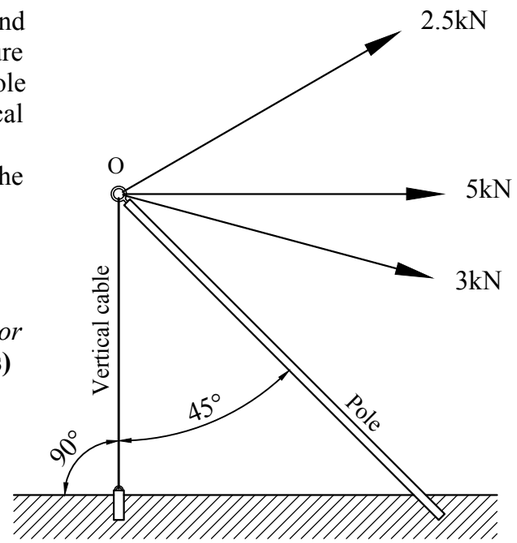
Question 2.

Three cables are attached to the end of a pole O and are pulling with the forces as indicated in the Figure (which represents a state of equilibrium). The pole is fixed to the ground and is supported by a vertical cable from the end O to the ground as shown.

a. Determine the forces in the **pole** and in the **vertical cable**.
b. Draw arrowheads to indicate how they act.

Note:

- *Use a scale of 10mm representing 1kN*
- *Use the rectangle below to sketch the vector diagram.* **(10 marks)**



FORCE IN VERTICAL CABLE = ...kN

FORCE IN POLE = ... kN

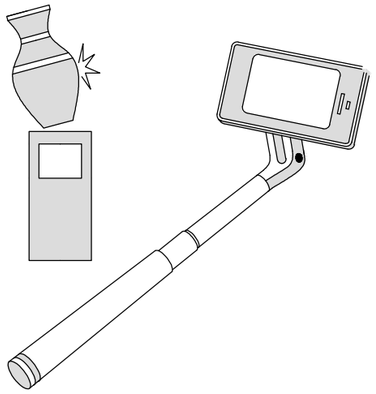
INDEX NUMBER : _____

Question 3.

A **Selfie Stick** is a device in the form of a rod on which a camera or smartphone may be mounted, enabling the persons holding it to take a photograph of themselves.

To safeguard the fragile artefacts, these selfie sticks have been banned from museums.

You have been asked by the museum authorities to design a prohibition sign to convey the message:

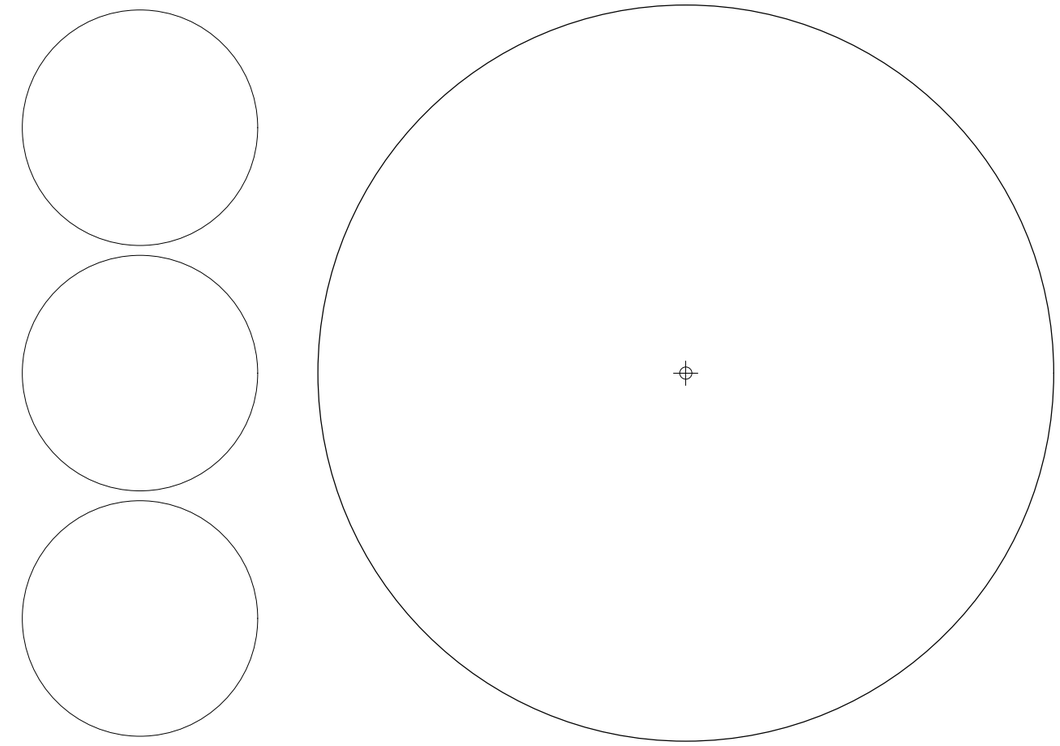


SELFIE STICKS ARE NOT ALLOWED

Notes:

- *The geometric shape and colours of the sign are to conform with BS and ISO regulations.*
- *Use the three circles to draw the preparatory sketches.*
- *A pictogram of the **human figure** is to be included.*
- *Draw and colour the final sign in the large circle.*

(15 marks)



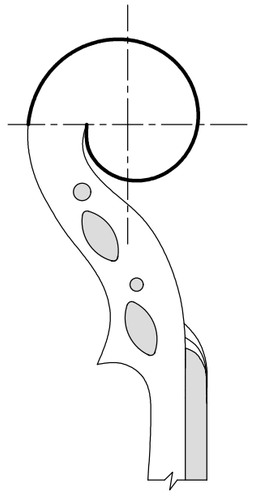
PREPARATORY SKETCHES

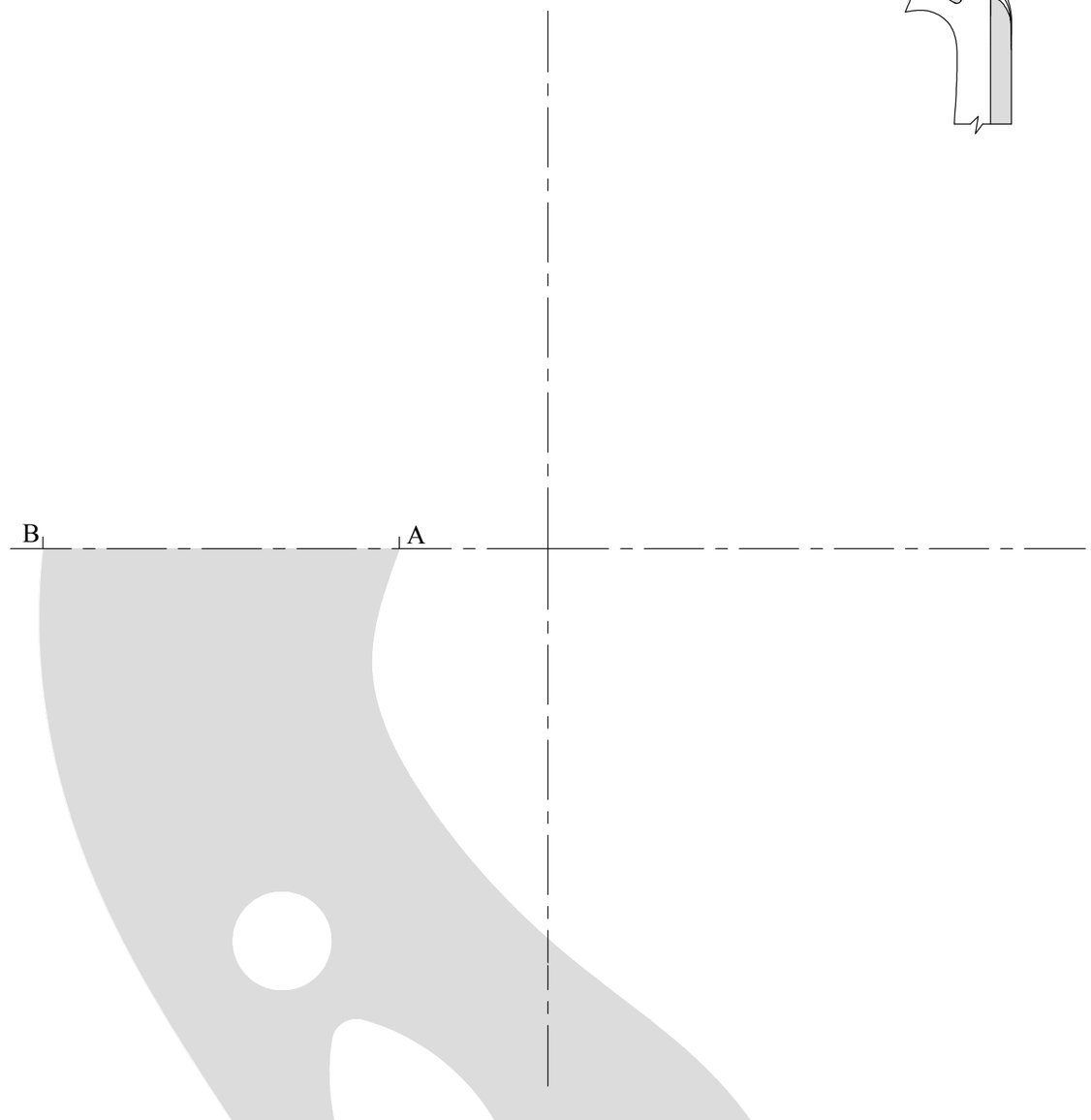
PROHIBITION SIGN

Question 4.

The illustration on the right shows a simplified scroll of a musical instrument (violin). The top part, shown bold, consists of **one turn** of an Archimedean Spiral. Using the given start lines, construct the spiral starting from point A and ending at point B.

(15 marks)





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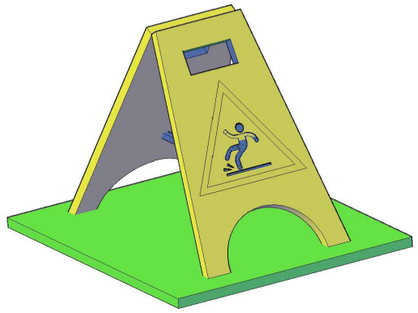
Question 5.

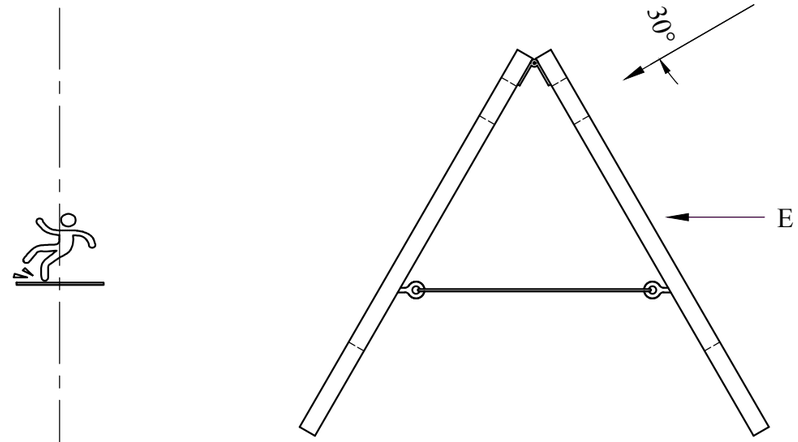
An illustration, a front elevation and an auxiliary view of a portable wet floor hazard sign are given.

In the space provided and using the given start lines project the end elevation as seen from the direction of arrow E.

Note: Do not show hidden details.

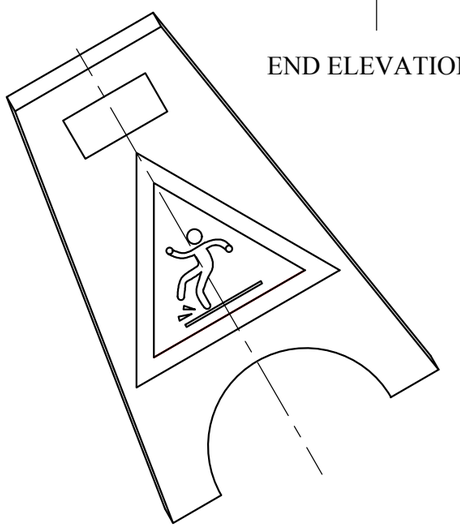
(16 marks)





END ELEVATION

FRONT ELEVATION



AUXILIARY VIEW AS VIEWED FROM ARROW 'A'

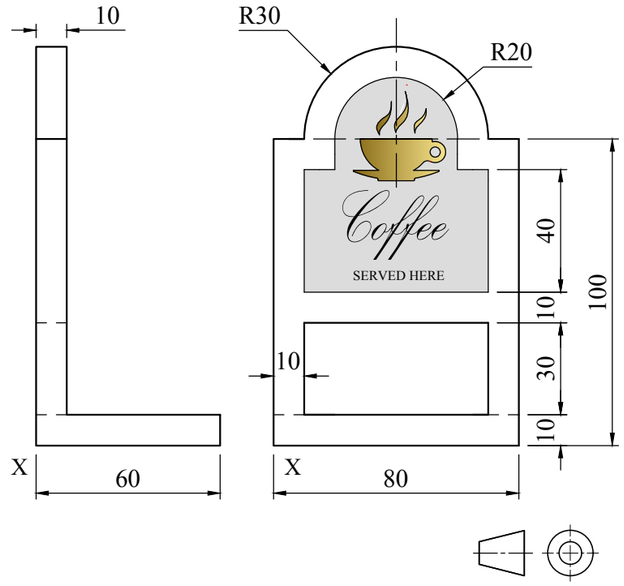
Question 6.

Two orthographic views of a sidewalk sign of a coffee shop are given. The sign (shown shaded) is painted on a wooden structure.

a. In the given rectangle, draw a freehand pictorial sketch to demonstrate your understanding of the given views.
b. Colour the sketch.
c. Use the given start lines to draw a cabinet oblique view of the structure.

Note:
Place corner X where indicated

(16 marks)



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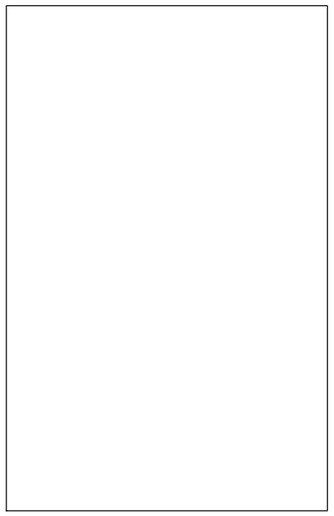

Freehand pictorial sketch

X

CABINET OBLIQUE VIEW

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Question 7.

An incomplete front elevation, an end elevation and an incomplete plan of a toy submarine are given.

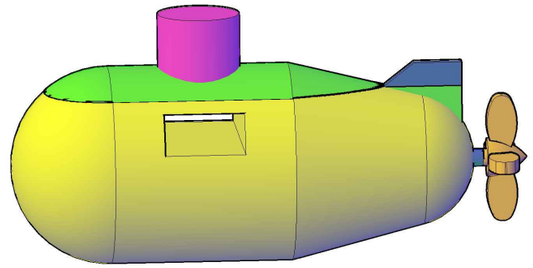
- The main body of the wooden toy consists of a combination of a hemisphere, a cylinder, a cone and a part sphere.
- A rectangular hole has been machined in the side of the cylinder to produce the windows.
- The upper part (shown shaded) of the submarine has been painted darker than the lower part.

You are requested to complete the drawing by projecting:

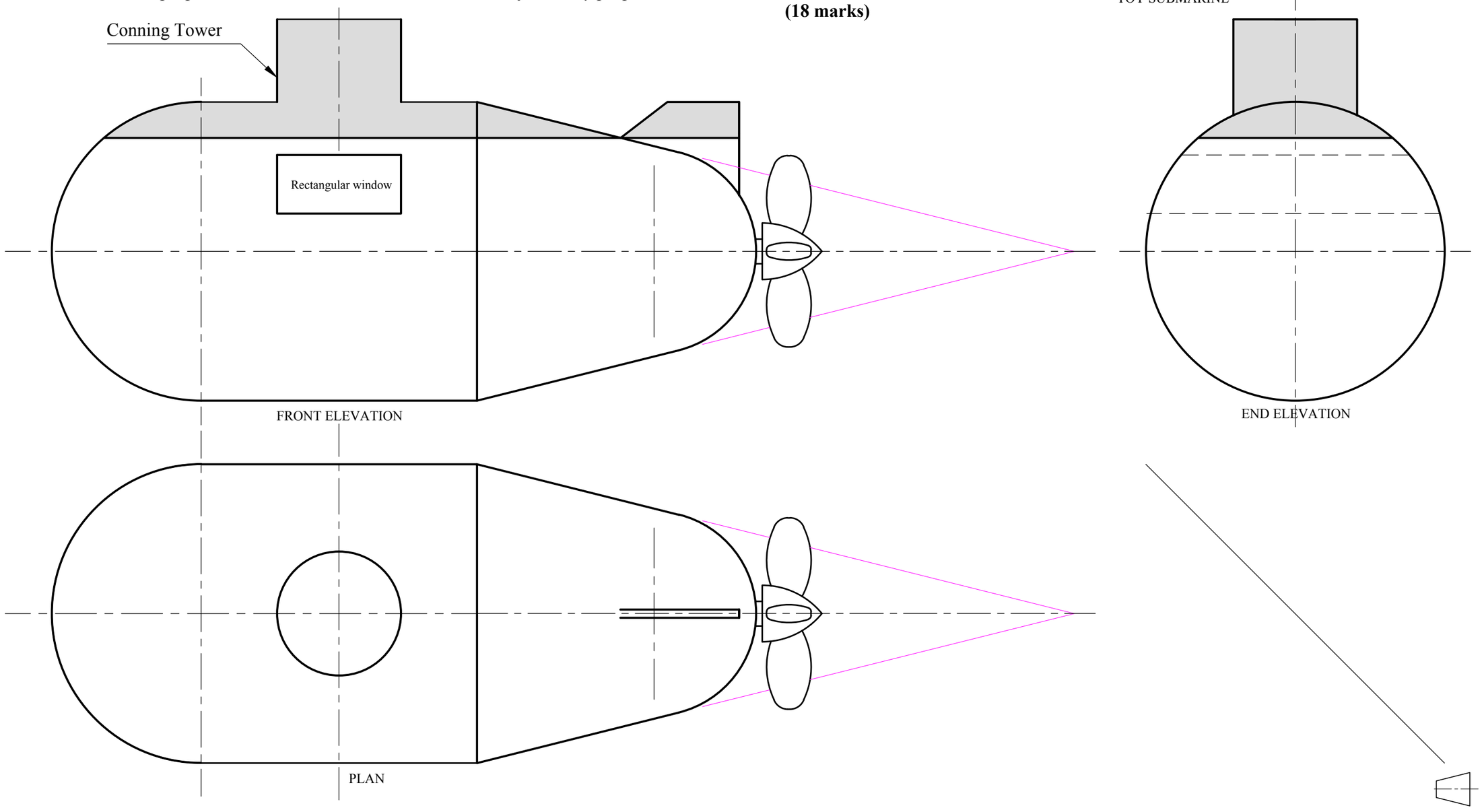
a. The curve of intersection between the cylindrical body and the conning tower in the front elevation.
b. The rectangular windows as seen in the plan.
c. The outline of the shaded area that denotes the different colours of the toy as seen in the plan.

Note: The rudder and propeller have been omitted in the end elevation for clarity purposes.

(18 marks)



TOY SUBMARINE



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