



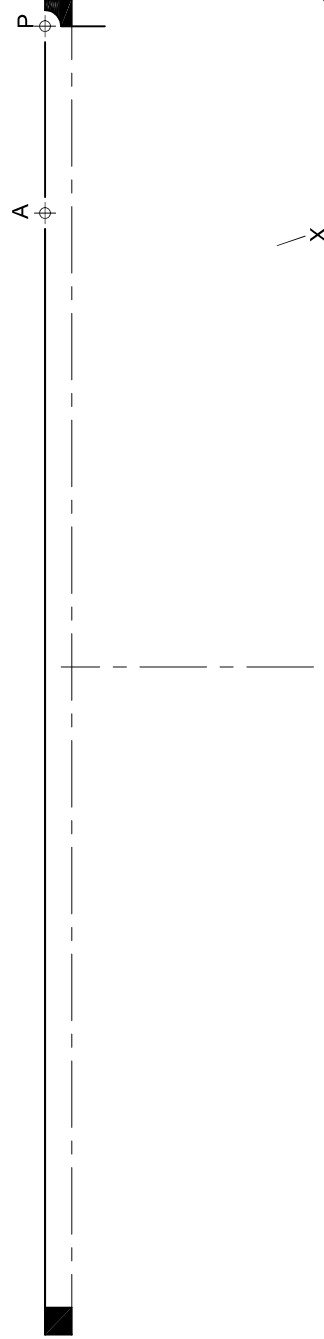
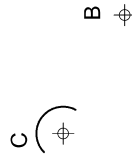
**Question 3.**

The simplified profile of a jet ski is given on the right. The lower part of the boat consists of a part semi-ellipse and a tangent. The upper part is made up of tangential arcs and lines.

Using the given starting lines and dimensions, construct:

- the semi ellipse having a major axis of 240 mm and a minor axis of 110 mm; (6)
- a tangent at point X and complete the rear lower part of the jet ski; (4)
- the upper part of the jet ski showing clearly how the centres, tangents and points of tangencies were derived. (10)

**(Total: 20 marks)**



**NOTES**

- A is the centre of arc R28.
- B is the centre of arc R20.
- C is the centre of the R5 arc.
- P is the starting point of constructed tangent to R28 arc.
- Points of tangencies are denoted by means of short dashes as shown.
- The tangent line connecting R28 to R20 arcs is to be constructed.
- Leave all constructions, necessary to locate centres and points of tangencies, visible.

**Question 4.**

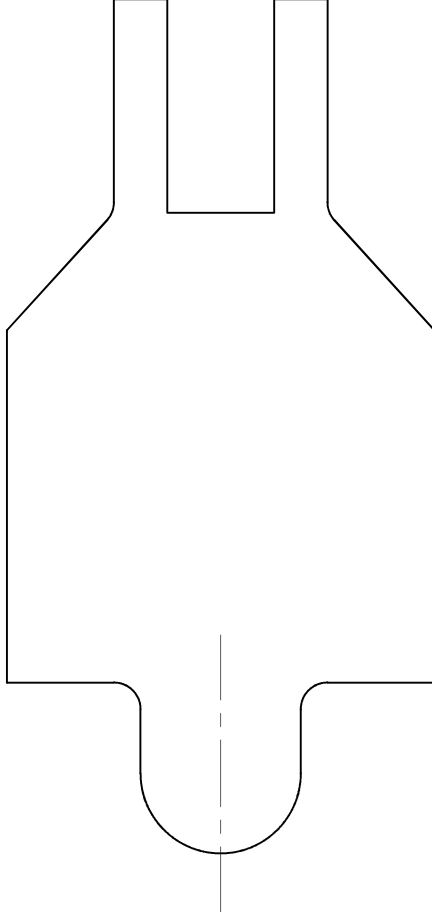
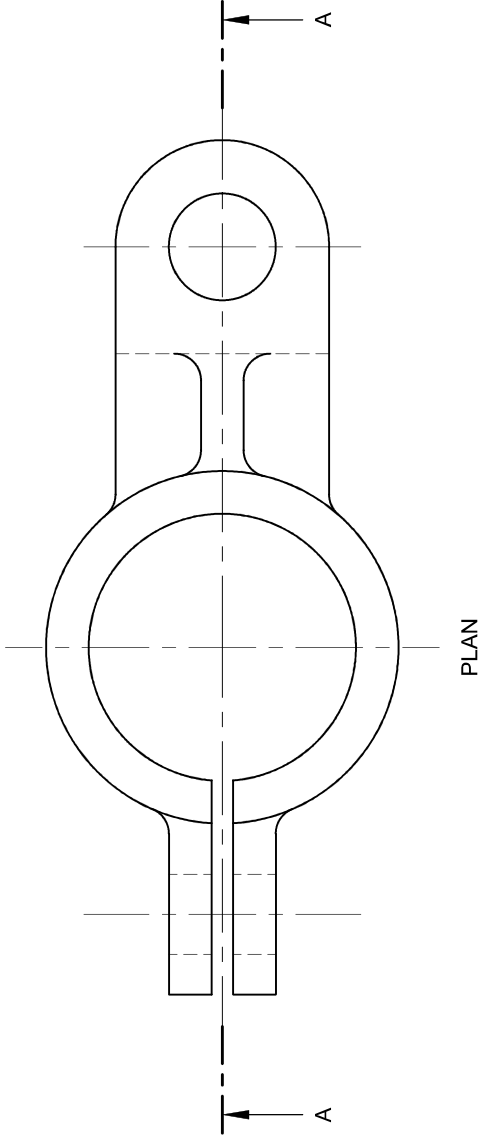
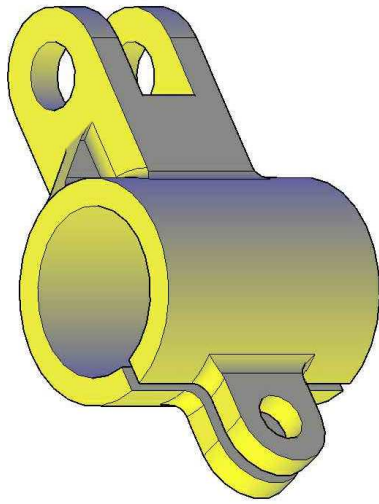
An illustration of a Guide Bracket is given below.  
A plan and the profile of the front elevation are also given.

- In the space provided, complete a sectional front elevation on the cutting plane A-A. (12)
- Insert **TWO** radial and **TWO** linear dimensions to the orthographic views. (4)

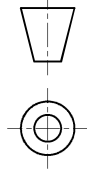
Notes:

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

**(Total: 16 marks)**



A-A

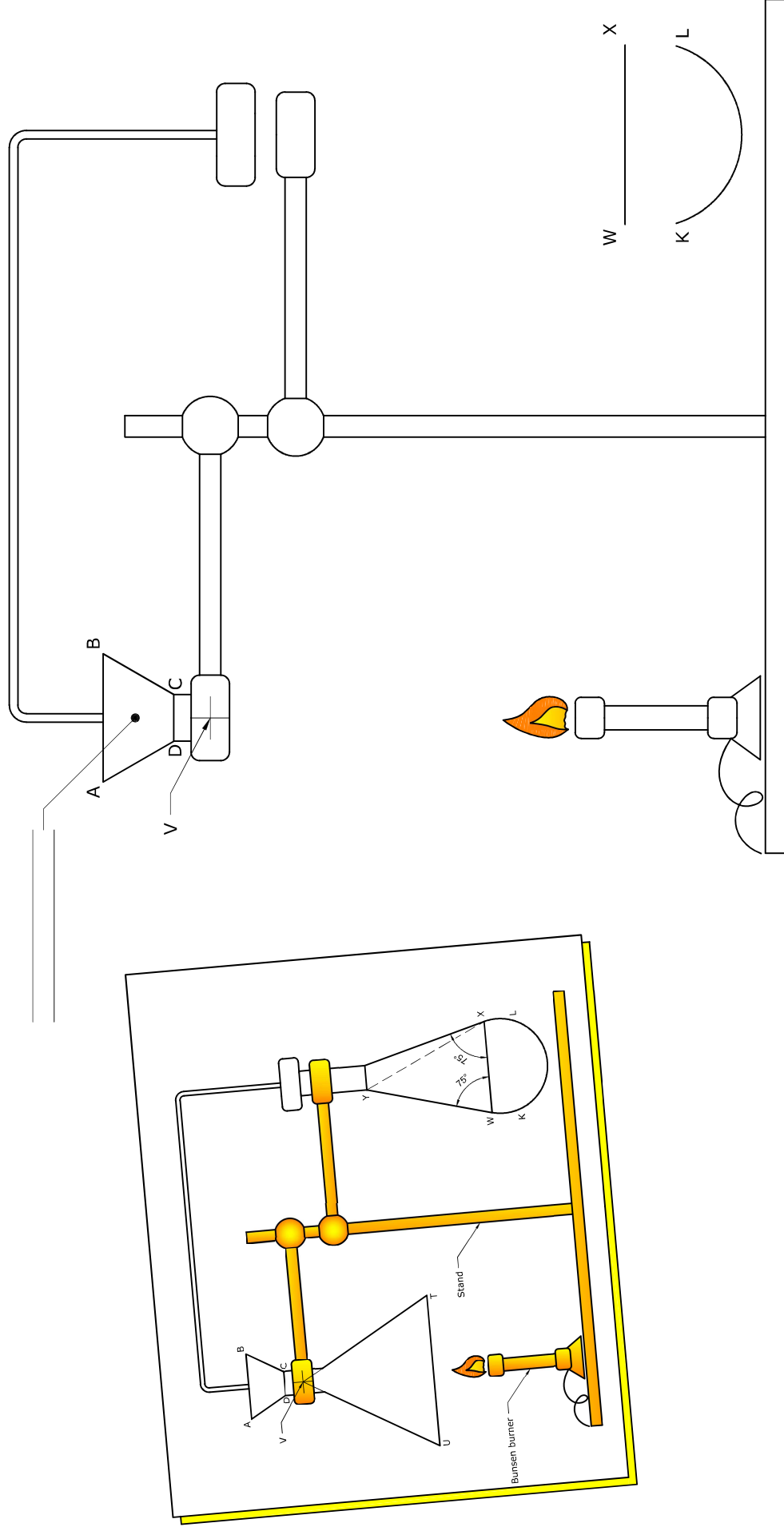


**Question 5.**

A science experiment setup is shown below. Complete the drawing by following these instructions:

- using the given guidelines, write the name of shape ABCD;
- construct equilateral triangle TUV with point V as the vertex, sides 69 mm and base TU horizontal;
- locate by construction the center of arc KL and complete the profile of the bottom flask;
- using your compasses only, locate point Y by constructing triangle WYX having base WX, angle  $\angle YWX = 75^\circ$  and a perimeter of 160 mm. Finish off the drawing;
- render the Bunsen burner and the stand as if they were made out of shiny metal.

**(Total: 18 marks)**





**Question 1.**

The following computer programme is written to create a decorative table centre piece.

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.

```

ACI 7: MOVE F,F; DRAW ____; DRAW ____;
ACI 7: MOVE H,F; DRAW G,I; DRAW H,H;
ACI 5: MOVE E,F; DRAW E,I; DRAW H,I;
ACI 5: MOVE E,I; DRAW D,J;
ACI 1: MOVE E,F; DRAW D,G; DRAW C,G; DRAW D,F; DRAW E,F;
ACI 1: MOVE H,I; DRAW G,J; DRAW G,K; DRAW H,J; DRAW H,I;
ACI 1: MOVE D,G; DRAW D,J; DRAW G,J;
ACI 1: MOVE C,G; DRAW C,K; DRAW G,K.
    
```

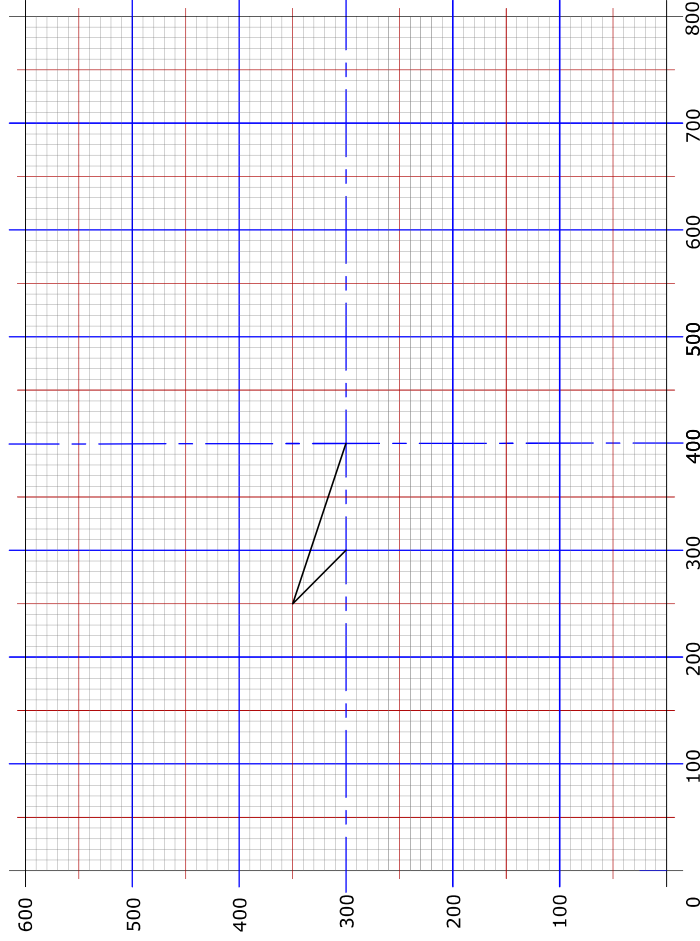
The **DATA** statement specifies the numeric values (in pixels) of given variables. **MOVE**, positions the cursor at a new location without drawing a line. **DRAW** draws a line from a current location to a new location. The instruction **ACI No.** makes the images that follow the instruction, appear 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 an 800 x 600 graphical display. Complete the programme by:

- filling in the missing commands; (1)
- using the grid to plot the image produced by this programme; (5)
- MIRRORING** the plotted design, using the vertical and horizontal centre lines as the mirror lines (lines of symmetry). (4)

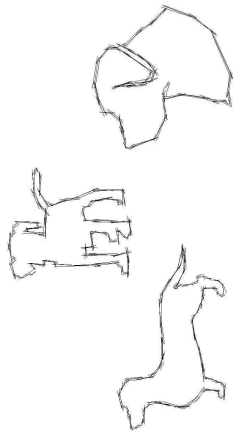
**(Total: 10 marks)**



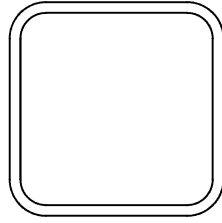
**Question 2.**

A group of web developers need to design some icons for an online poll. They are using a star rating system where children vote for their preferred pet. **THREE** sketches and **ONE** final icon for dogs have been given.

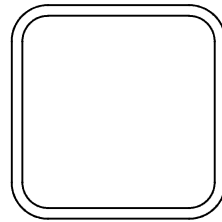
- a. Design **THREE** sketches each and **ONE** final icon each for cats, birds and fish in the space available. Colour the final icons according to the key in Table B. (9)



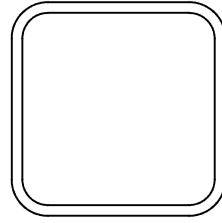
Dogs



Cats



Birds



Fish

- b. Fill in the missing data in Pictograph A and Table B using the icons designed in Question (a) and the information obtained from Pictograph A and Table B. (3)

**(Total: 12 marks)**

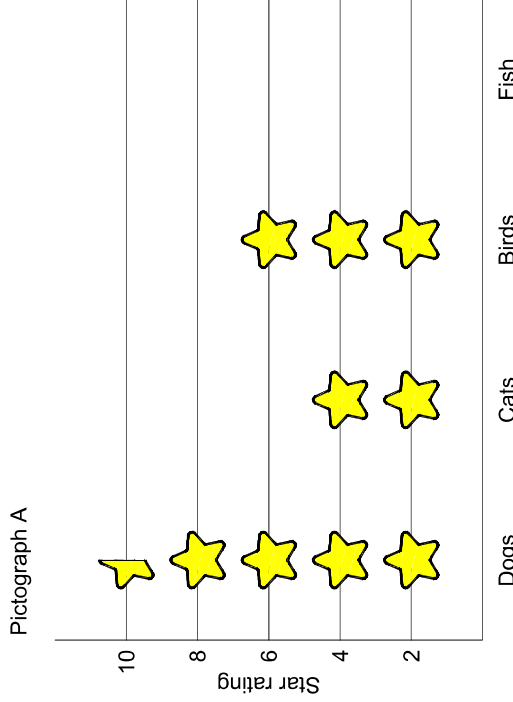


Table B: Pet popularity amongst school children.

Key colour	Pet	Icon	Star rating
Black	Dogs		
Red	Cats		
Blue	Birds		
Green	Fish		3

**Question 3.**

Sketch the (a) orthographic and (b) isometric views, in freehand.

Notes:

- Use the given starting lines and draw to an approximate scale of 1:1.
- Do **not** show hidden details.

a. Sketch the front elevation, end elevation and plan of Fig. 1. (4)

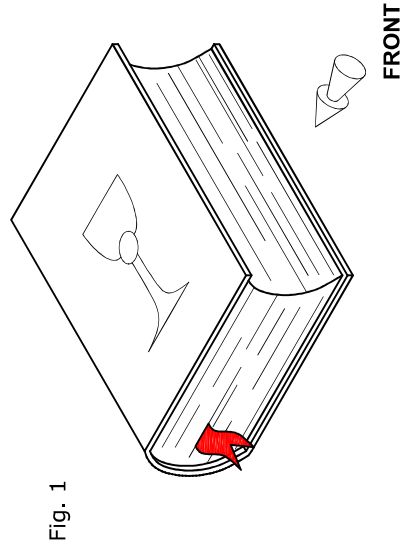


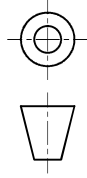
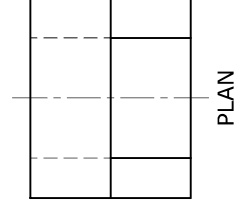
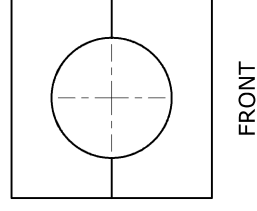
Fig. 1

b. Sketch, using the starting lines, the isometric view of Fig. 2. (6)

(Total: 10 marks)



Fig. 2





**Question 4.**

A Santa sledge is shown in Fig. 3. Draw the sledge design by constructing:

- a. an involute around circle C and finishing off the supports; (6)
- b. one revolution of an Archimedean spiral, from A1 to B1 and having center point O; (6)
- c. one revolution of a second Archimedean spiral, from A2 to B2 and having center point O. (4)

**(Total: 16 marks)**

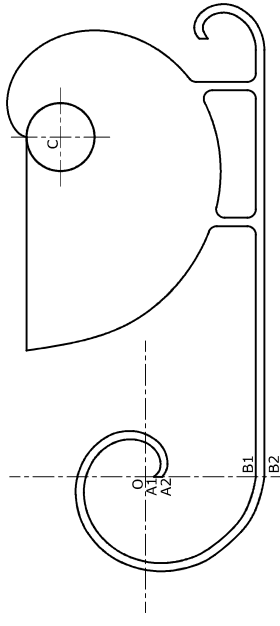
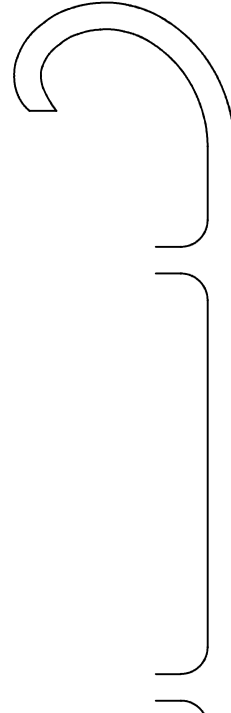
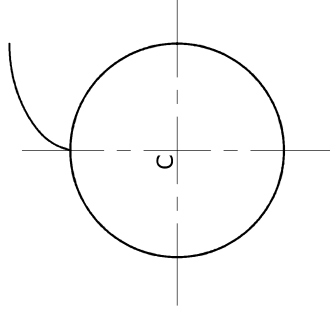
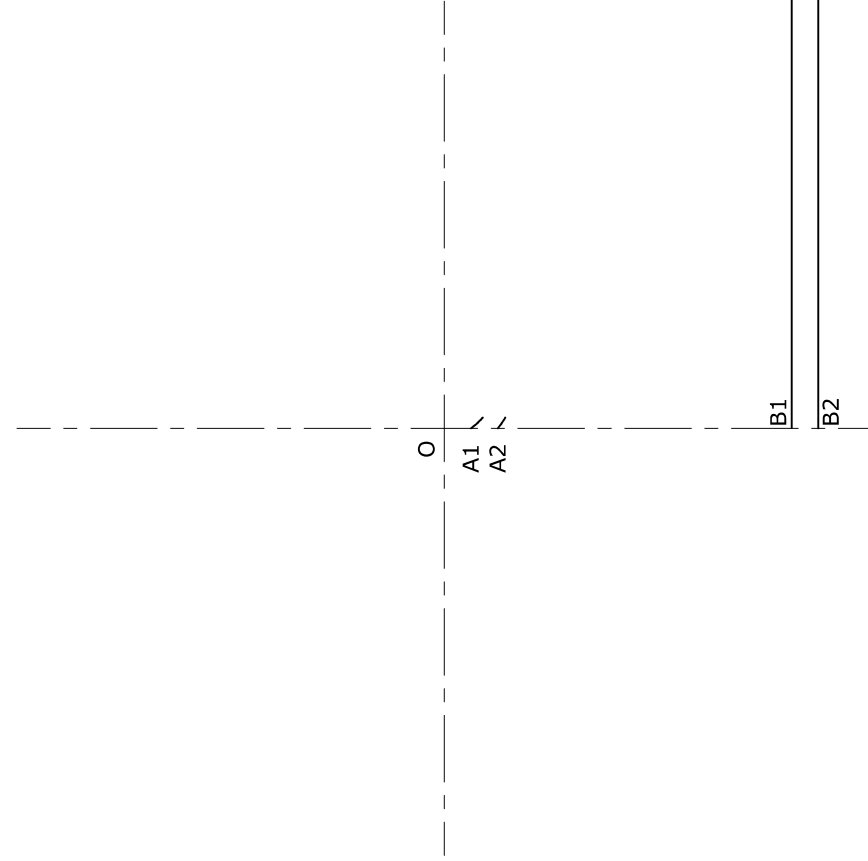


Fig. 3



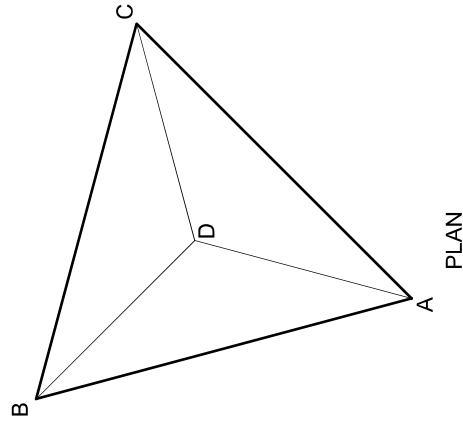
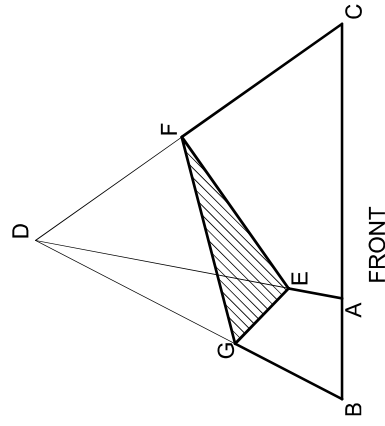
**Question 5.**

A pictorial view, an incomplete plan and a front elevation of a truncated triangular based pyramid are given. By construction, complete:

- the truncation in the plan; (2)
- the end elevation; (4)
- the development of the lower part using point D as the starting point; (6)
- the true shape of cut EGF and write down the true lengths in the given box. (4)

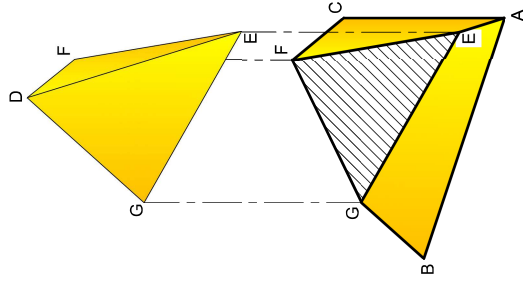
Note: Show the hidden detail.

**(Total: 16 marks)**

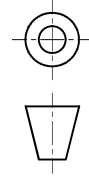


D $\phi$

TRUE SHAPE



True Lengths:	EG = ___ mm
	EF = ___ mm
	GF = ___ mm



DEVELOPMENT OF LOWER PART

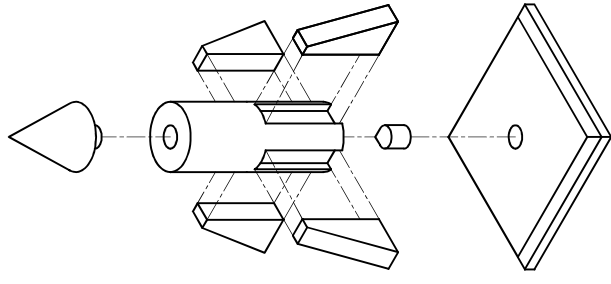
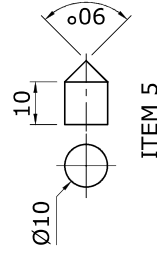
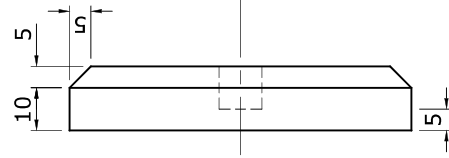
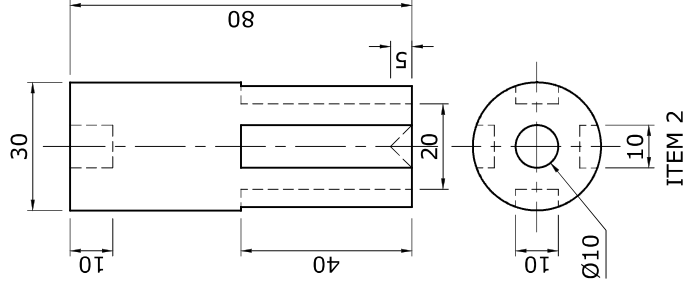
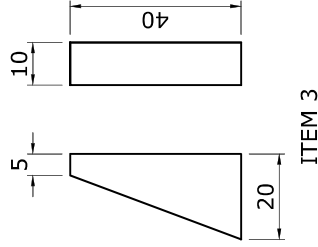
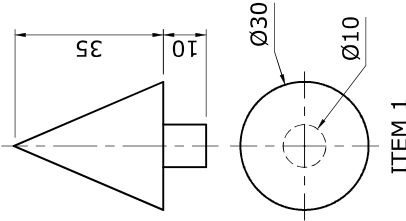
**Question 6.**

An exploded view of a toy wooden rocket is shown on the right. Detail drawings of the separate parts and a parts list are given below. Use the given starting lines to draw: (a) front elevation and (b) plan of the assembled rocket.

Note: Show hidden details.

**(Total: 18 marks)**

PARTS LIST		DESCRIPTION
ITEM	QTY	
1	1	NOSE CONE
2	1	FUSELAGE
3	4	FIN
4	1	LAUNCH PAD
5	1	DOWEL



FRONT ELEVATION

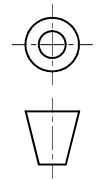
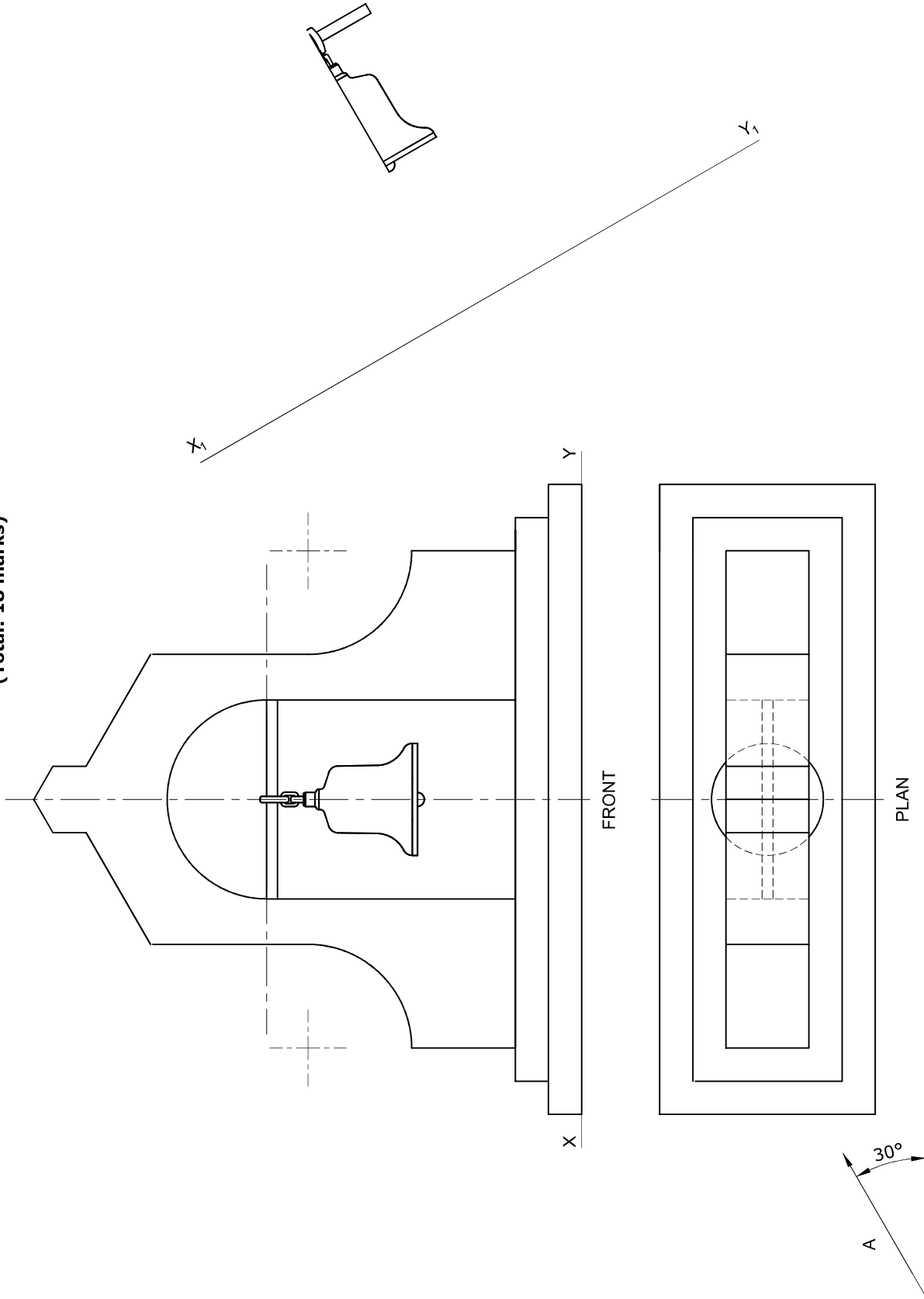
PLAN

**Question 7.**

Two orthographic views of a bell tower are given below. Project an auxiliary view as seen from the direction of arrow A on line  $X_1-Y_1$ .

Note: Do not show hidden details.

(Total: 18 marks)



**Question 1.**

The following computer programme is written to create a decorative table centre piece.

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.

ACI 7: MOVE F,F; DRAW E,G; DRAW H,F; DRAW G,I; DRAW H,H;  
ACI 5: MOVE E,F; DRAW E,I; DRAW H,I;  
ACI 5: MOVE E,I; DRAW D,J;  
ACI 1: MOVE D,F; DRAW D,J; DRAW H,J;  
ACI 1: MOVE C,F; DRAW C,K; DRAW H,K.

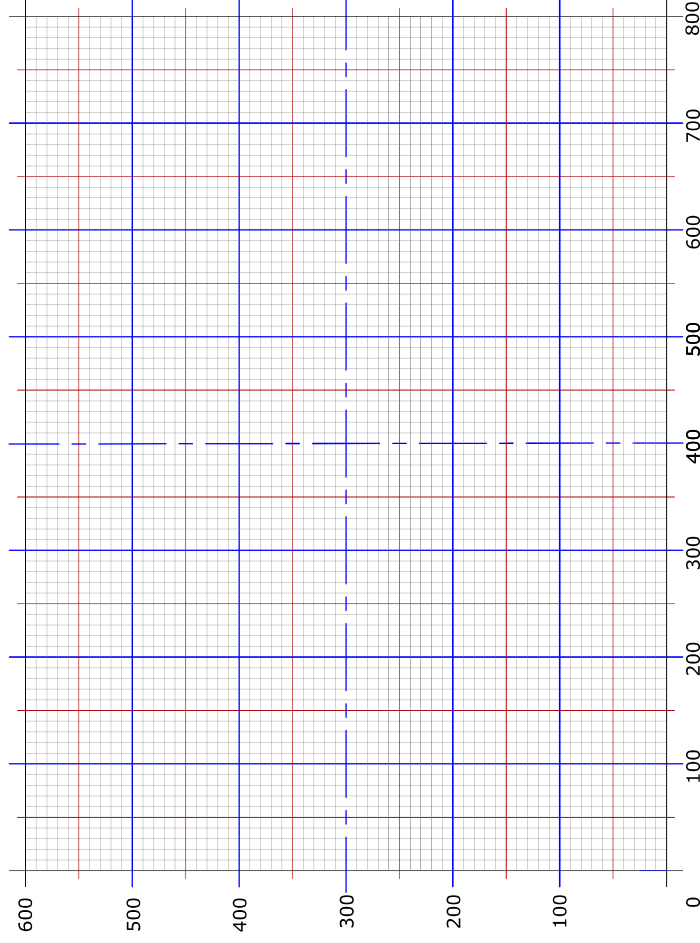
The **DATA** statement specifies the numeric values (in pixels) of given variables. **MOVE**, positions the cursor at a new location without drawing a line. **DRAW** draws a line from a current location to a new location. The instruction **ACI No.** makes the images that follow the instruction, appear 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 an 800 x 600 graphical display. Complete the programme by:

- using the grid to plot the image produced by this programme; (6)
- MIRRORING** the plotted design, using the vertical and horizontal centre lines as the mirror lines (lines of symmetry). (4)

**(Total: 10 marks)**



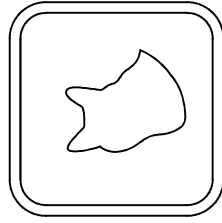
**Question 2.**

A group of web developers need to design some icons for an online poll. They are using a star rating system where children vote for their preferred pet. **THREE** sketches and **ONE** final icon for dogs and cats have been given.

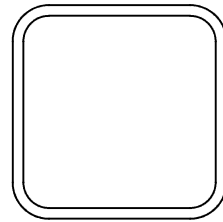
- a. Design **THREE** sketches each and **ONE** final icon each for birds and fish in the space available. Colour the final icons according to the key in Table B. (8)



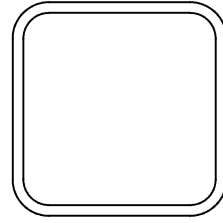
Dogs



Cats



Birds



Fish

- b. Fill in the missing data in Pictograph A and Table B using the icons designed in Question (a) and the information obtained from Pictograph A and Table B. (4)

**(Total: 12 marks)**

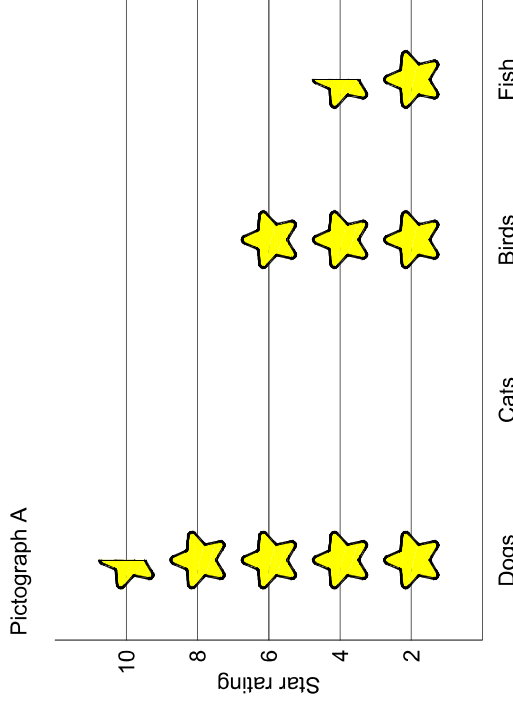


Table B: Pet popularity amongst school children.

Key colour	Pet	Icon	Star rating
Black	Dogs		9
Red	Cats		4
Blue	Birds		
Green	Fish		3

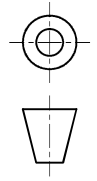
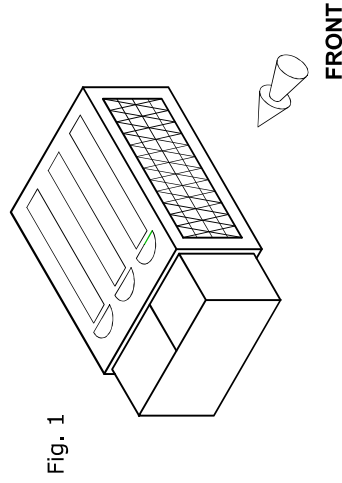
**Question 3.**

Sketch the (a) orthographic and (b) isometric views, in freehand.

Notes:

- Use the given starting lines and draw to an approximate scale of 1:1.
- Do **not** show hidden details.

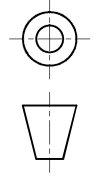
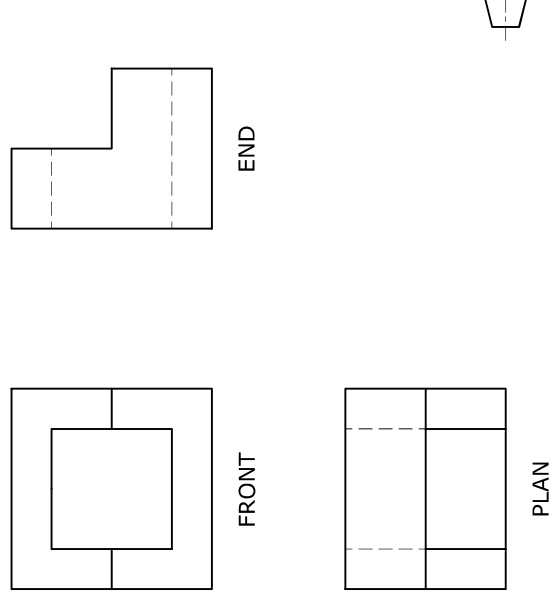
a. Sketch the front elevation, end elevation and plan of Fig. 1. (4)



b. Sketch, using the starting lines, the isometric view of Fig. 2. (6)

**(Total: 10 marks)**

Fig. 2



- Question 4.**  
 A Santa sledge is shown in Fig. 3. Draw the sledge design by constructing:
- a. an involute around circle C and finishing off the supports; (8)
  - b. one revolution of an Archimedean spiral, from A to B and having center point O. (8)
- (Total: 16 marks)**

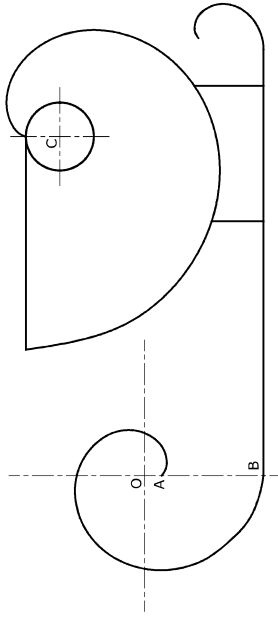
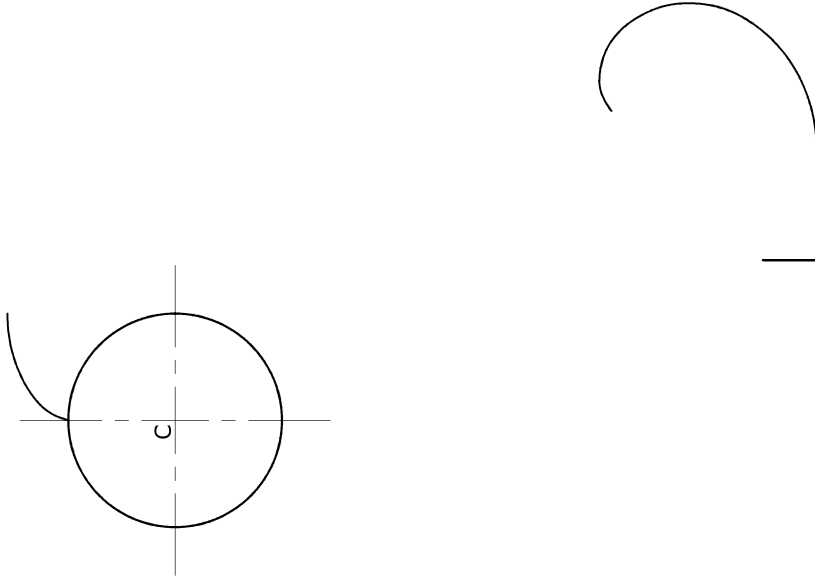
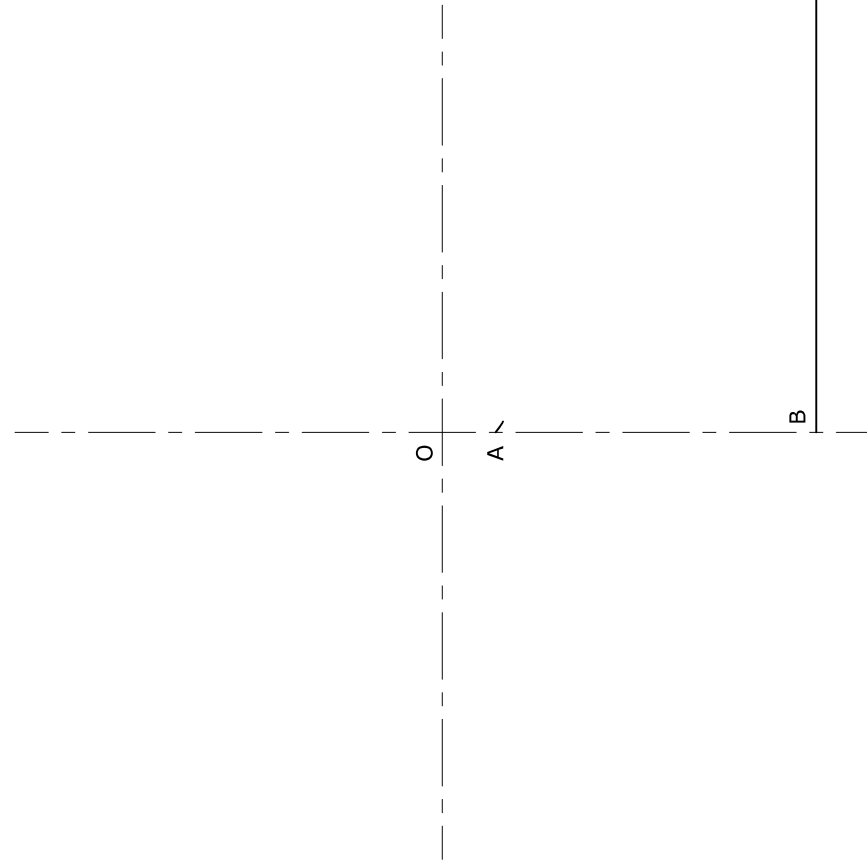


Fig. 3





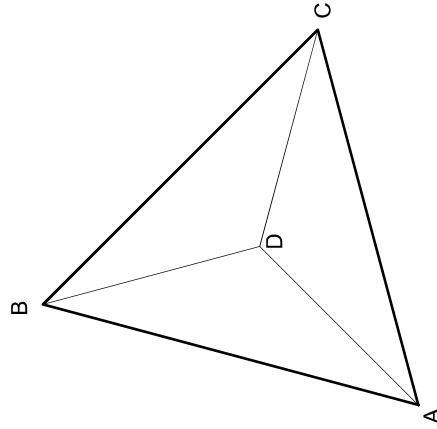
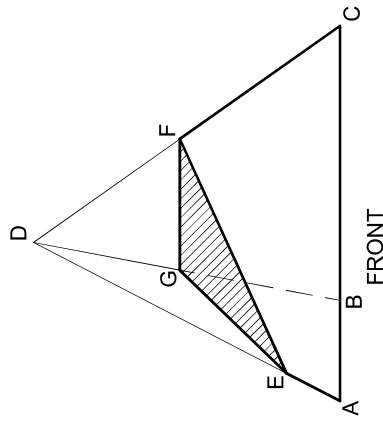
**Question 5.**

A pictorial view, an incomplete plan and a front elevation of a truncated triangular based pyramid are given. By construction, complete:

- the truncation in the plan; (2)
- the end elevation; (4)
- the development of the lower part using point D as the starting point; (6)
- the true shape of cut EGF and write down the true lengths in the given box. (4)

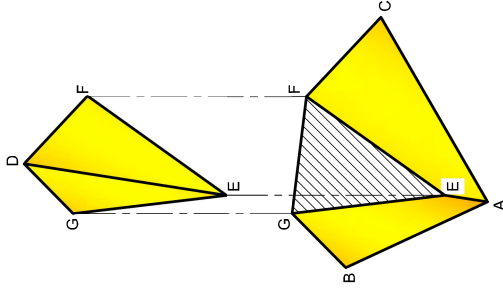
Note: Show the hidden detail.

**(Total: 16 marks)**

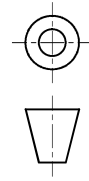


D $\phi$

TRUE SHAPE



True Lengths:
EG = ___ mm
EF = ___ mm
GF = ___ mm



DEVELOPMENT OF LOWER PART

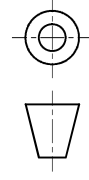
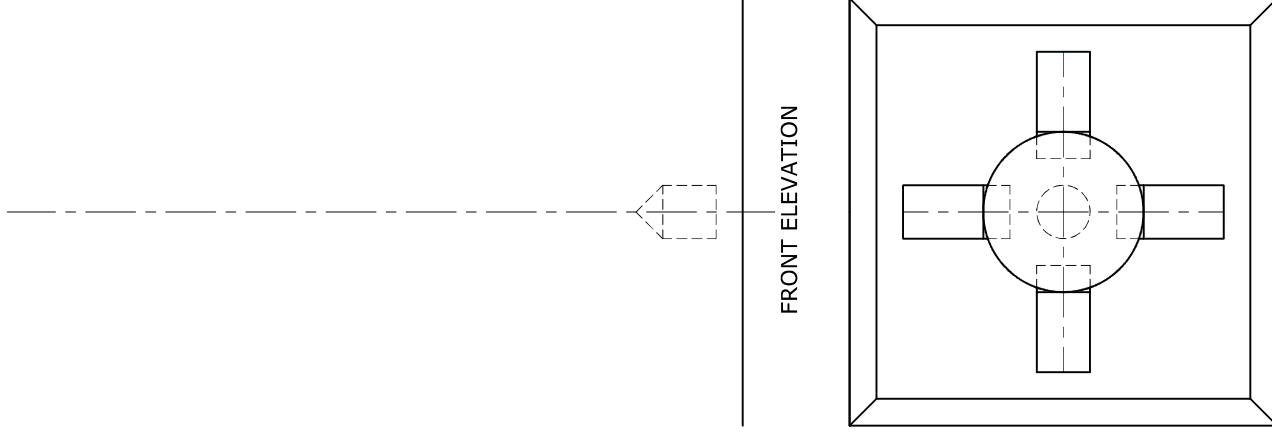
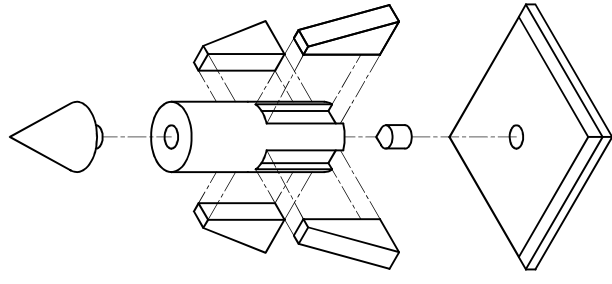
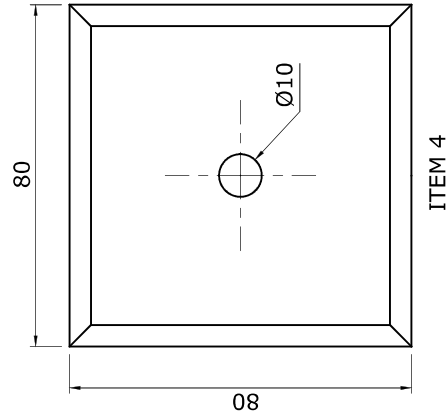
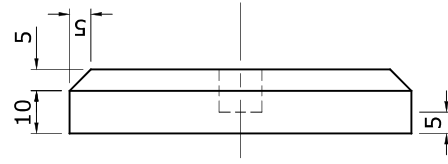
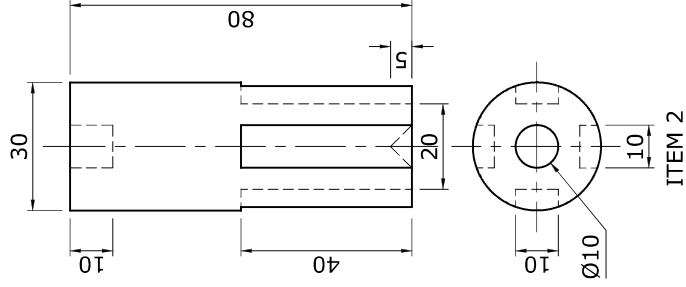
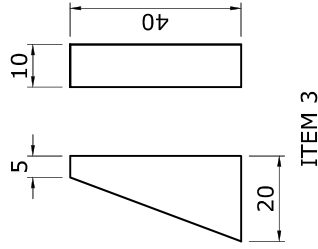
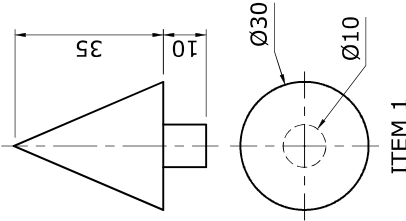
**Question 6.**

An exploded view of a toy wooden rocket is shown on the right. Detail drawings of the separate parts and a parts list are given below. Use the given starting lines to draw a front elevation of the assembled rocket.

Note: Show hidden details.

**(Total: 18 marks)**

PARTS LIST		DESCRIPTION
ITEM	QTY	
1	1	NOSE CONE
2	1	FUSELAGE
3	4	FIN
4	1	LAUNCH PAD
5	1	DOWEL



PLAN

FRONT ELEVATION

**Question 7.**

Two orthographic views of a bell tower are given below. Project an auxiliary view as seen from the direction of arrow A on line  $X_1-Y_1$ .

Note: Do not show hidden details.

(Total: 18 marks)

