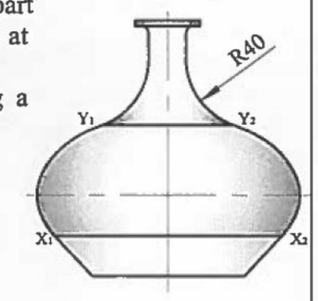
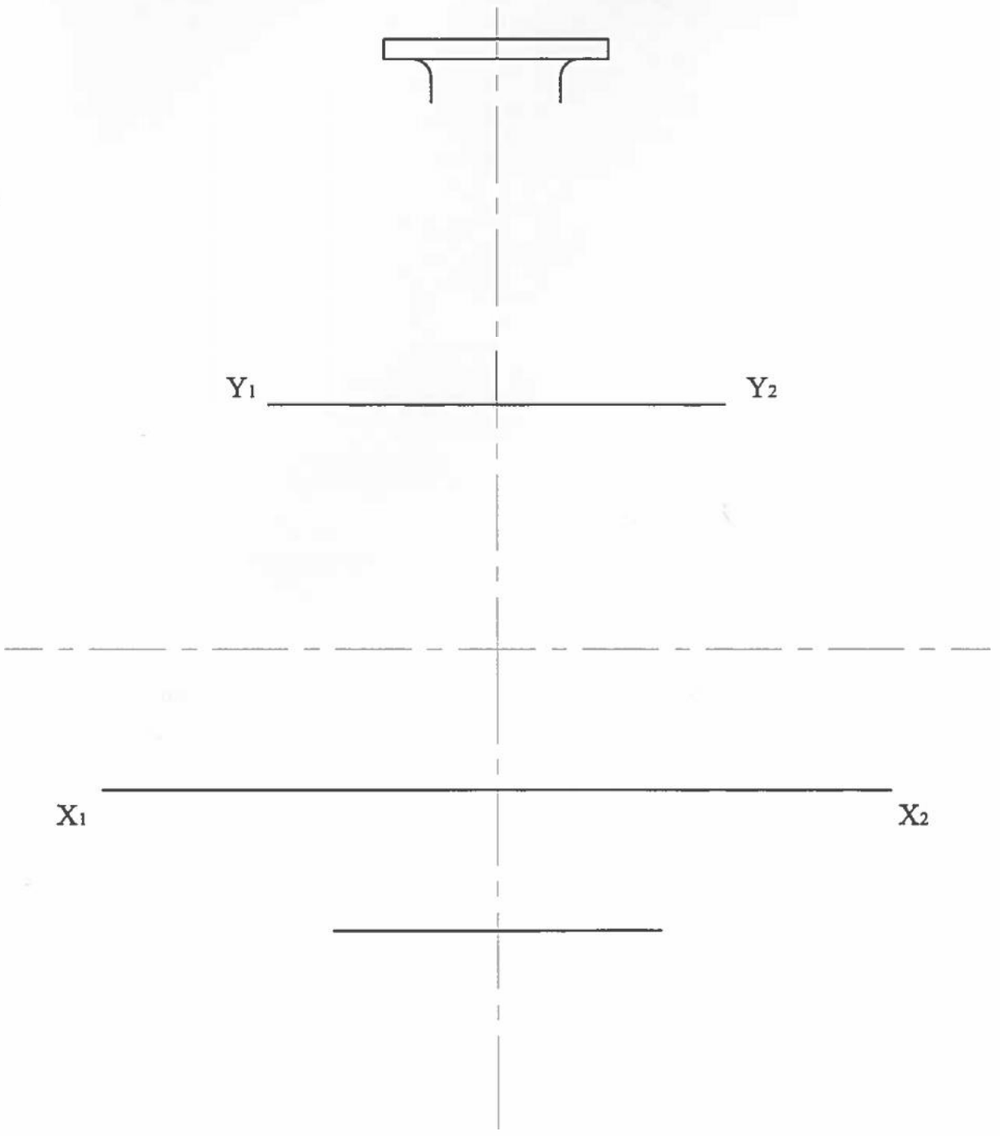
Question 1.

The profile of the vase shown on the right is composed of a part ellipse, two tangential lines at point X_1, X_2 and two tangential arcs at points Y_1, Y_2.

a. On the given centre lines, construct the part ellipse having a major axis of 148mm and a minor axis of 92mm.
b. Construct a tangent at point X_1, reflect the tangent at point X_2.
c. Construct a normal at point Y_1, reflect the normal at point Y_2.
d. Locate the centres of the two R40 arcs on the normals.
e. Complete the outline of the vase.

(12 marks)

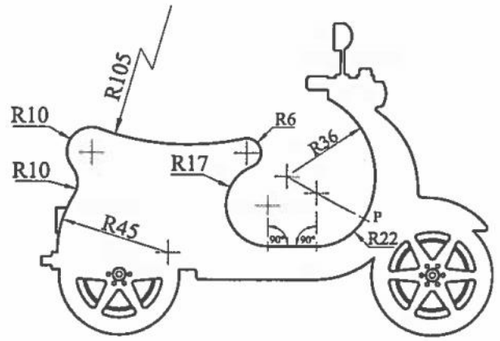


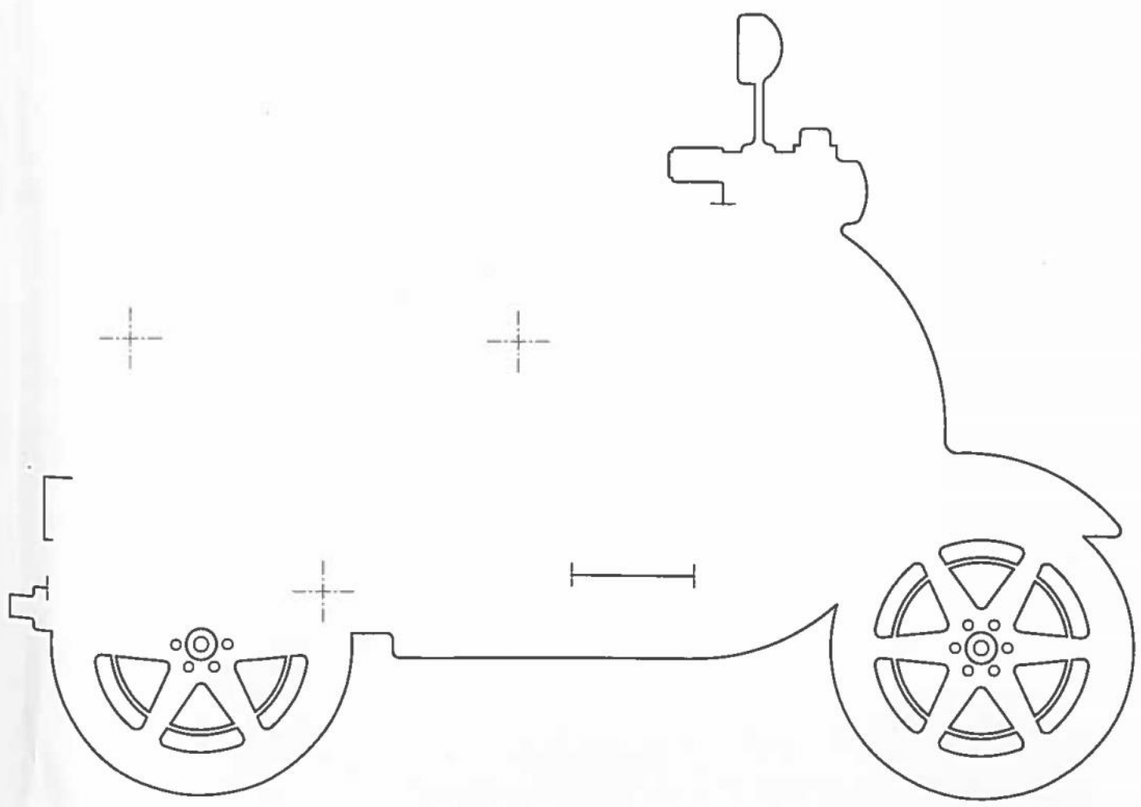


Question 2.

A line drawing of a model motor scooter with the necessary dimensions is shown on the right. Part of the outline of the motor scooter is already given below.
Complete the outline by using the given dimensions clearly showing the constructions used to locate the centres of the arcs.
P is the point of tangency between R36 and R22.
Short dashes denote other points of tangency.

(13 marks)





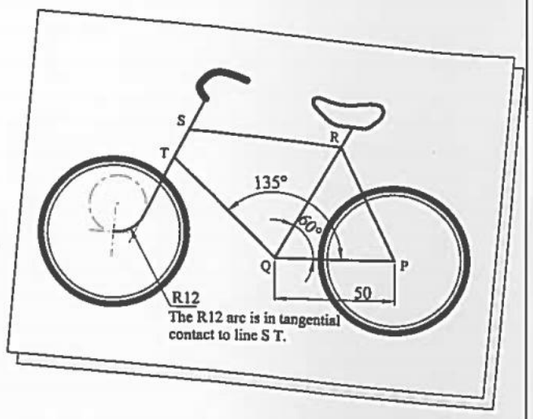
Question 3.

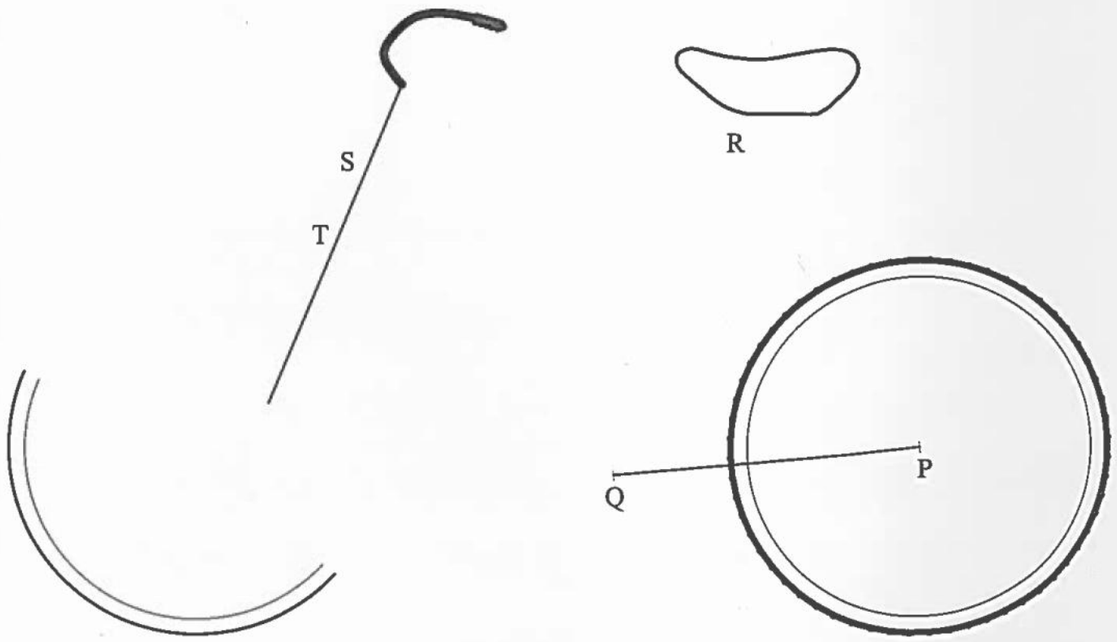
A dimensioned bicycle is shown on the right. An incomplete full size drawing of the bicycle is given below. Using appropriate geometrical construction:

a. locate the centre and complete the shape of the front wheel;
b. locate and draw the R12 arc and complete the front fork;
c. using your compasses only construct the angle PQR (60°) and angle PQT (135°);
d. construct the triangle PQR, thus locating point R, given that its perimeter is 158mm, base PQ 50mm and an included angle PQR 60°.

Note: The line SR is horizontal.

(13 marks)

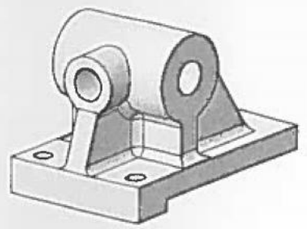


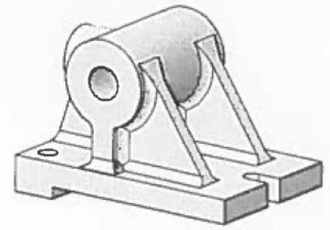


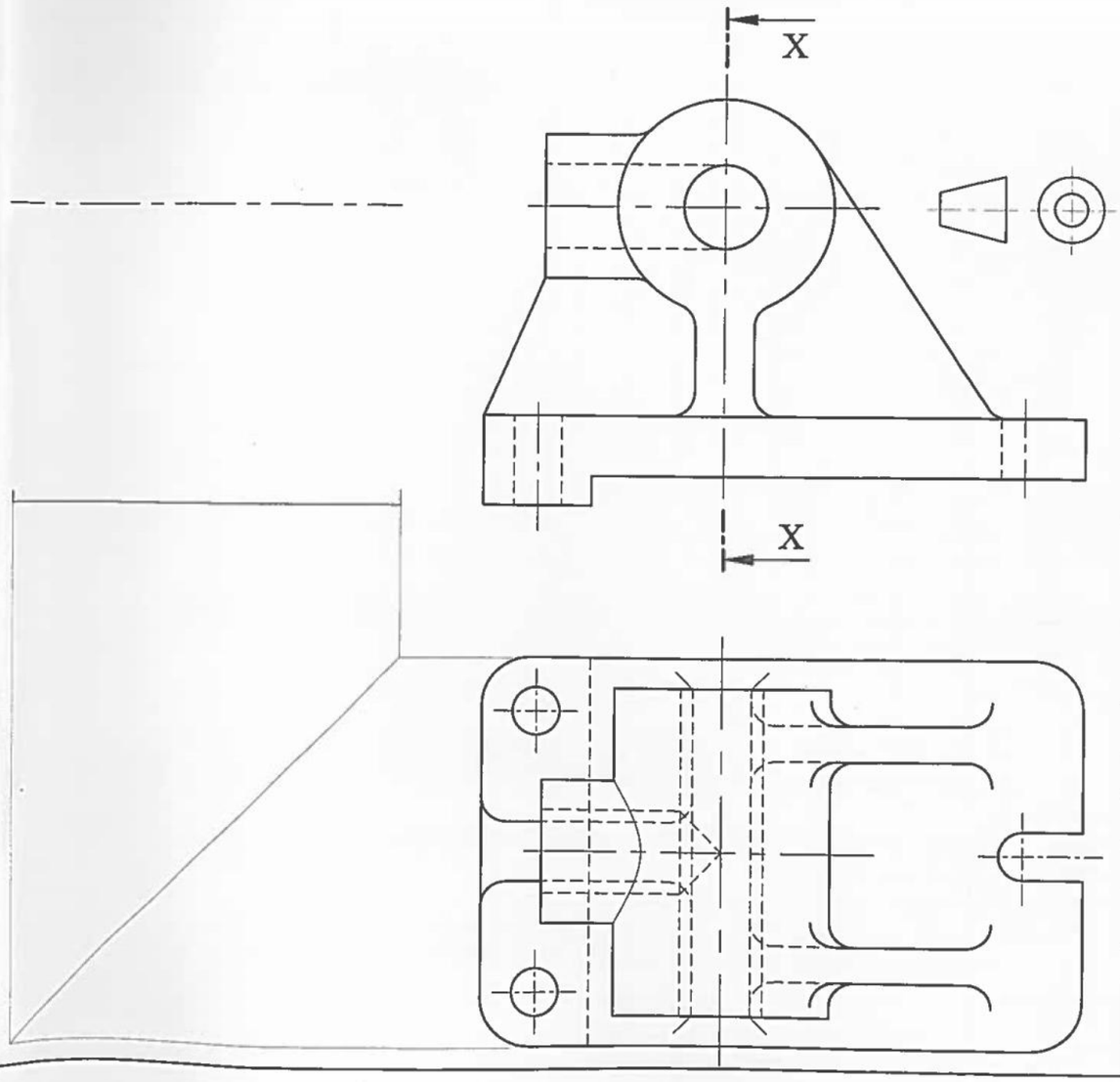
Question 4.

A front elevation and a plan view of a cast anchor bracket are shown in first angle projection. Project a sectional end/side elevation on the cutting plane X-X indicated in the front elevation. Hacthing/section lines must be clearly shown and hidden details are not required.

(14 marks)







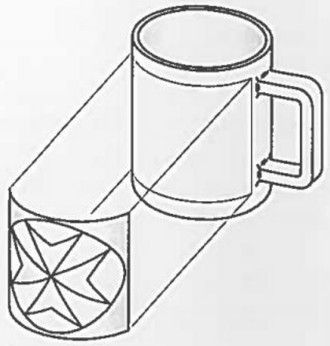
Question 5.

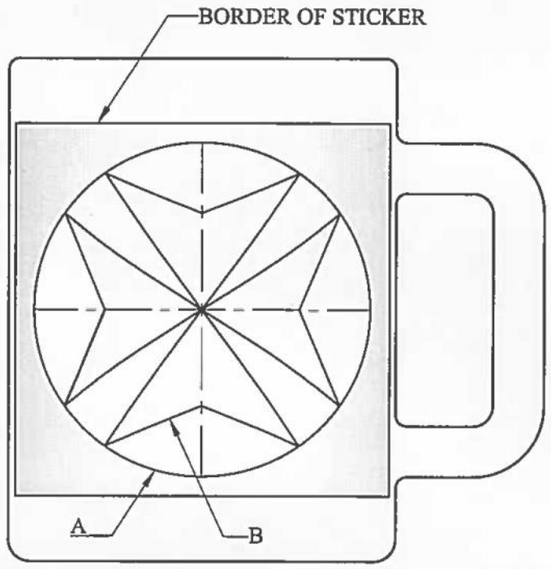
The owner of a tourist resort requires stickers which can be applied to ceramic mugs, as shown in the pictorial drawing and sold as souvenirs of Malta. The final product will have to look like the front elevation given below.

From the given views and within the given border of the sticker, construct:

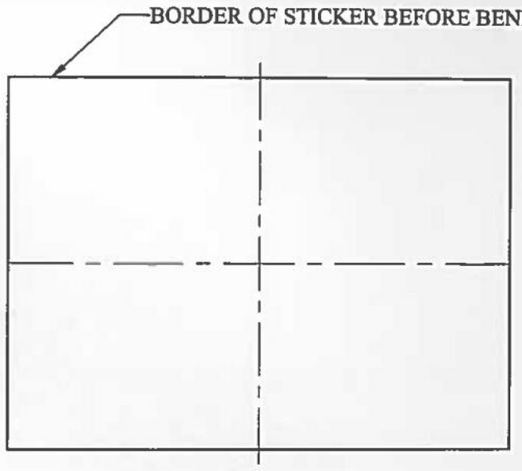
a. the true profile of the curve marked A;
b. the true shape of the cross marked B showing the label in the flat position before bending.

(14 marks)

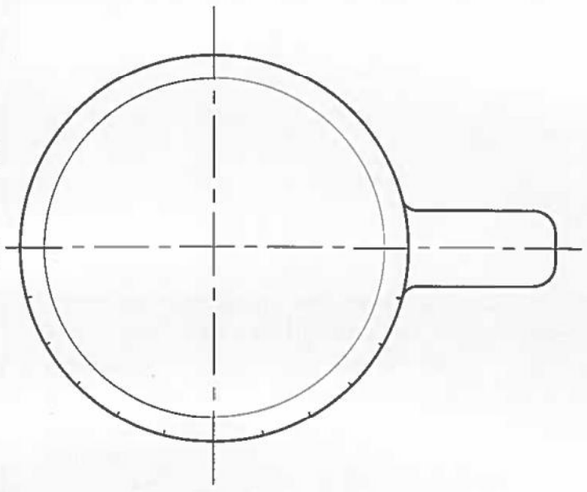




FRONT ELEVATION



STICKER IN THE FLAT POSITION



PLAN

Question 6.

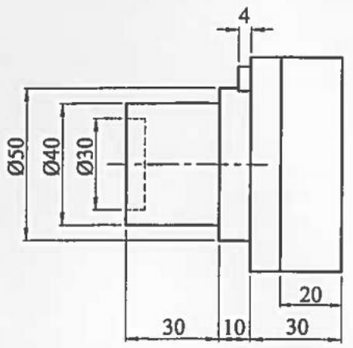
The drawings show three orthographic views and a pictorial drawing of the main features of a camera.

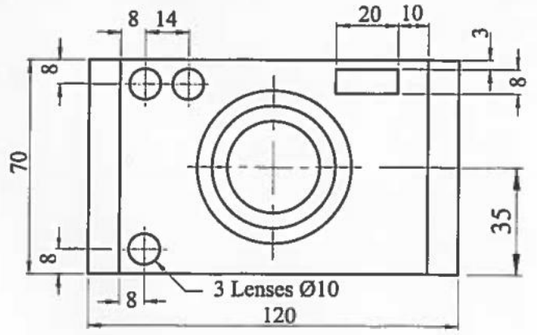
Draw, a **cabinet oblique view** of the camera on the given start lines.

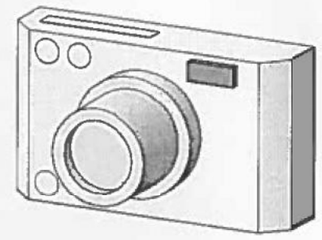
In your view show the circular features of the camera at the front.

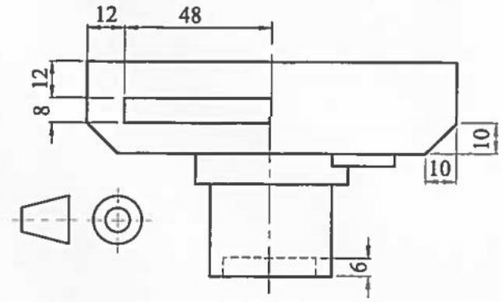
Do not include any hidden detail.

(16 marks)



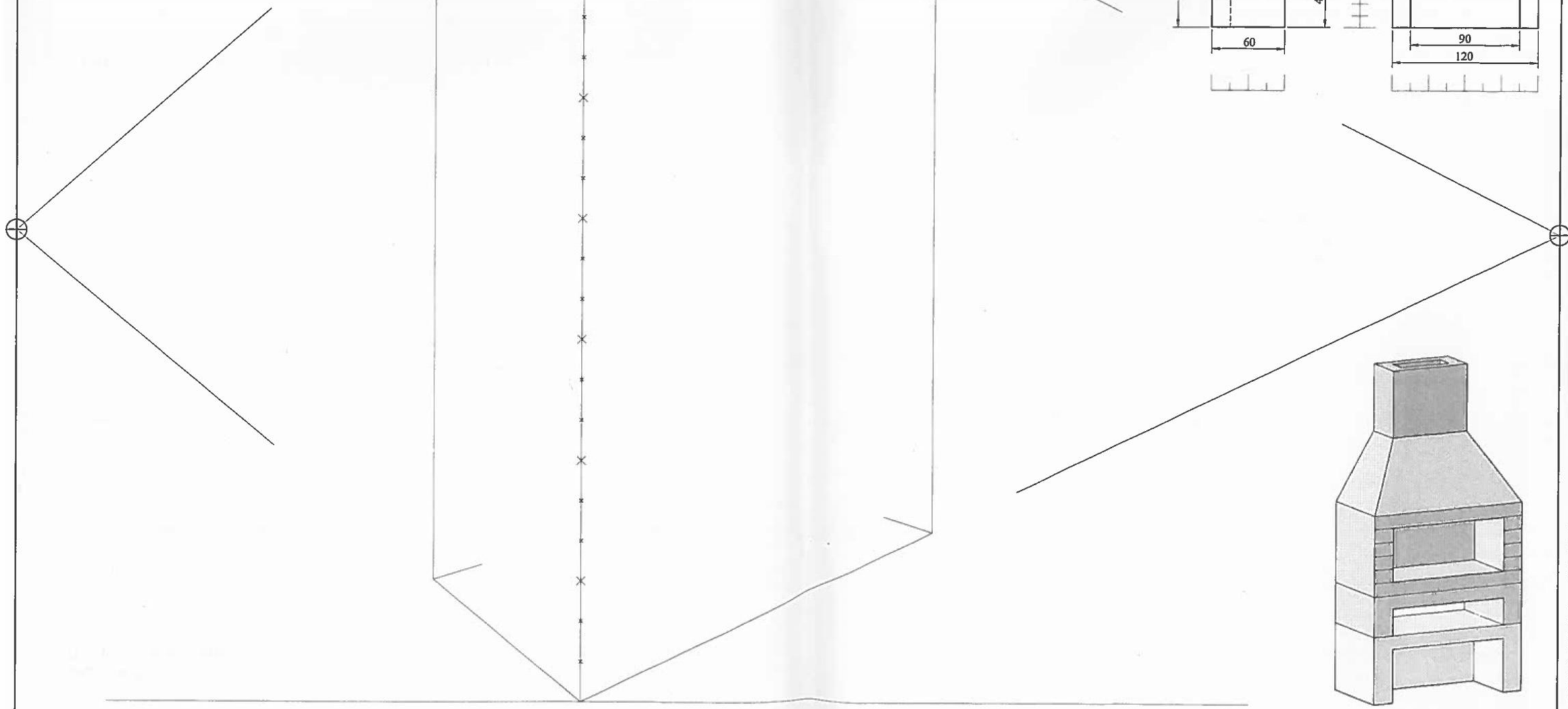


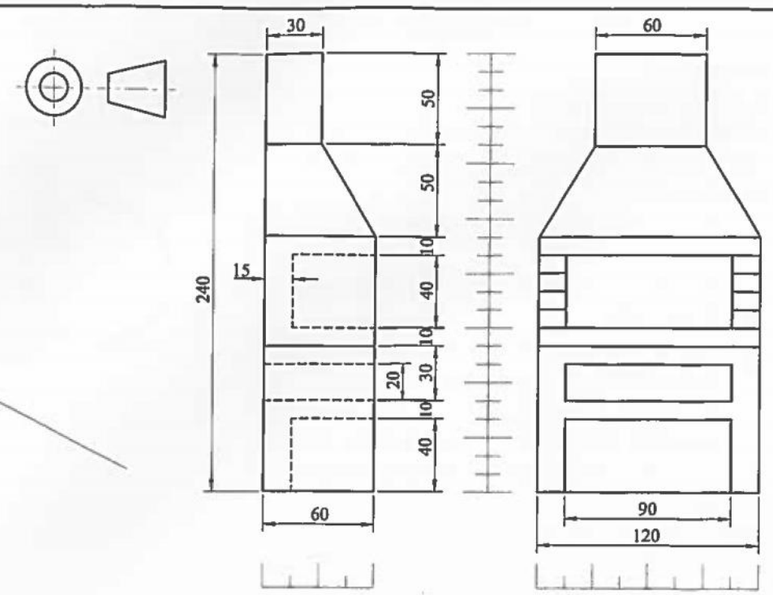




Question 7.
Two orthographic views and a pictorial diagram of a model of a Barbeque (BAR-B-Q) are shown.
Using the given vanishing points and start lines, construct a two-point estimated perspective view of the model.
Leave all construction lines visible.

(18 marks)



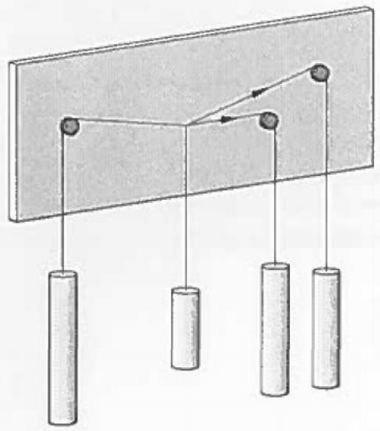


Question 1.

A special wall-board apparatus for an experiment is shown pictorially. The four weights are attached as shown by fine strings.

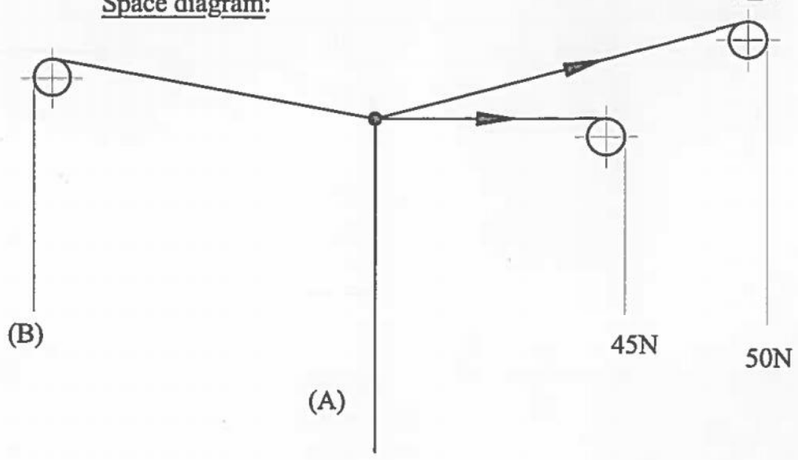
From the space diagram given below and using a scale of 10mm representing 10N, draw a force diagram to determine the magnitude and direction of the missing weights to keep the whole arrangement in equilibrium.

Write down your answers in the spaces provided below.



(10 marks)

Space diagram:



Weights required to hold the whole arrangement in equilibrium:

Weight (a) required..... Acting downwards ..... or upwards ..... (tick where appropriate)

Weight (b) required..... Acting to the right ..... or to the left ..... (tick where appropriate)

Question 2.

The following computer programme is written to create a symbol for a new T. V. station.

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; P = 700:
ACI 3: MOVE E,L; DRAW E,G; DRAW L,G; DRAW L,L; DRAW E,L:
ACI 1: MOVE E,K; DRAW C,K; DRAW C,H; DRAW E,H:
ACI 1: MOVE L,H; DRAW P,G; DRAW P,L; DRAW L,K:
ACI 5: MOVE G,G; DRAW F,B: DRAW D,A; DRAW M,A; DRAW K,B; DRAW J,G:
ACI 7: MOVE K,G; DRAW M,E; DRAW N,E.

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 by 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 draw the image produced by this programme.

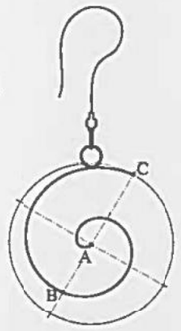
(12 marks)

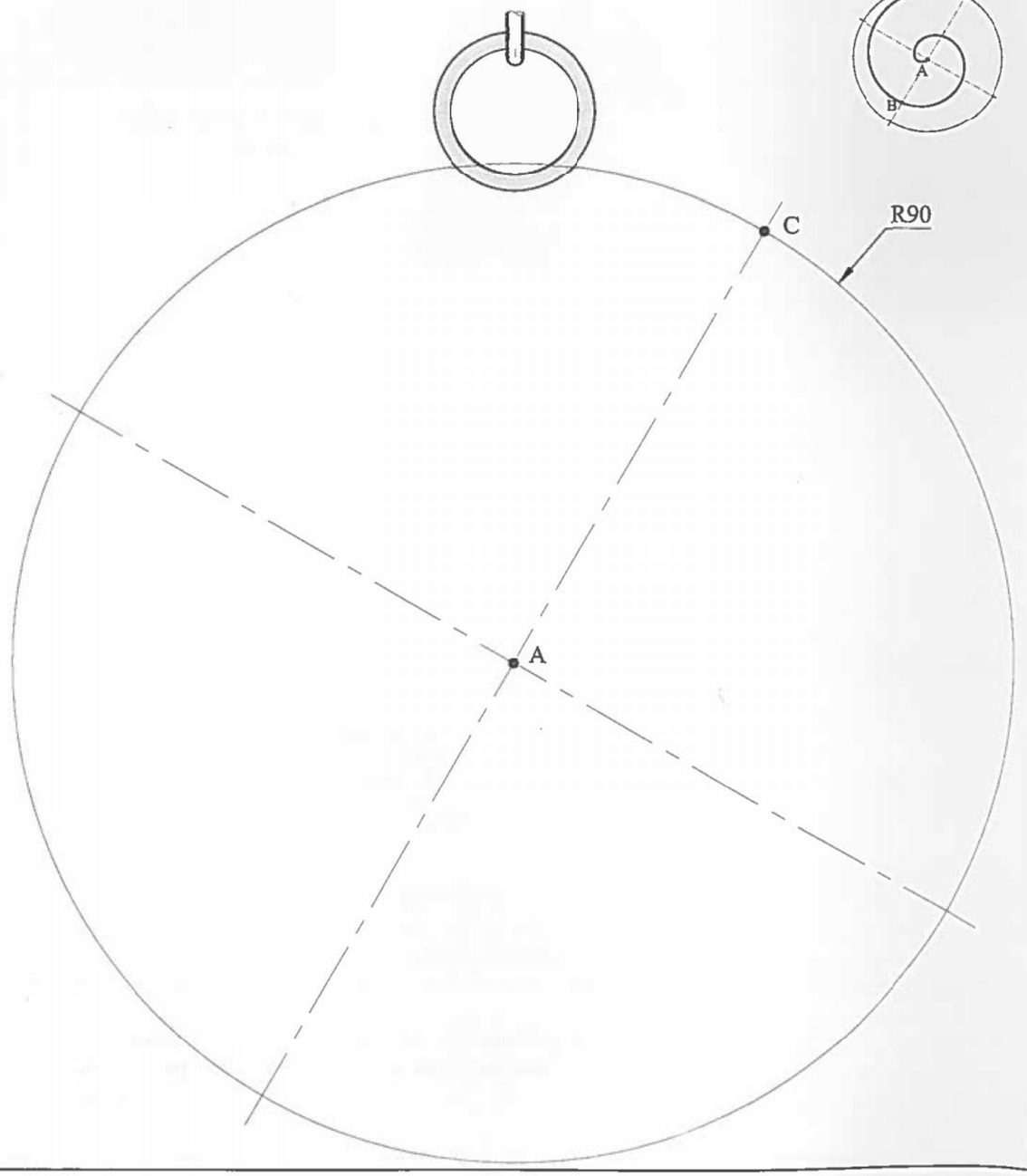
Question 3.

The ear ring shown on the right is formed by winding silver wire for one and a half turns of an Archimedean spiral, A,B and C.

On the start lines given below construct one and a half turns of an Archimedean spiral starting from point A and terminating at the point C.

(14 marks)





Question 4.

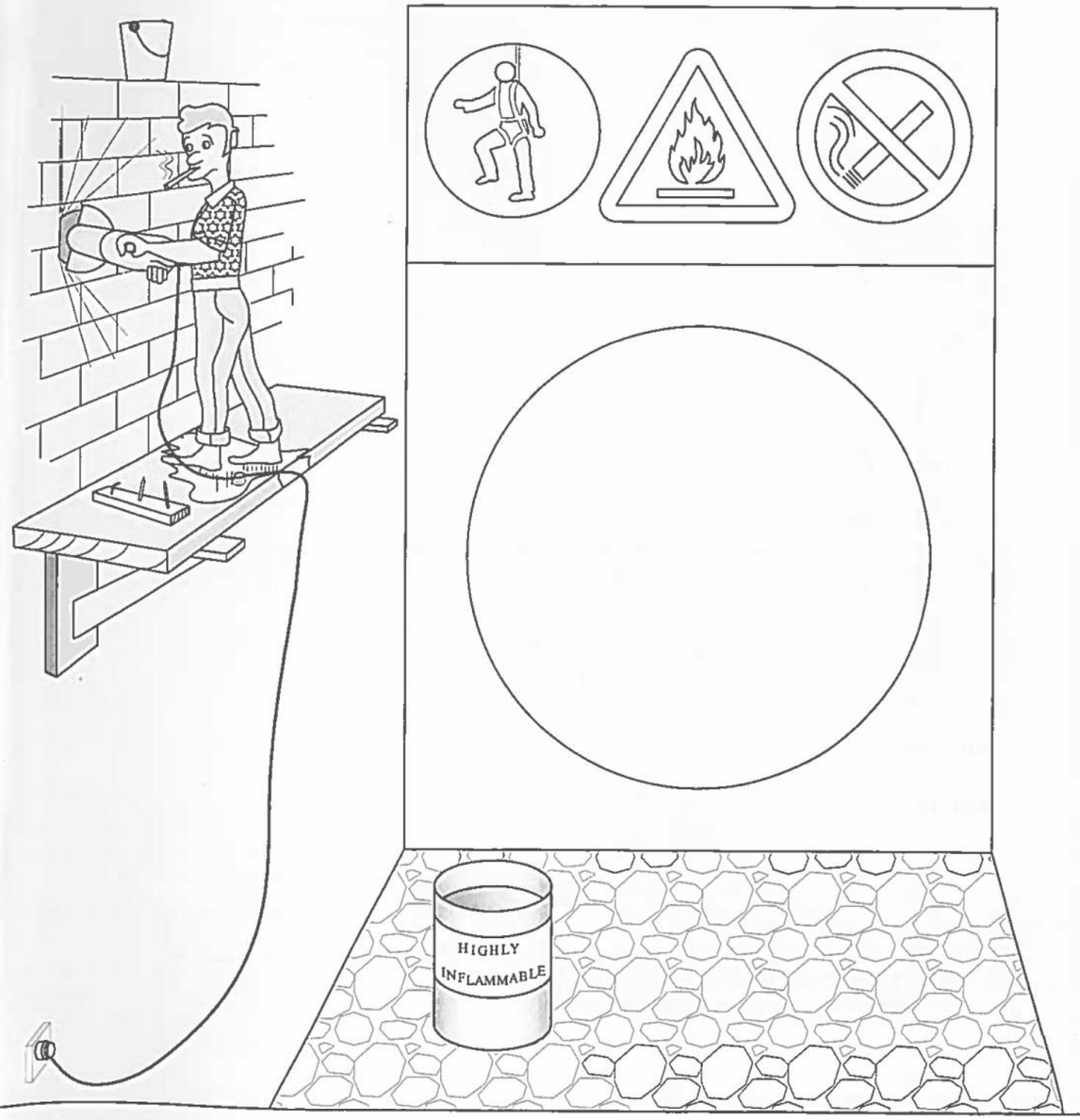
The drawing below shows a construction worker doing his job in an insecure environment. An on-site inspection by the Health and Safety officer has resulted in a number of safety signs being mounted on a board which was placed in a prominent position of the construction site. Three of the signs (shown below) have already been mounted. You are asked to:

a. colour the given signs;

b. add another coloured sign (in the circle given below) that obliges the worker to wear **safety goggles.**

Note: Colouring is to be in accordance with an approved recognized convention.

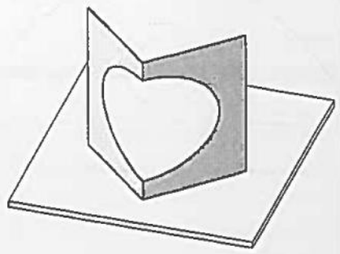
(14 marks)

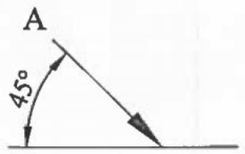


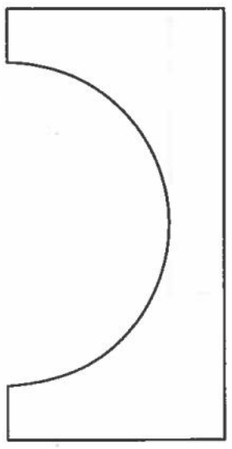
Question 5.

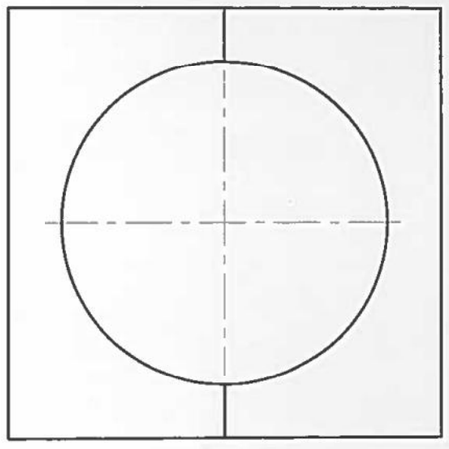
A valentine greeting card is shown displayed on a table.
Three orthographic views of the card are given below.
Draw an auxiliary view of the card as seen from the direction of arrow **A**.

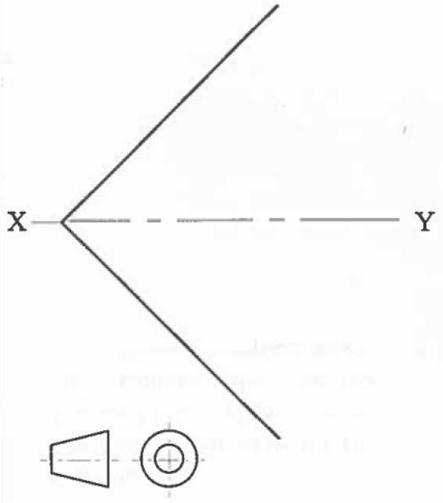
(16 marks)

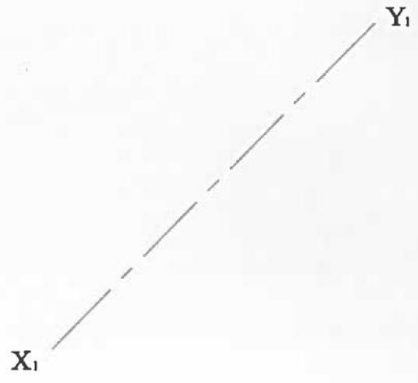












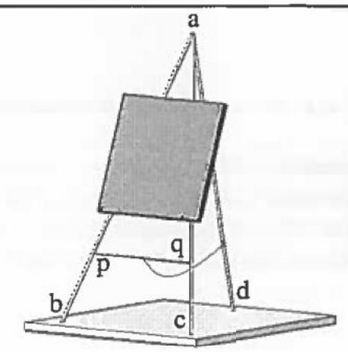
Question 6.

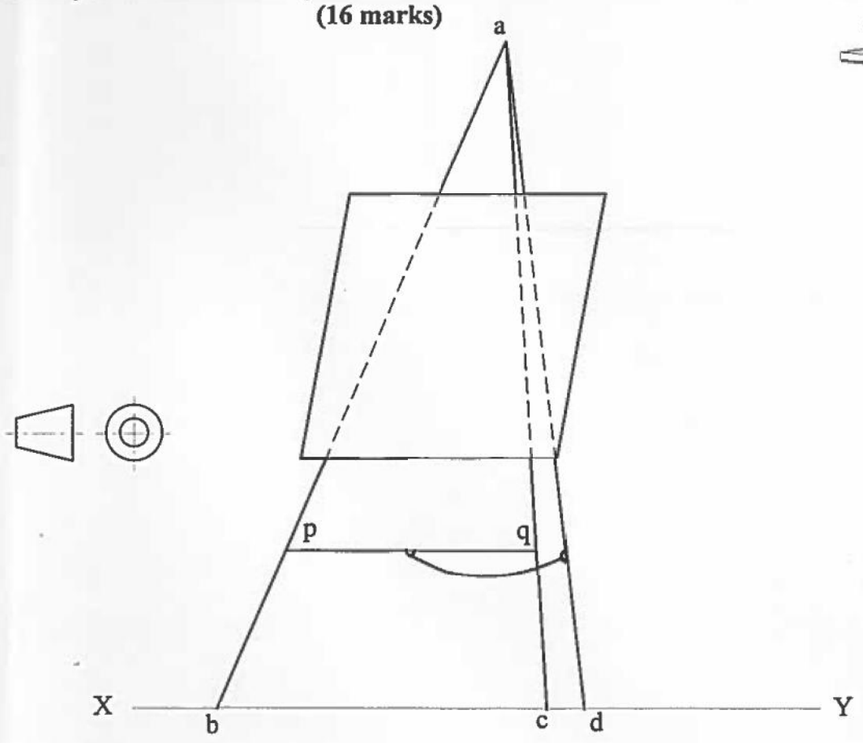
Two orthographic views of an artist's easel and board are drawn below.
Using geometrical construction, determine:

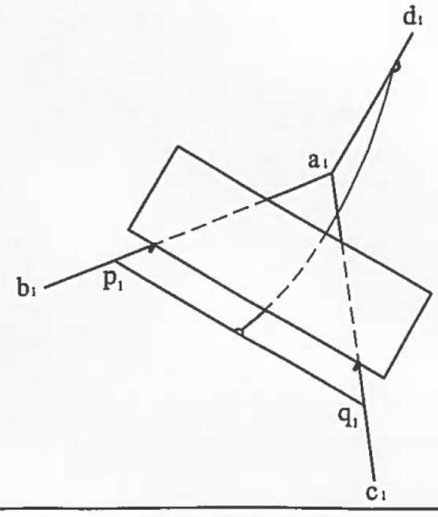
a. the true lengths of ab, ac, ad and pq;
b. the actual angle of line ab with the horizontal;
c. the true dimensions of the board.

Insert your answers in the spaces below.

(16 marks)







True length of tube ab =.....mm

True length of tube ac =.....mm

True length of tube ad =.....mm

True length of tube pq =..... mm

Actual angle of line ab with the horizontal XY =..... °

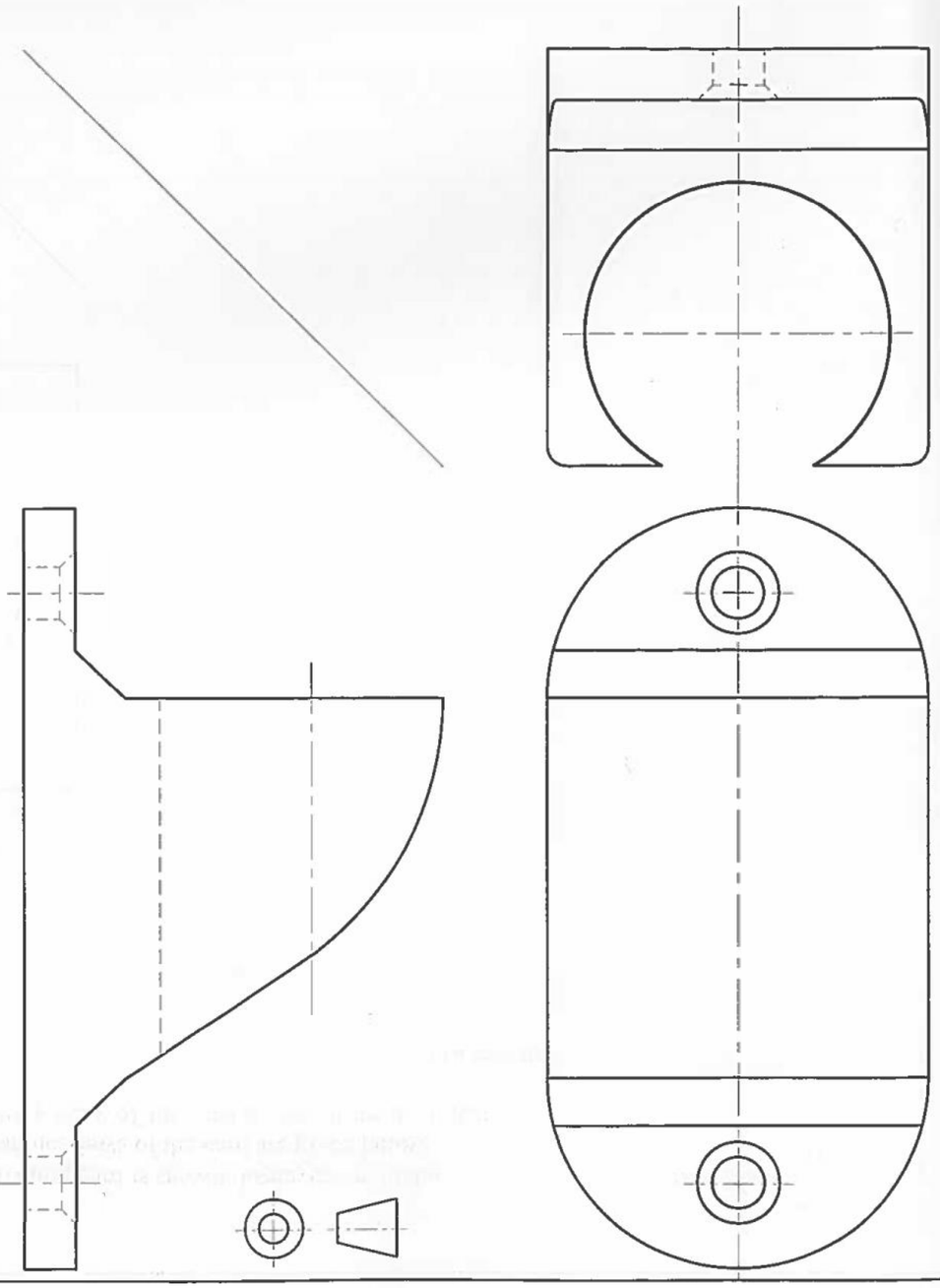
True dimension of board =.....mm by .....mm

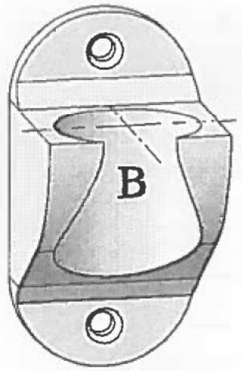
Question 7.

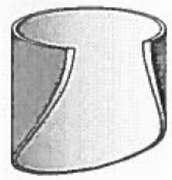
The pictorial views on the right show a shower handle holder and an inner cylindrical plastic sleeve.
The start lines below show two complete views and an incomplete front elevation.

a. Complete the given front elevation by constructing geometrically the curve of intersection.
b. Draw a complete development of the inner cylindrical plastic sleeve, marked **'B'.**

(18 marks)







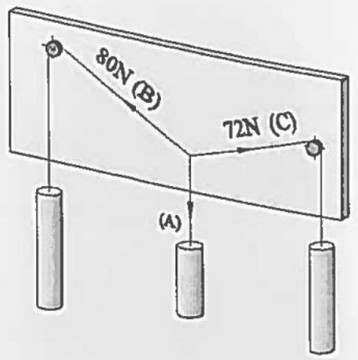
Inner cylindrical plastic sleeve
part 'B'

Question 1.

A special wall-board apparatus for an experiment is shown pictorially. The three weights are attached as shown by fine strings.

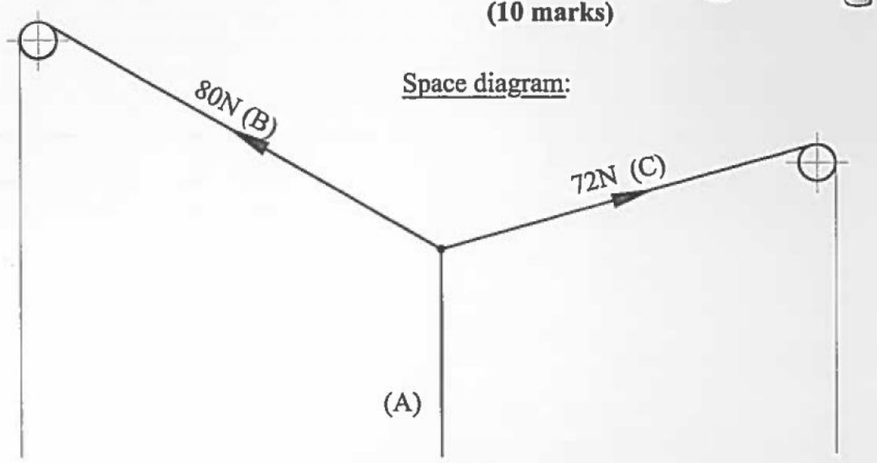
From the space diagram given below and using a scale of 10mm representing 10N, draw a force diagram to determine the magnitude and direction of the missing load (A) to keep the whole arrangement in equilibrium.

Write down your answer in the space provided below.



(10 marks)

Space diagram:



Load required to hold the whole arrangement in equilibrium:

Load (A) required ..... Acting downwards ..... or upwards .....

Question 2.

The following computer programme is written to create a symbol for a Video Camera.

DATA: A = 150; B = 250; C = 300; D = 350; E = 400; F = 450; G = 500; H = 550; J = 700:
ACI 1: MOVE B,F; DRAW B,B; DRAW H,B; DRAW H,F; DRAW B,F:
ACI 5: MOVE B,E; DRAW A,E; DRAW A,C; DRAW B,C:
ACI 3: MOVE H,C; DRAW J,B; DRAW J,F; DRAW H,E:
ACI 7: MOVE D,B; DRAW F,A: DRAW G,A:

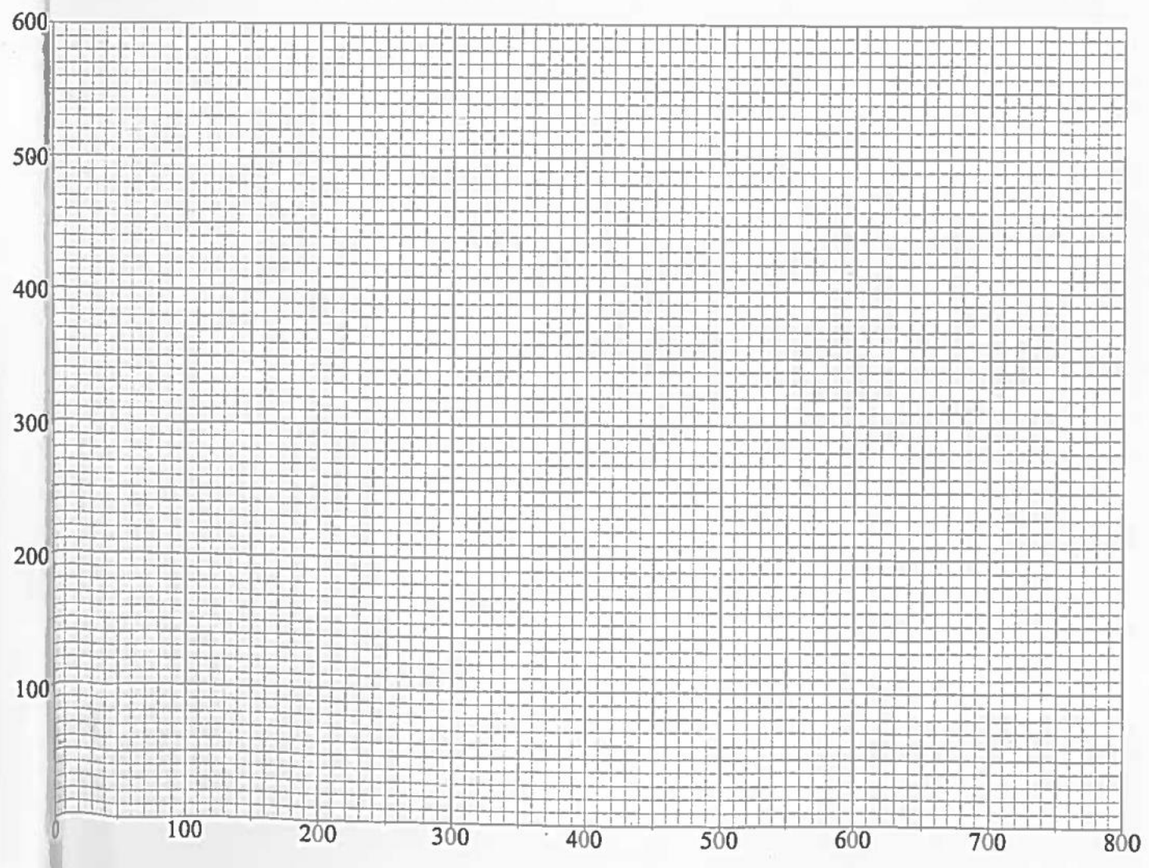
The **DATA** statement specifies the numeric values (in pixels) of given variables. **MOVE** positions the cursor at a new location without drawing a line. **DRAW** draws a line from a current location to a new location. The instruction **ACI No.** makes the images that follow the instruction, appear in the colour associated by 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 draw the image produced by this programme.

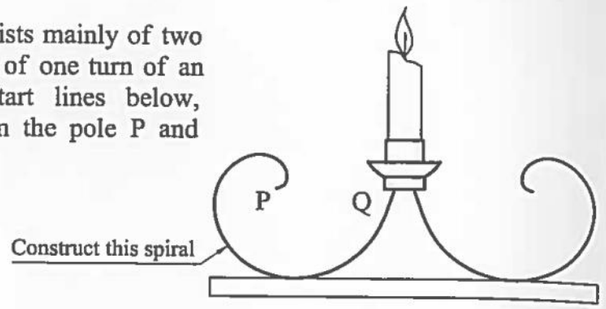
(12 marks)

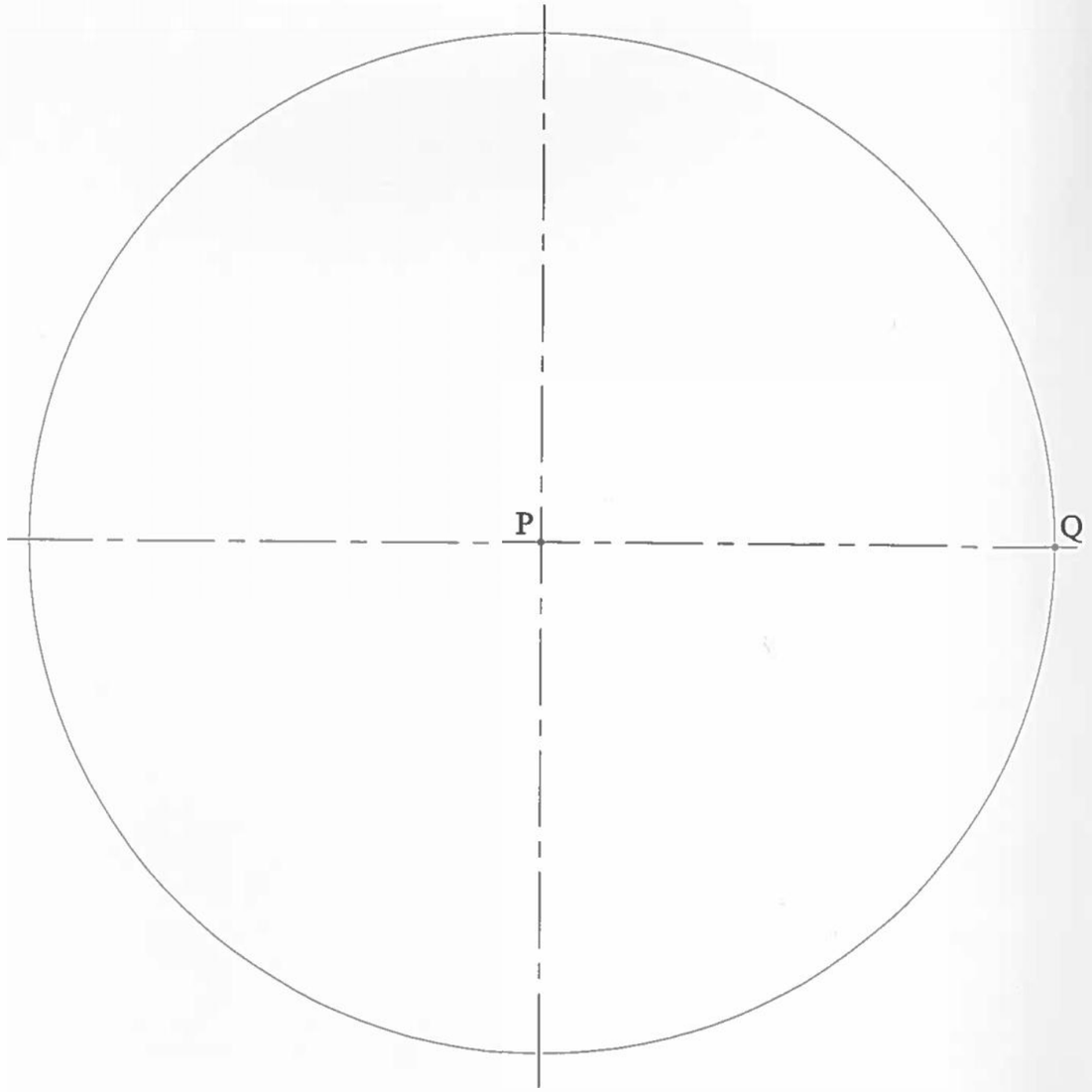


Question 3.

The candle holder shown on the right, consists mainly of two wrought iron scrolls which have the shape of one turn of an Archemedean Spiral. On the given start lines below, construct the indicated spiral starting from the pole P and ending at point Q.

(14 marks)





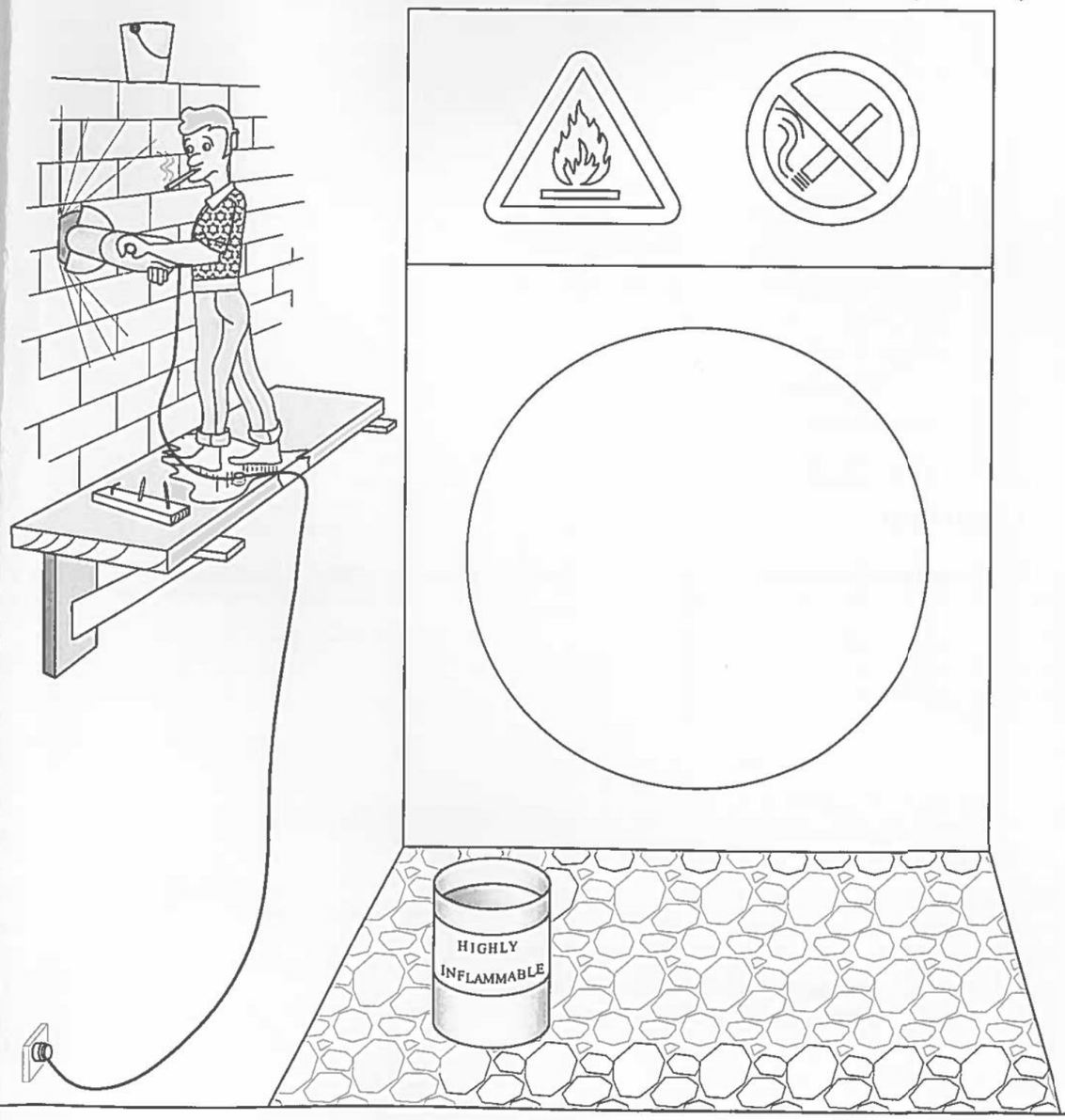
Question 4.

The drawing below shows a construction worker doing his job in an insecure environment. An on-site inspection by the Health and Safety officer has resulted in a number of safety signs being mounted on a board which was placed in a prominent position of the construction site. Two of the signs (shown below) have already been mounted. You are asked to:

a. colour the given signs;
b. add another coloured sign (in the circle given below) that obliges the worker to wear **safety boots.**

Note: Colouring is to be in accordance with an approved recognized convention.

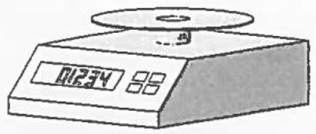
(14 marks)

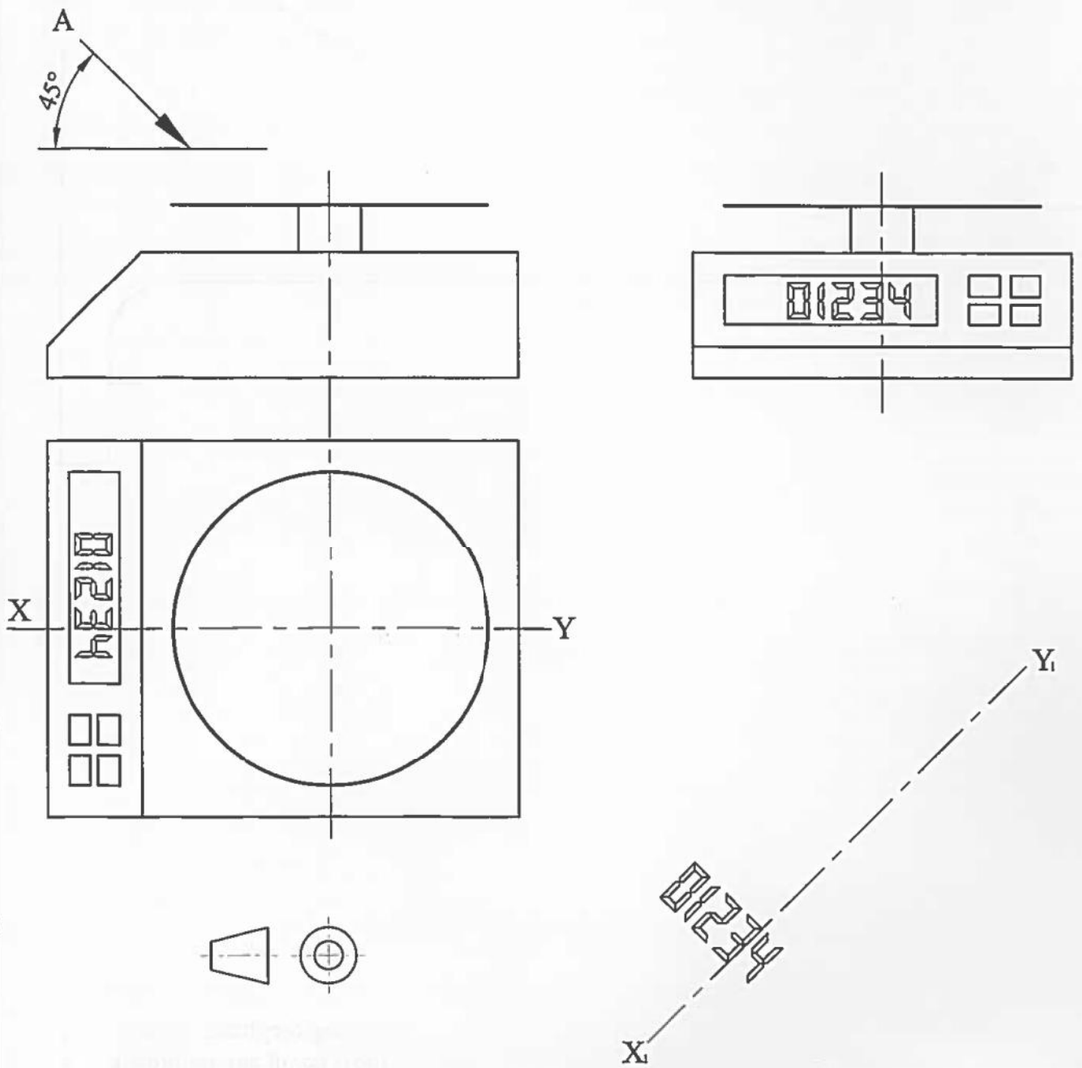


Question 5.

A pictorial laboratory digital scale is shown on the right.
Three orthographic views of the digital scale are given below.
Draw an auxiliary view of the laboratory scale as seen from the direction of arrow **A**.
Hidden details are to be omitted.

(16 marks)





LABORATORY DIGITAL SCALE

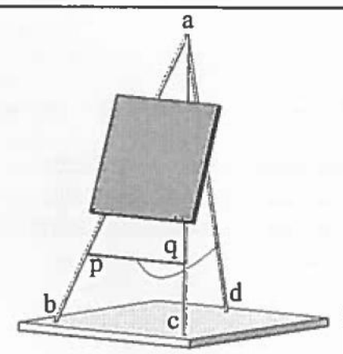
Question 6.

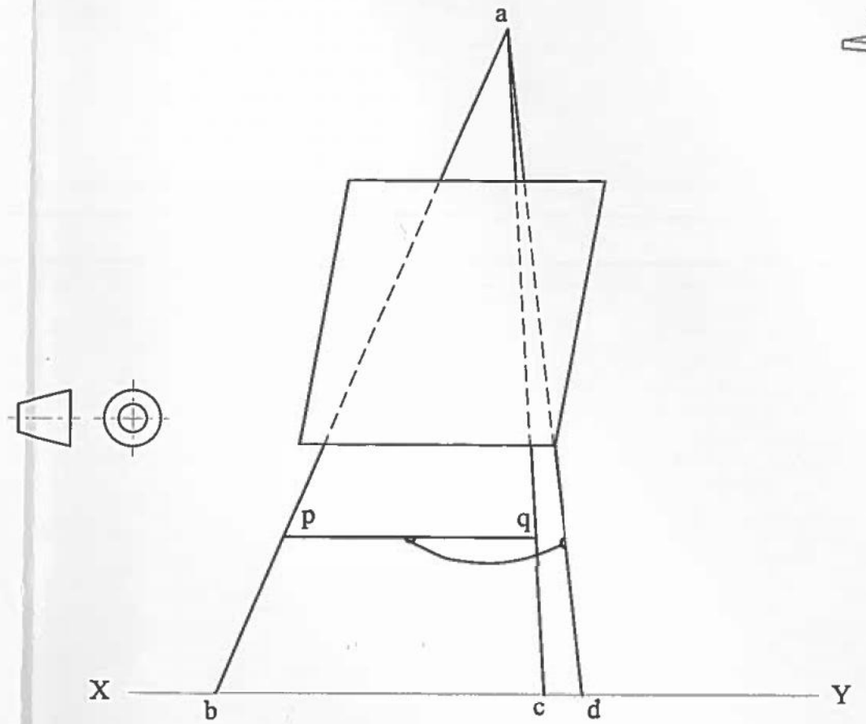
Two orthographic views of an artist's easel and board are drawn below.
Using geometrical construction, determine:

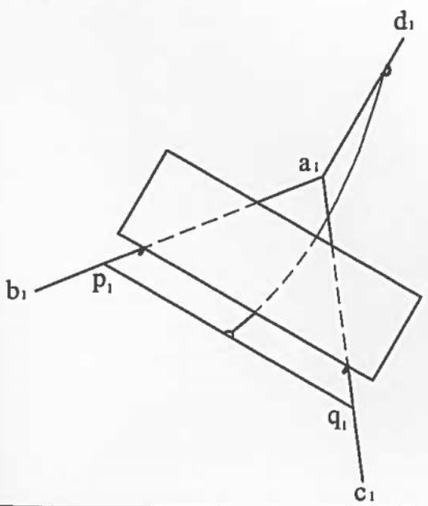
a. the true lengths of ab, ac, and ad;
b. the actual length and breadth of the board.

Insert your answers in the spaces below.

(16 marks)







True length of tube ab =.....mm

True length of tube ac =.....mm

True length of tube ad =.....mm

Actual dimension of board =.....mm by .....mm

Question 7.

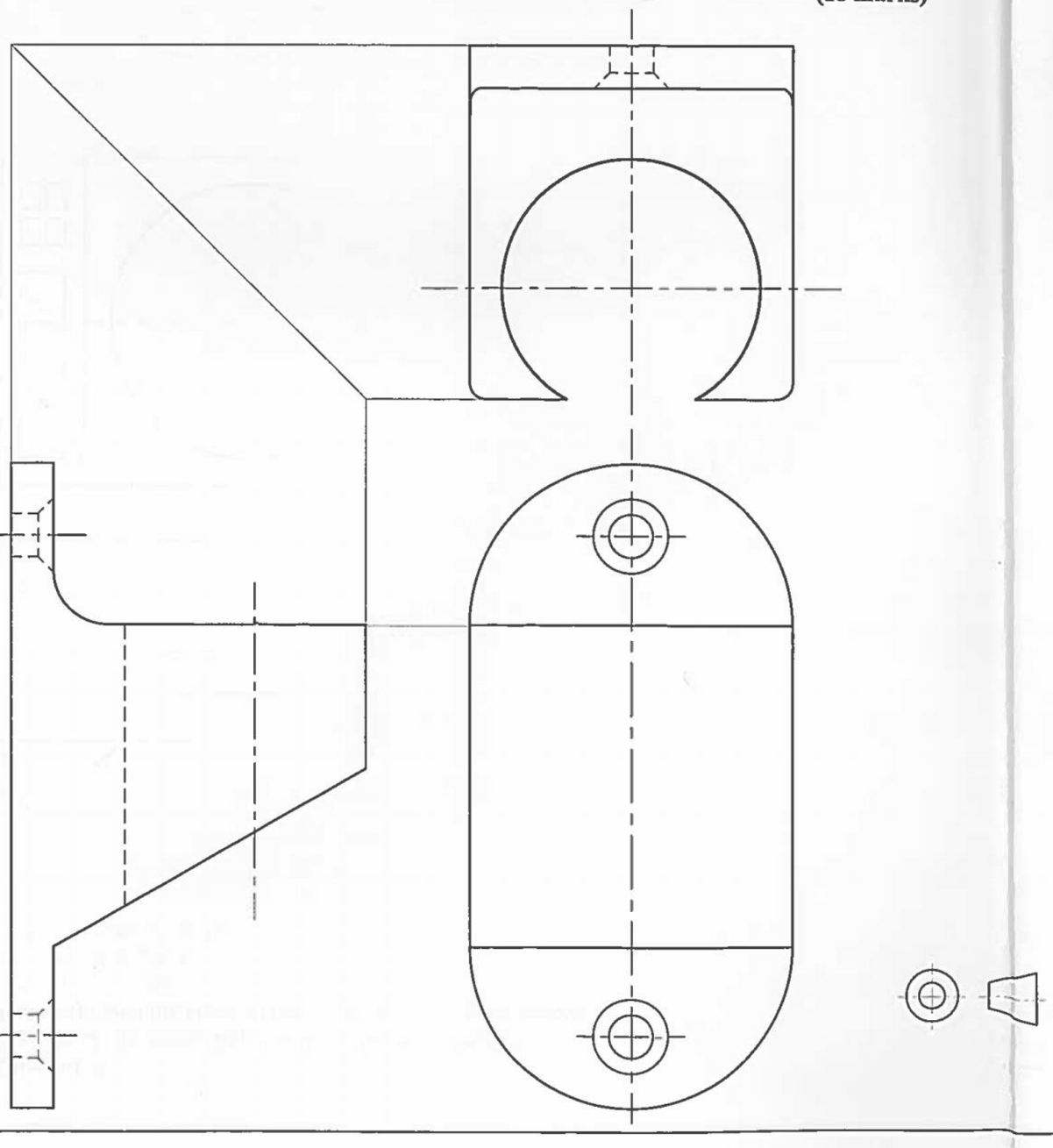
The pictorial views on the right show a bracket to hold a spray gun and an inner cylindrical plastic cover.

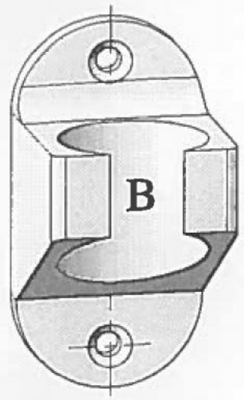
The start lines below show two complete views and an incomplete front elevation.

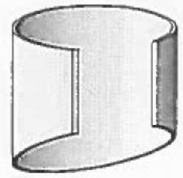
a. Complete the given front elevation by constructing geometrically the curve of intersection.

b. Draw a complete development of the inner cylindrical plastic cover, marked **'B'.**

(18 marks)







Inner cylindrical plastic cover
part 'B'