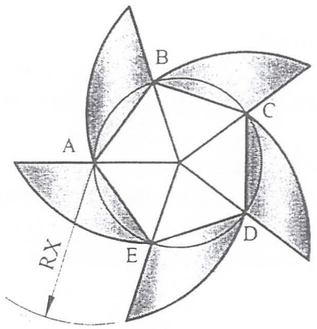
Question 1.

The logo of a firm that manufactures rotary cutters, shown on the right, consists mainly of a regular pentagon with a blade attached to each side.

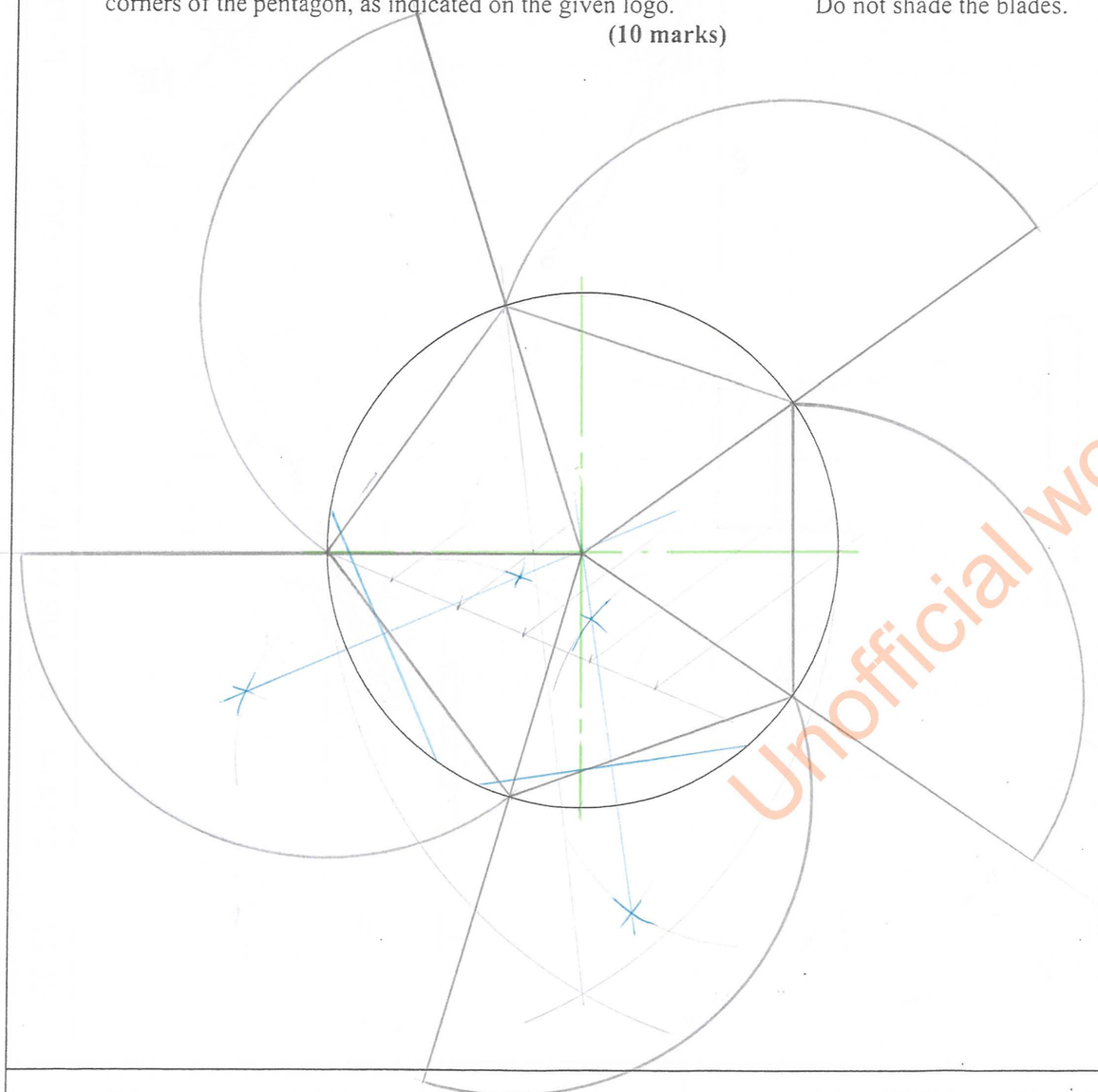
Inside the given circle, construct the logo by following the given steps:

a. Locate, by construction, the centre of the circle.
b. Inside the circle construct a regular pentagon.
c. Draw radials from the centre of the circle to the corners of the pentagon and extend.
d. Draw the five arcs to represent the blades. The centres (A,B,C,D,E) of the arcs (radius RX) lie on the opposite corners of the pentagon, as indicated on the given logo.

(10 marks)



Do not shade the blades.



Question 2.

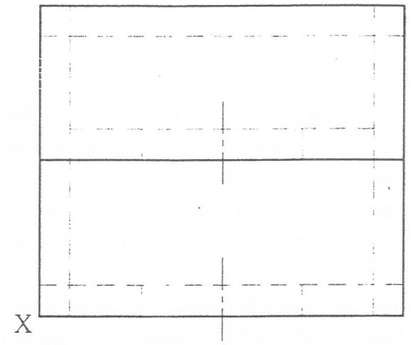
Three FULL SIZE orthographic views of a wooden STEP STOOL are given.

a. In the space provided, draw a freehand pictorial sketch of the stool.
b. On the given start lines, project an **ISOMETRIC** view placing corner X in the lowermost position.

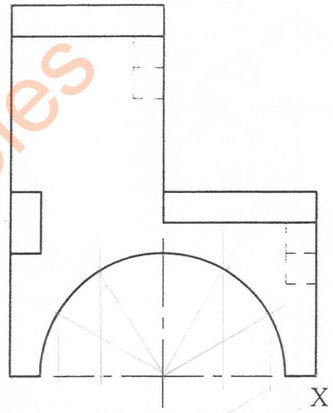
Note:

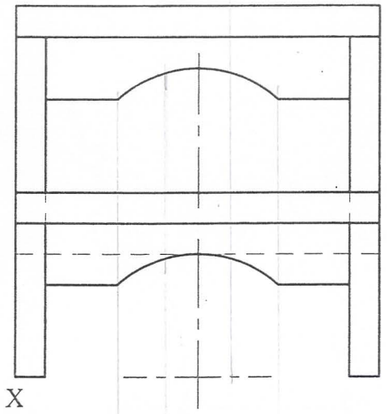
1. *The material thickness is 5mm throughout.*
2. *No hidden detail is required.*

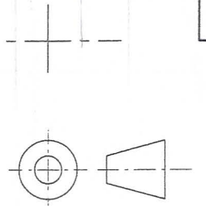
(14 marks)

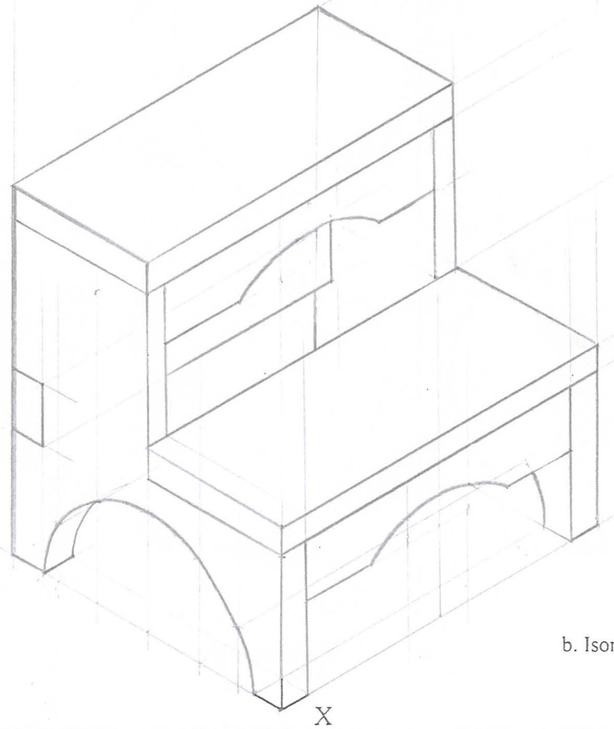


a. Freehand Sketch









b. Isometric Projection

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

GRAPHICAL COMMUNICATION - PAPER 1 (Page 1) - ATTEMPT ALL QUESTIONS - DATE: 12th May 2014. - TIME : 9.00 a.m. to 11.00 a.m.

INDEX NUMBER : _____

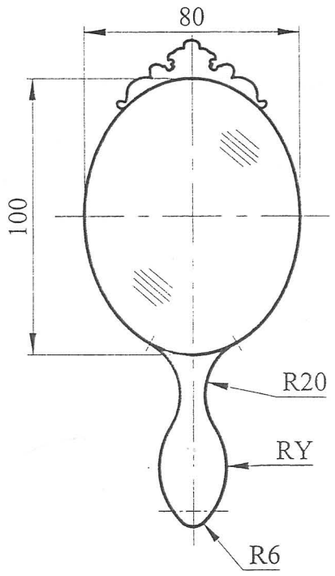
Question 3.

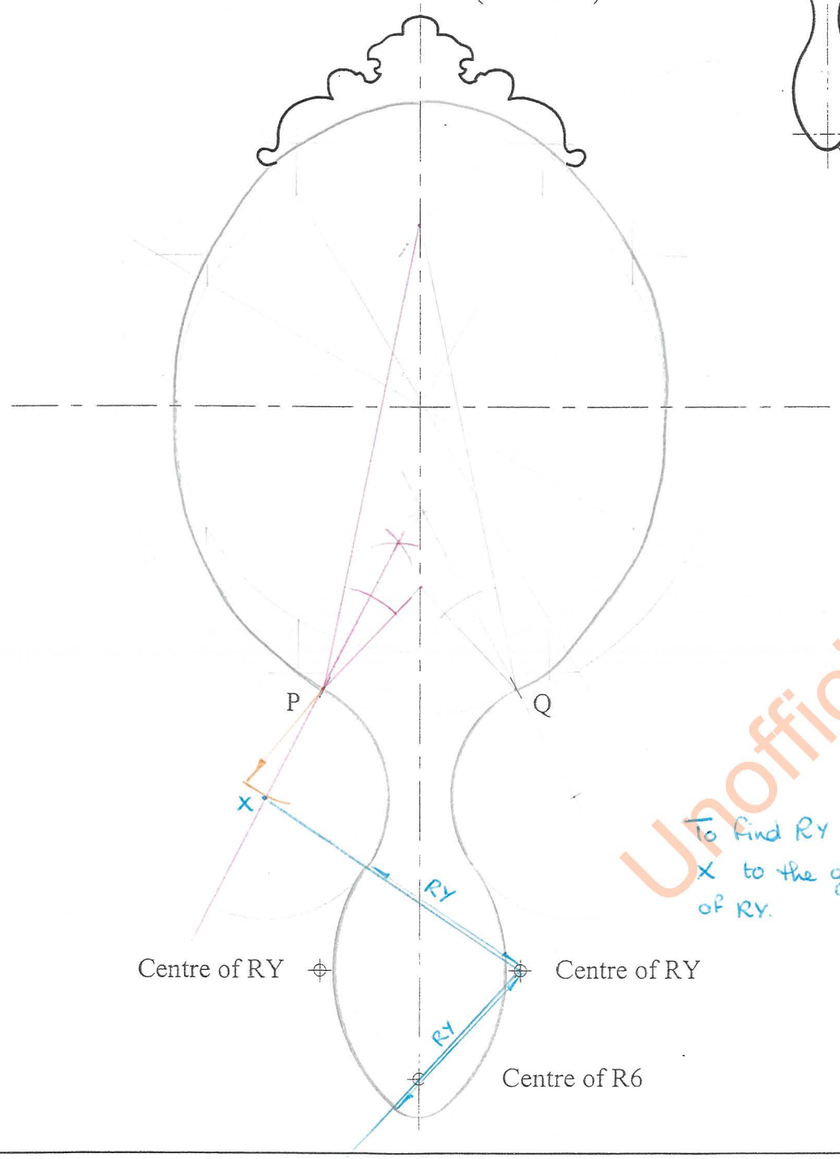
The profile of an elliptical hand-held mirror is given on the right. The ellipse has a major axis of 100mm and a minor axis of 80mm. Using the start lines given below:

a. Construct the ellipse.
b. Locate the focal points of the ellipse.
c. Construct normals at points P and Q to locate the centres of the R20 blending arcs.
d. Using the given centres, complete the handle profile.

Note: Radius RY is to be found by construction.

(14 marks)





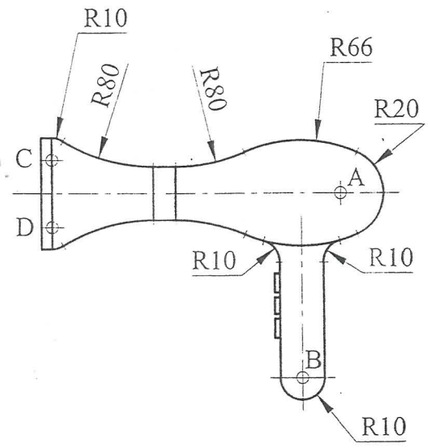
Question 4.

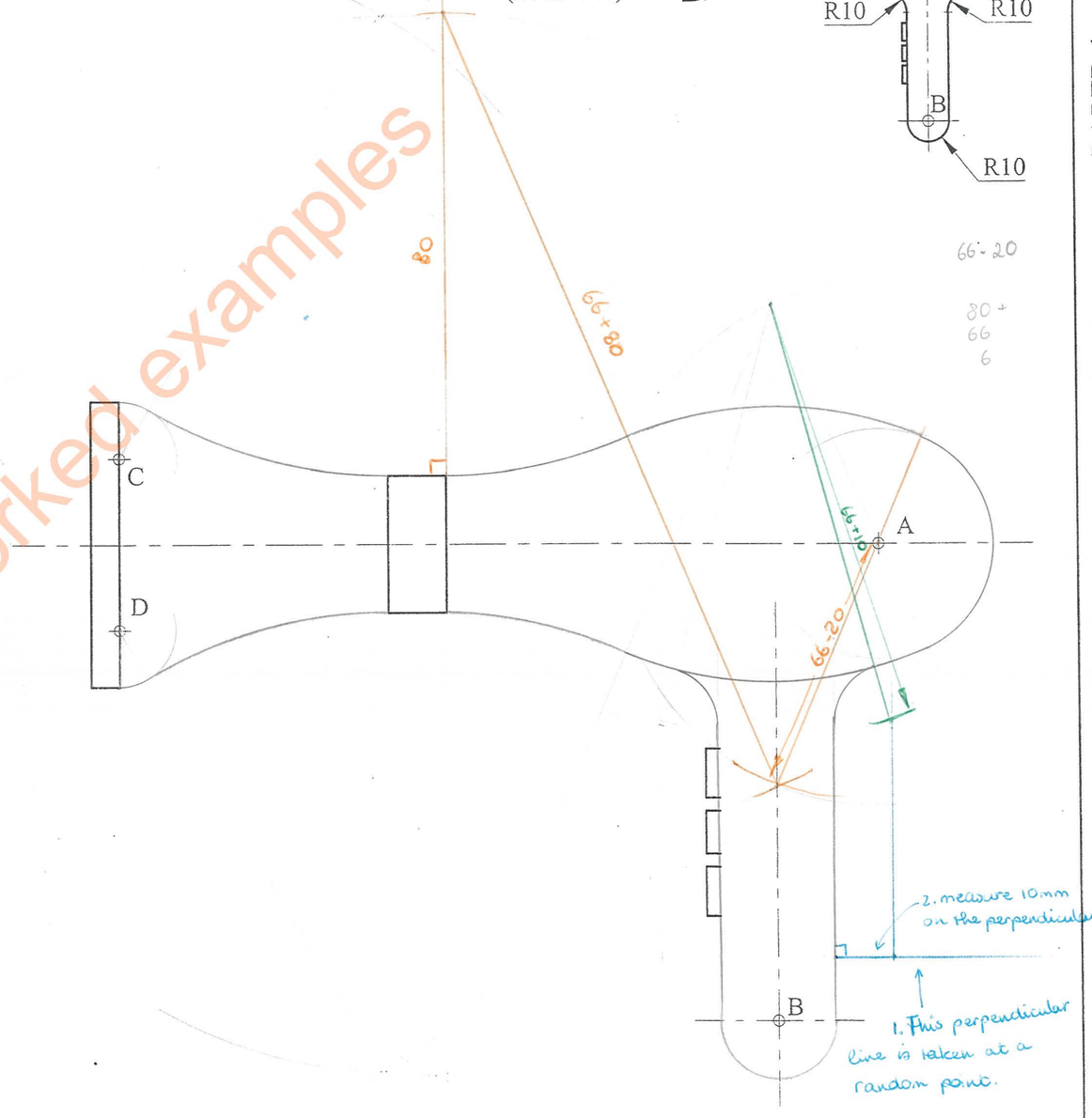
The outline of a hair dryer is composed of straight lines and arcs. On the given start lines construct the profile.

Notes:

- *The centres of arcs A ,B,C and D are given.*
- *The short dashes indicate points of tangencies.*
- *The main body of the dryer is symmetrical.*
- *Show all constructional work.*

(14 marks)





Question 5.

An exploded pictorial view, an end view and a plan of an assembled **Cast Iron Bracket** are given.

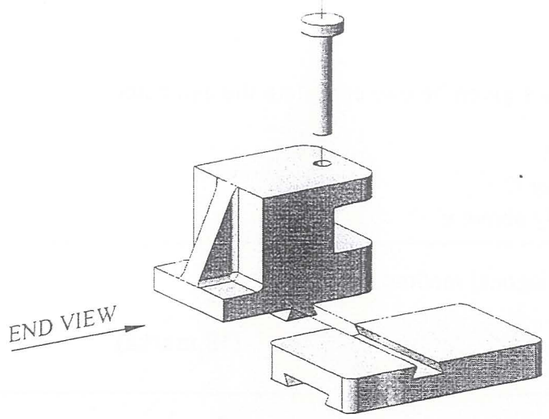
In the space provided:

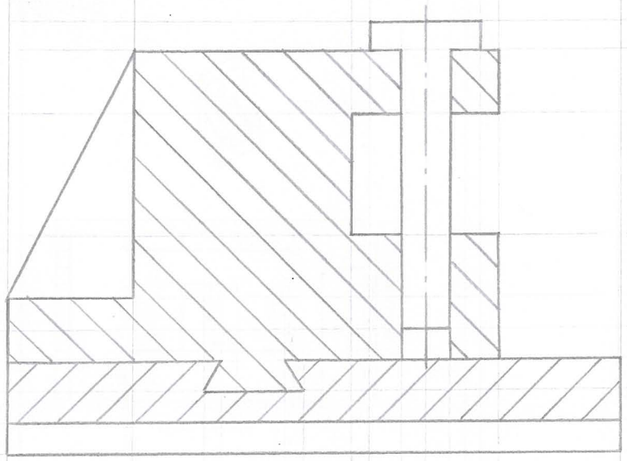
a. project a sectional front elevation on the cutting plane X-X indicated in the end view;

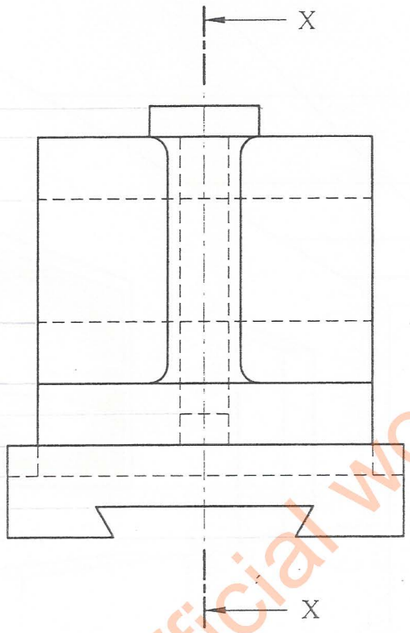
b. draw the symbol of the projection used.

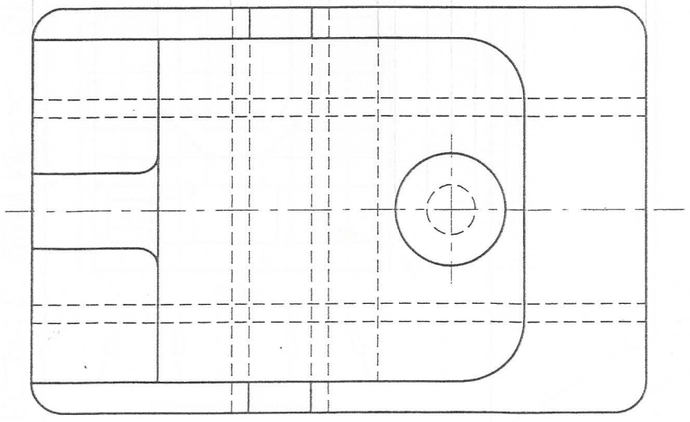
Note: Do not show hidden details.

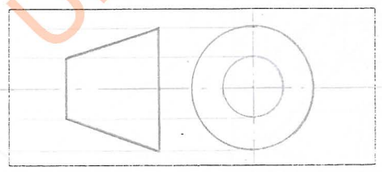
(15 marks)











PROJECTION SYMBOL

Question 6.

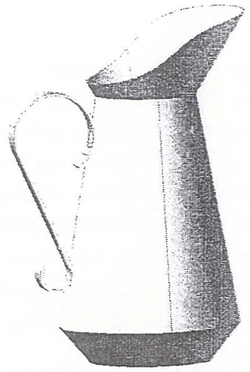
Three right cones are used to make the jug illustrated on the right. A complete front elevation and an incomplete plan of the top cone are given below.

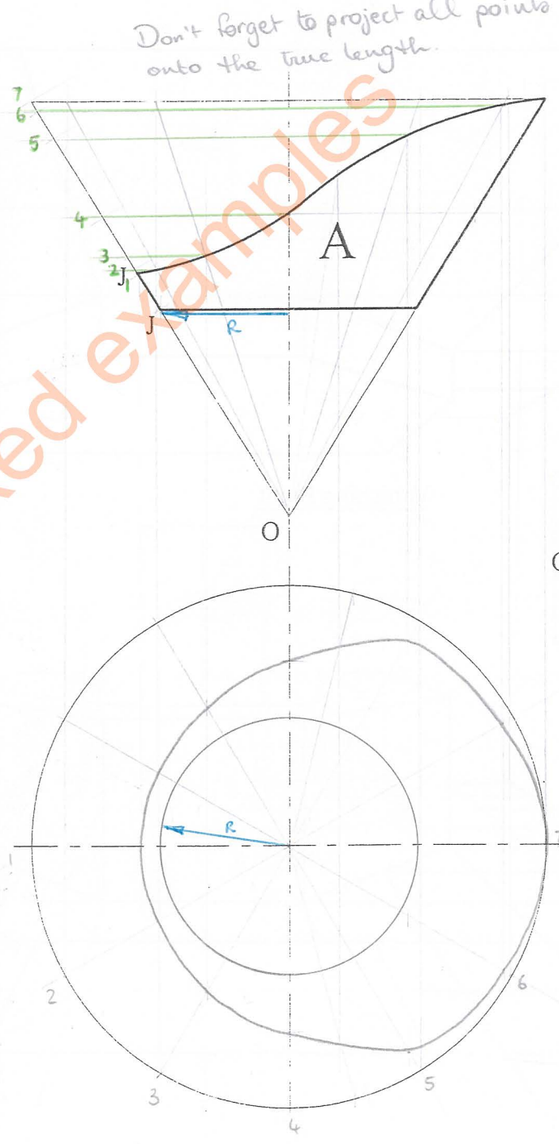
a. Complete the plan.

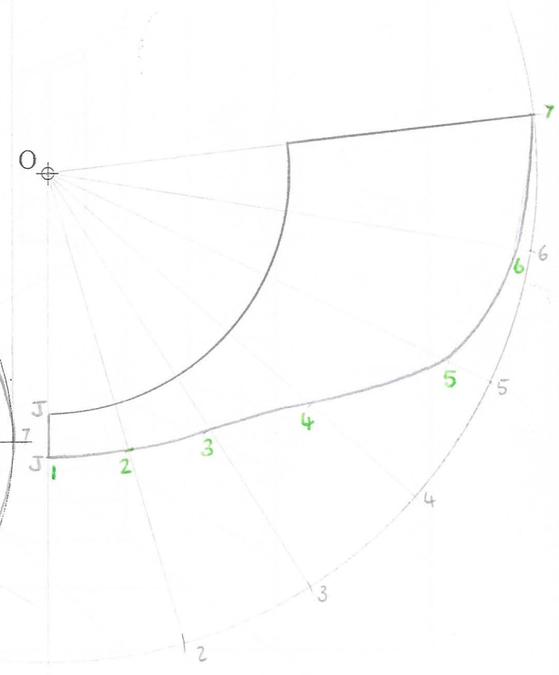
b. Construct a half surface development of the truncated cone marked 'A'.

Note: Place the joint line along JJ.

(15 marks)







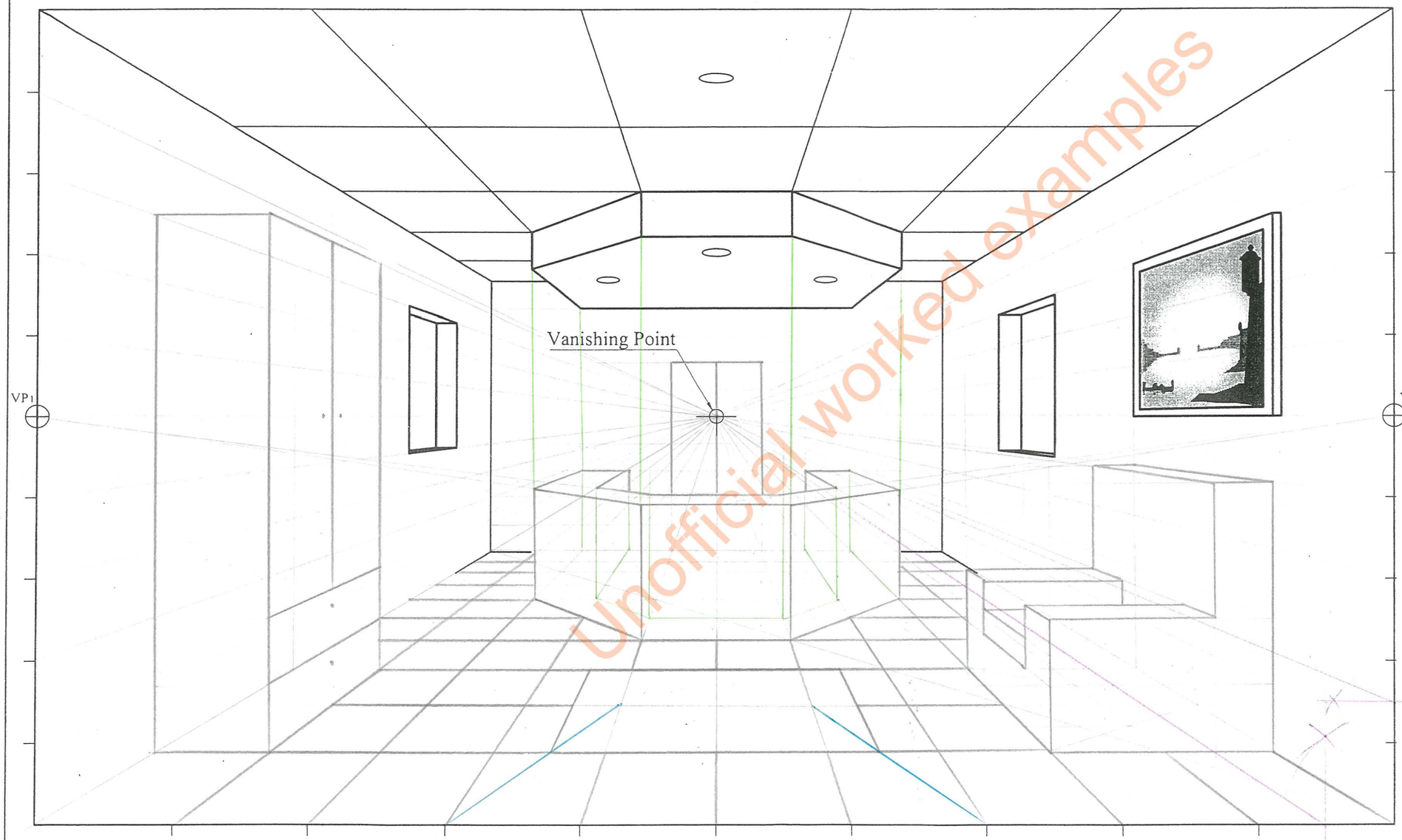
INDEX NUMBER : _____

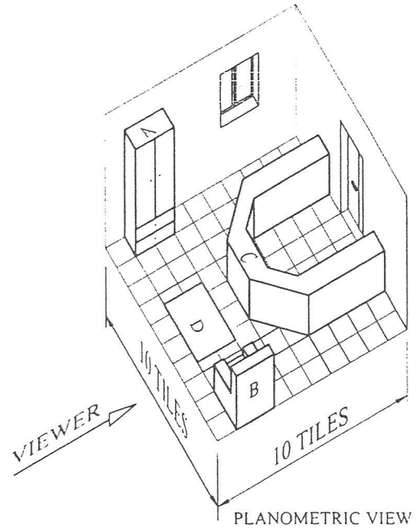
Question 7.

Two orthographic views and a planometric view of a **reception room** are given on the right. On the start lines given below, complete the estimated Single-Point **Perspective** view of the room. The following notes are to be read carefully:

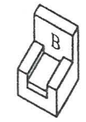
a. The viewing direction is indicated by arrows, the main vanishing point is indicated at the centre of the room.
b. Two additional vanishing points, VP_1 and VP_2 may be used to complete the top angled corners of the counter C.
c. The given drop-down ceiling has equal outside dimensions as the reception counter C and is situated directly above it.
d. The tiles and courses are marked on the picture plane.
e. The corners of the wall opposite the viewer are given. The tiled floor is to be constructed by means of the diagonal method.
f. The measurements, the locations of the furniture and the carpet are indicated in the given views.
g. Leave all construction lines visible.

(18 marks)

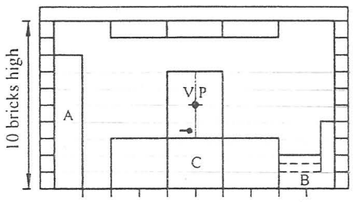




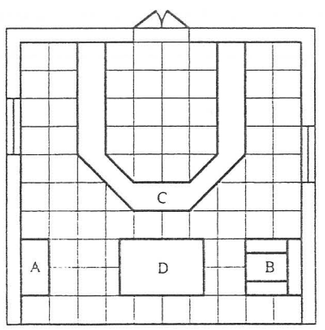
PLANOMETRIC VIEW



ARM SOFA



FRONT VIEW



PLAN

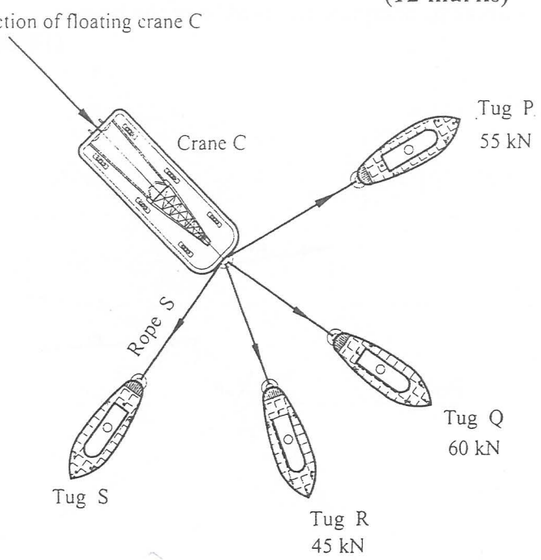
VIEWING DIRECTION

Question 1.

Four tugboats P, Q, R and S are pulling a floating crane C. The pulling directions of the tugboats and the resultant direction of the floating crane are given. The tension in ropes P, Q and R are also given.

a. To a scale of 1mm representing 1 kN, construct a force diagram.
b. Determine the tension in rope S attached to tugboat S and the resultant pull on the barge.
c. Tugboat S leaves the scene and tugboat R changes its pull and direction to maintain the same direction and resultant pull on the crane. Using the same force diagram, find the force and direction that tugboat R should pull.

(12 marks)



b. Pull exerted by tugboat S = 47 kN

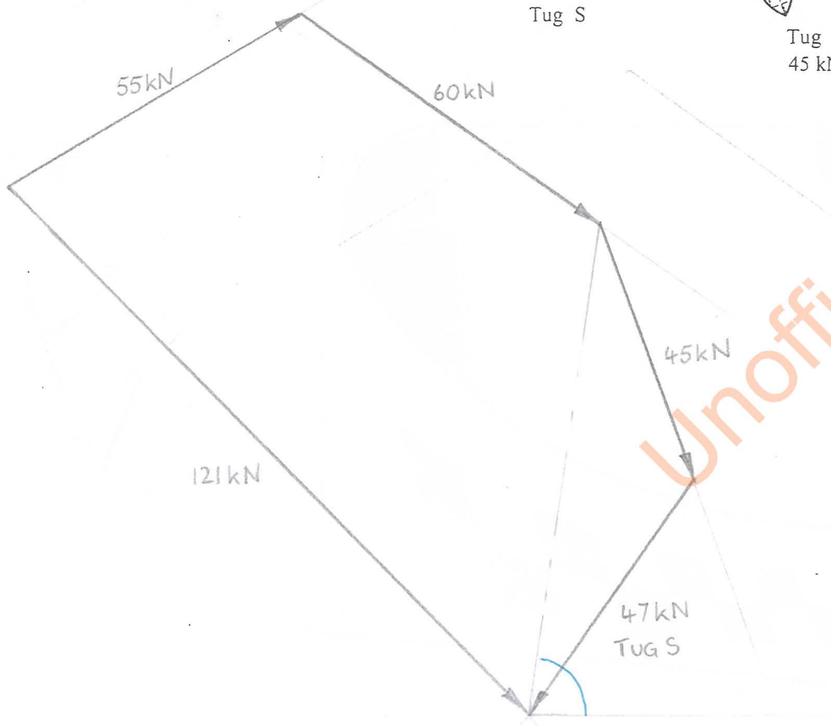
Resultant pull on crane 121 kN

c. Pull exerted by tugboat R

when tugboat S leaves = 81 kN

New acute angle that tugboat R

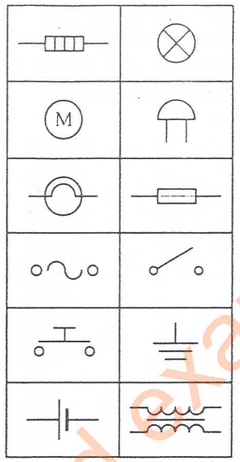
makes with the horizontal = 81 °

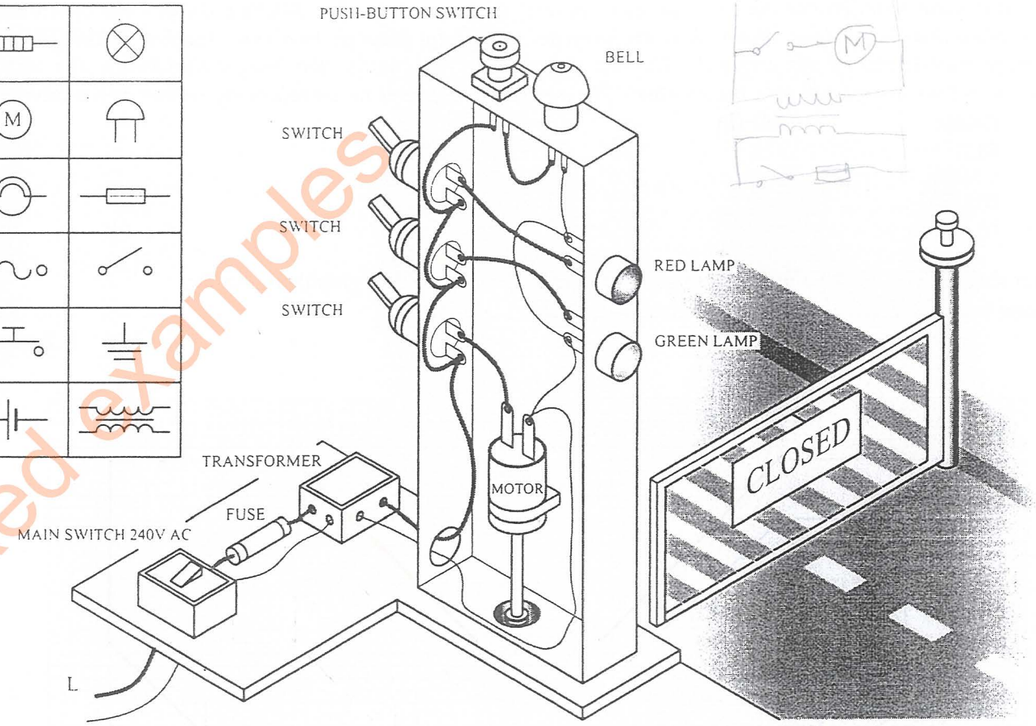


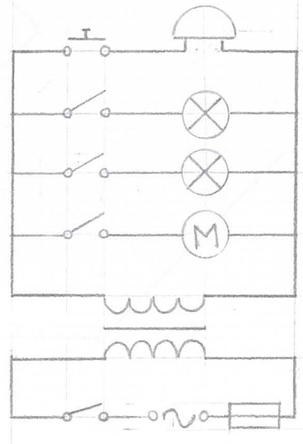
Question 2.

The given drawing shows components assembled together for a model car/train crossroad. The electrical circuit incorporates two lamps operated by separate switches, a bell operated by a push-button switch and a motor (to open the gate) operated by a switch. A transformer supplies low voltage to the traffic control circuit. The main switch turns on and off the power supply.
With the aid of instruments and drawing aids, draw a schematic circuit diagram incorporating electrical symbols from those given below.

(12 marks)







I strongly suggest you read and understand the circuit from the paragraph rather than from the drawing.

Question 3.

The following computer programme is written to create a Logo for a Nature Awareness Organization.

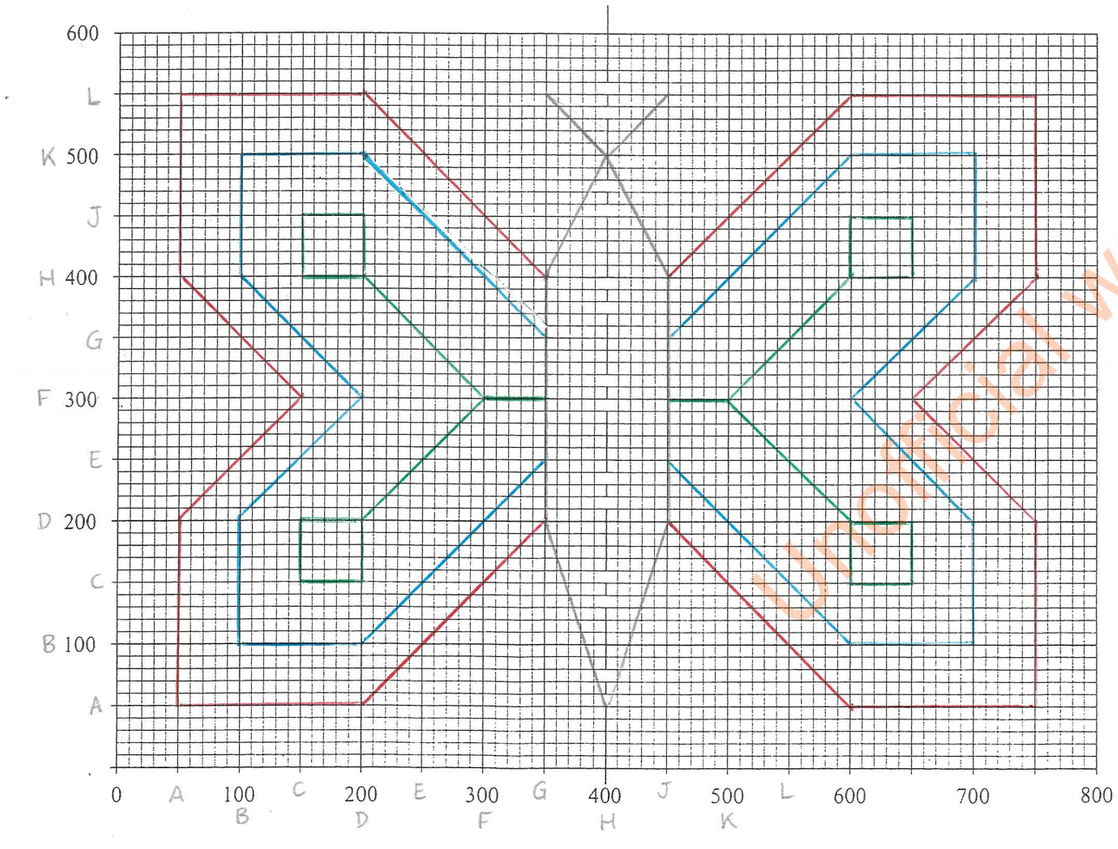
DATA: A = 50; B = 100; C = 150; D = 200; E = 250; F = 300; G = 350; H = 400; J=450; K=500; L=550;
ACI 7: MOVE H,A; DRAW G,D; DRAW G,H; DRAW H,K; DRAW G,L:
ACI 3: MOVE G,F; DRAW F,F; DRAW D,D; DRAW D,C; DRAW C,C; DRAW C,D; DRAW D,D:
ACI 3: MOVE F,F; DRAW D,H; DRAW C,H; DRAW C,J; DRAW D,J; DRAW D,H:
ACI 5: MOVE G,E; DRAW D,B; DRAW B,B; DRAW B,D; DRAW D,F; DRAW B,H; DRAW B,K; DRAW D,K; DRAW G,G:
ACI 1: MOVE G,D; DRAW D,A; DRAW A,A; DRAW A,D; DRAW C,F; DRAW A,H; DRAW A,L; DRAW D,L; DRAW G,H:
MIRROR the plotted design, using the vertical centre line as the mirror line (line of symmetry).

*The **DATA** statement specifies the numeric values (in pixels) of given variables. **MOVE** positions the cursor at a new location without drawing a line. **DRAW** draws a line from a current location to a new location. **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.
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.

(12 marks)

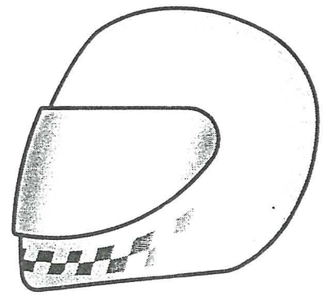


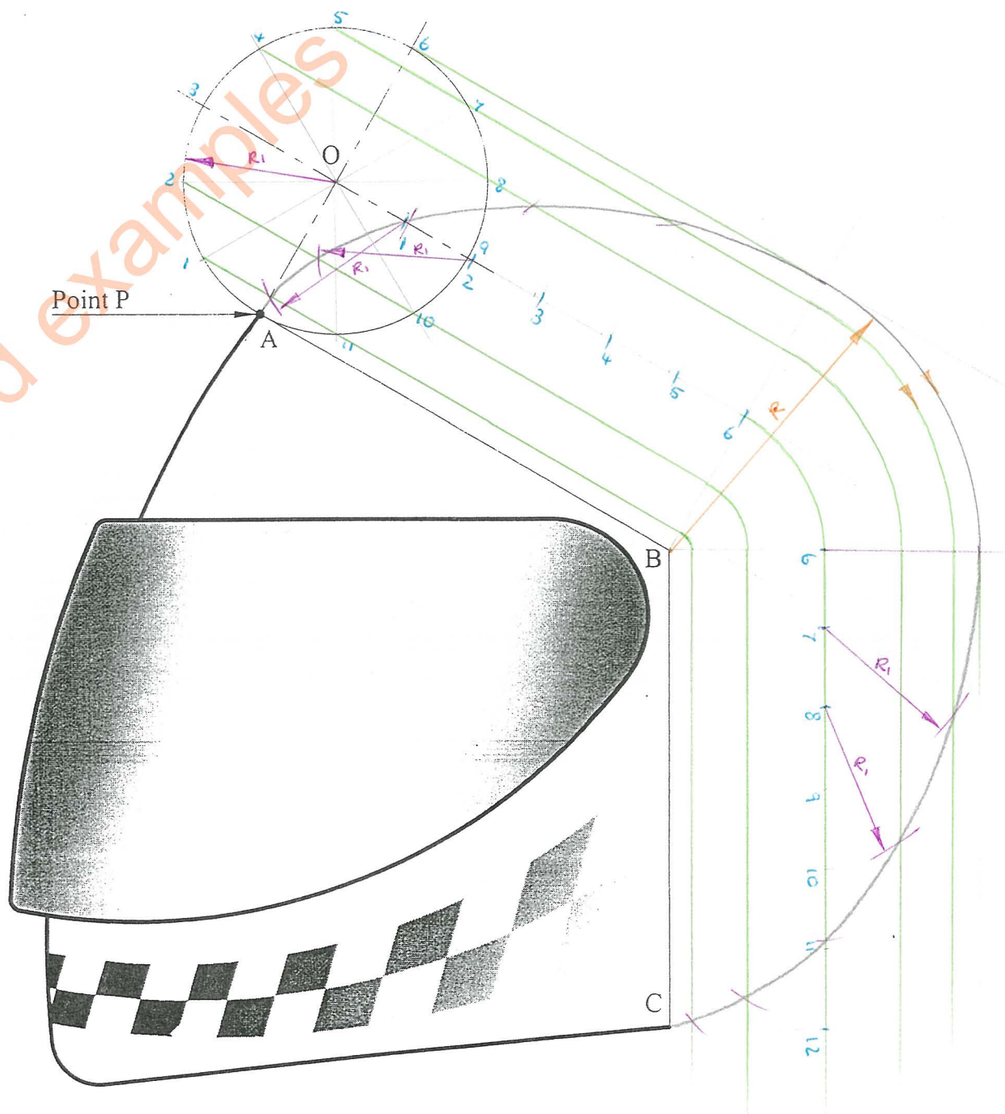
Question 4.

The drawing of a crash helmet is shown on the right. An incomplete helmet is given below. The missing curves consist of two half cycloids and an arc. These curves are to be generated by point P on the circle, centre O, which rolls, without slipping on lines AB for the first half revolution and BC for the second half revolution.

Using the given start lines, construct the necessary curves to complete the profile of the helmet.

(14 marks)





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Question 5.

A survey carried out among 12-16 year old students revealed that an **alarming** 40% of those interviewed do not practice any sport and are inactive during their free time. The remaining students practice the following types of sport: 25% football, 20% cycling, 10% judo and 5% kayaking.

In the space provided below:

a. Draw a 3-D pie chart to show a comparison of the way students spend their free time.
b. Split (to emphasize) the slice of the pie chart that indicates the inactive students.
c. Draw three preparatory sketches to represent the football activity.
d. Draw the final version of the 'football activity' graphic symbol.
e. Complete the legend by drawing a small version of the football graphic symbol (d).
f. Add suitable colour to both pie chart and legend.

(16 marks)

INACTIVE	40%	°		
FOOTBALL	25%	°		
CYCLING	20%	°		
JUDO	10%	°		
KAYAKING	5%	°		

SKETCHES FOOTBALL GRAPHIC SYMBOL LEGEND (KEY)

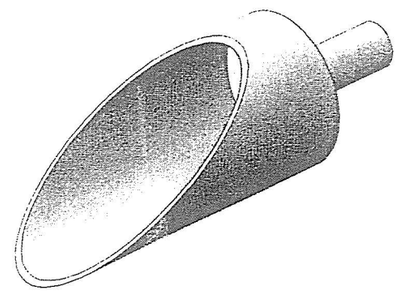
Question 6.

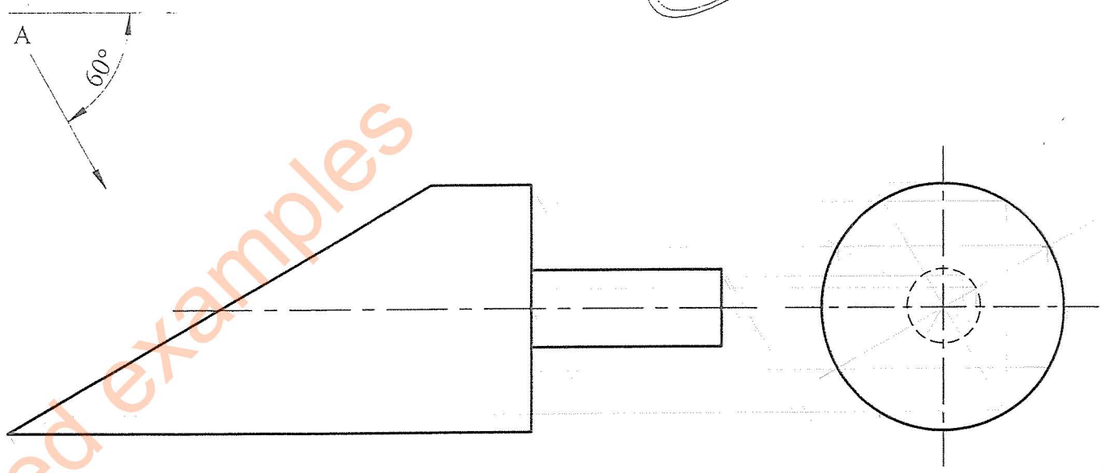
A pictorial view and two orthographic views of a sugar scoop are given.

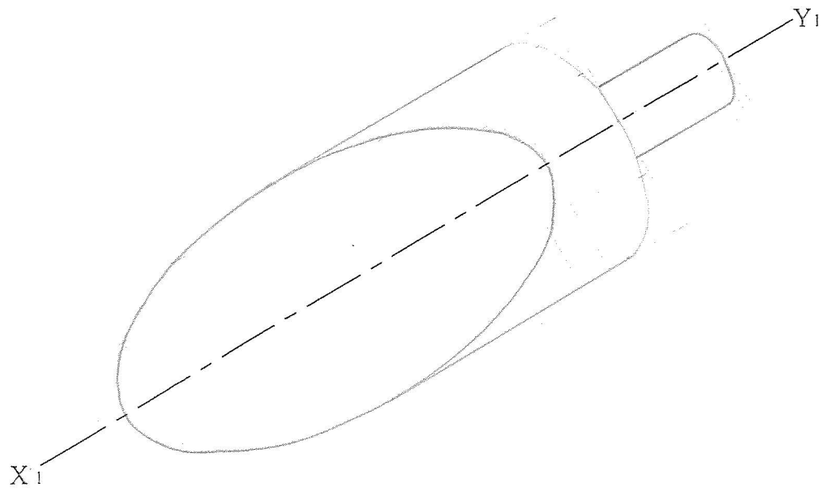
Draw an auxiliary elevation of the scoop by looking on the front elevation in the direction of arrow A.

Hidden detail is not required.

(16 marks)







MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD, UNIVERSITY OF MALTA, MSIDA
GRAPHICAL COMMUNICATION - PAPER 2A (Page 3) - ATTEMPT ALL QUESTIONS - DATE: 12th May 2014. - TIME : 4.00 p.m. to 6.00 p.m.

INDEX NUMBER : _____

Question 7.

The three pictorial views on the right show the main stages of making a wooden toy racing car. A front elevation, an end elevation and an incomplete plan are given below. The body of the car consists of a part octagonal prism which was cut as shown in the pictorial views and in the front elevation.

Using the information given, complete the **plan** showing clearly the constructions used to determine the lines and curves of intersection.

(18 marks)