



SUBJECT:	Engineering Drawing/Graphical Communication
PAPER NUMBER:	I
DATE:	26 th May 2020
TIME:	9:00 a.m. to 12:05 p.m.

Directions to Candidates

Write your index number where indicated at the top of all drawing sheets.

Attempt any **FIVE** questions.

Programmable calculators **cannot** be used.

Unless otherwise stated:

- drawings should conform to B.S. or equivalent (ISO) standards;
- all dimensions are in millimetres;
- all answers are to be accurately drawn with instruments;
- all construction lines must be left in each solution;
- drawing aids may be used.

Dimensions not given should be estimated.

Careful layout and presentation are important.

Marks will be awarded for accuracy, clarity, and appropriateness of constructions.

1. An igloo-shaped doghouse is illustrated in Figure 1a. It consists of a hemisphere with an offset pentagonal doorway.
- Use the dimensions given in Figure 1b to:
- copy the given views; (3)
 - complete the plan showing clearly the resulting curves of intersection; (10)
 - project an end elevation as seen from arrow A. (7)

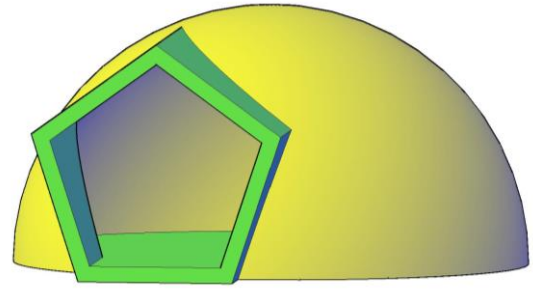


Figure 1a

(Total: 20 marks)

Notes:

- Show hidden details;
- Ignore material thickness.

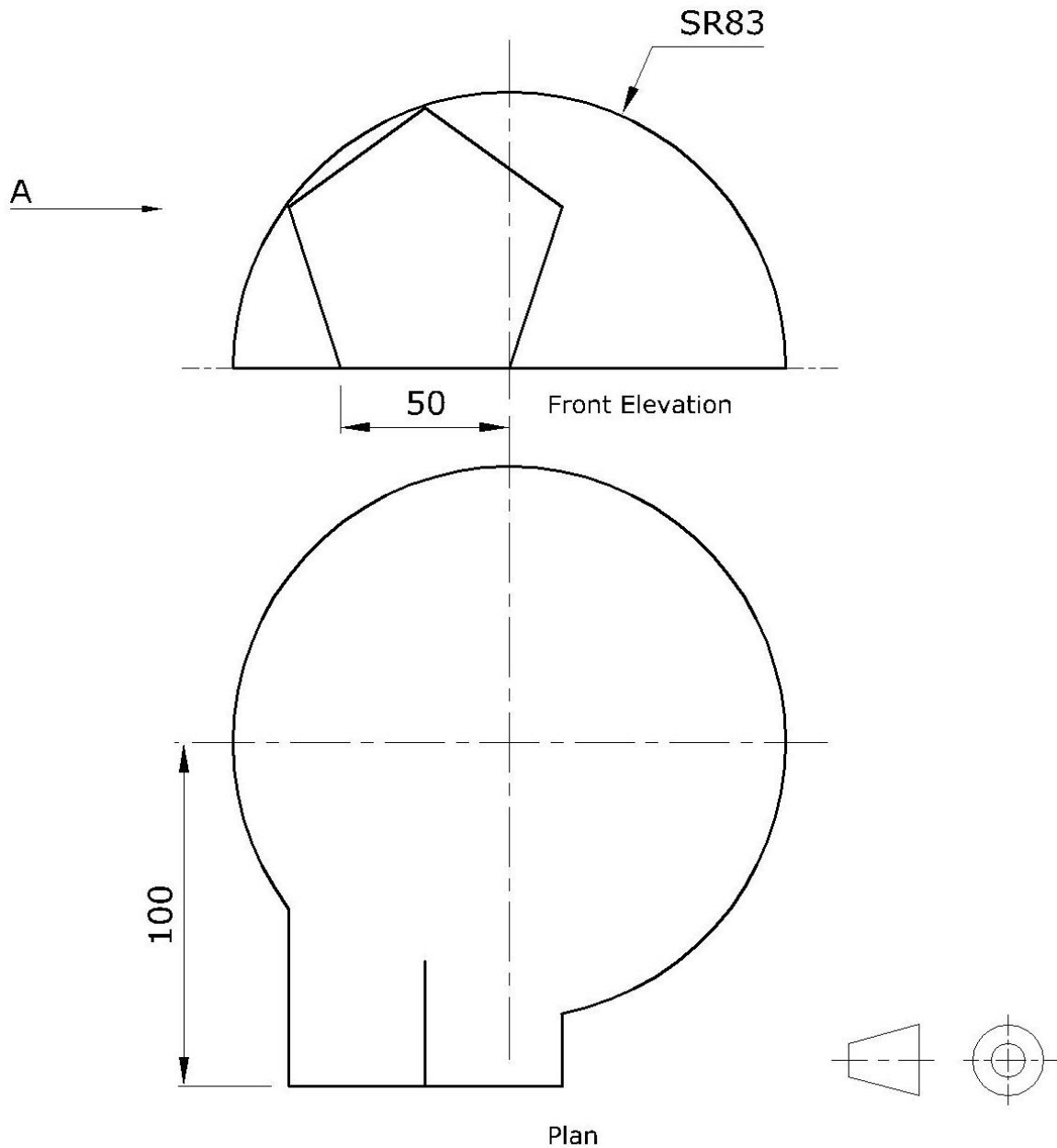


Figure 1b

2. An illustration of an ornamental candle holder is given in Figure 2a. The ornament consists of four items shown in Figure 2b.

- Item 1 is the top of the candle holder.
- Item 2 consists of two $\text{\O}20$ metal tubes twisted to form two left-hand helices.
- Item 3 is a spacer on which the tubes are fitted.
- Item 4 is the base which has its curved profile consisting of a semi superior trochoid. The locus is generated by point P on the generating circle $\text{\O}54$ as the $\text{\O}44$ concentric circle (centre O) rotates, in an anticlockwise direction, without slipping along line A B for half a revolution.

You are requested to use the given dimensions to draw / construct the assembled candle holder as shown in Figure 2a. Note that you are requested to construct the right-hand side semi-superior trochoid and reflect the left-hand side.

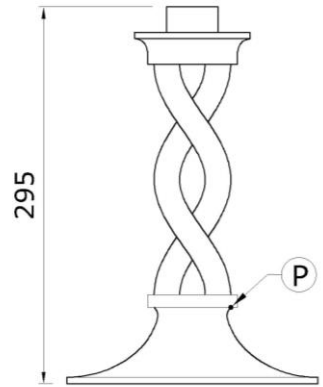


Figure 2a

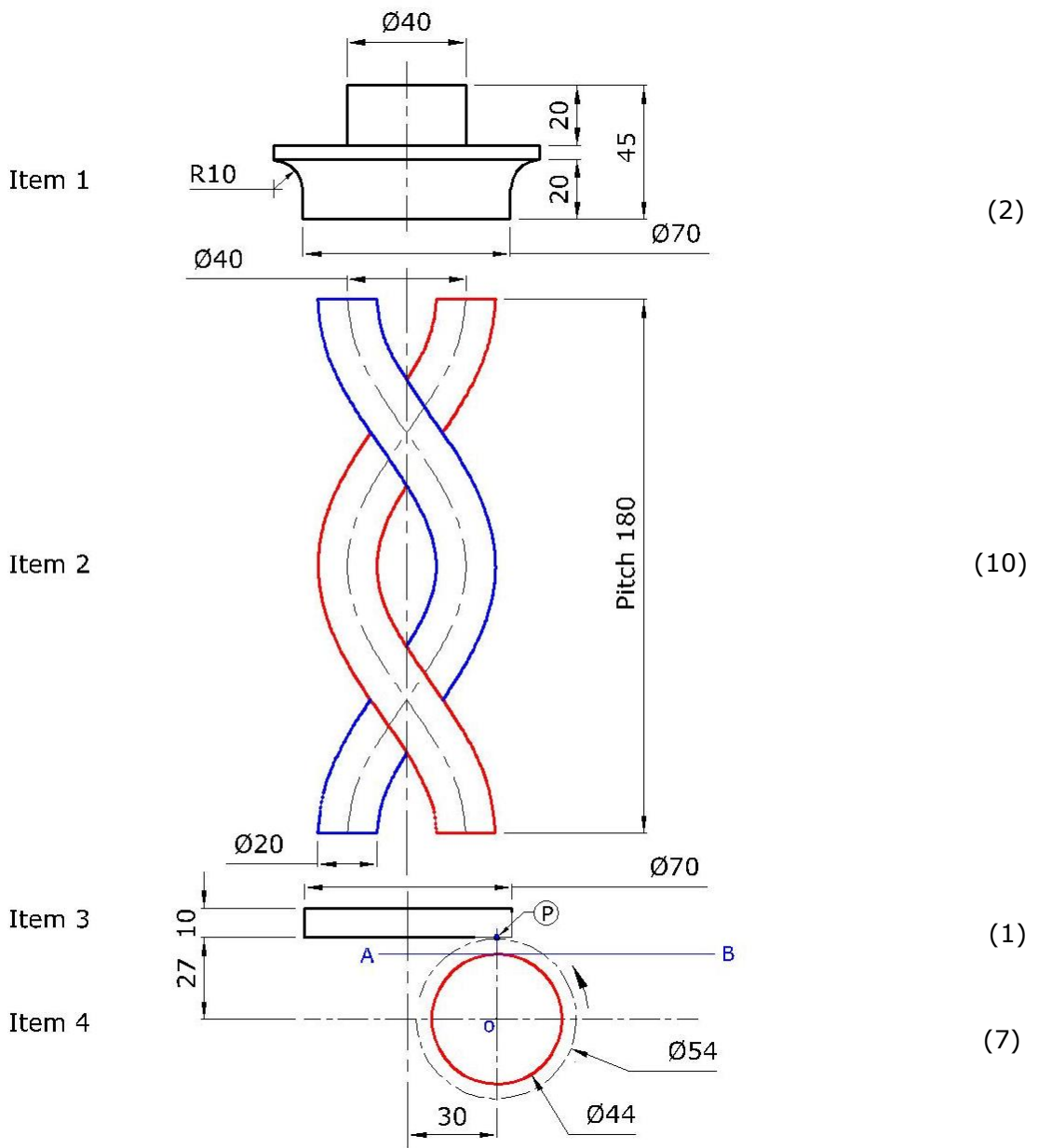


Figure 2b

(Total: 20 marks)

3. An illustration of a bird feeder is shown on the right. The upper part of the feeder consists of two sheet metal hexagonal pyramids. Six identical sheet metal ridge caps are used to join lower pyramid (as indicated in Figure 3a). Two orthographic views of one ridge cap are given in Figure 3b. You are required to:
- copy the given views; (2)
 - determine the dihedral angle of the bent sheet metal ridge cap; (12)
 - determine the true shape of the ridge cap before bending. (6)

(Total: 20 marks)

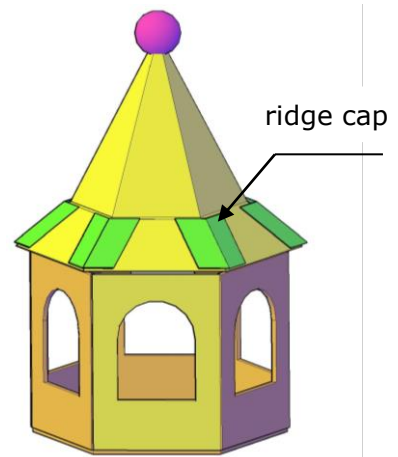


Figure 3a

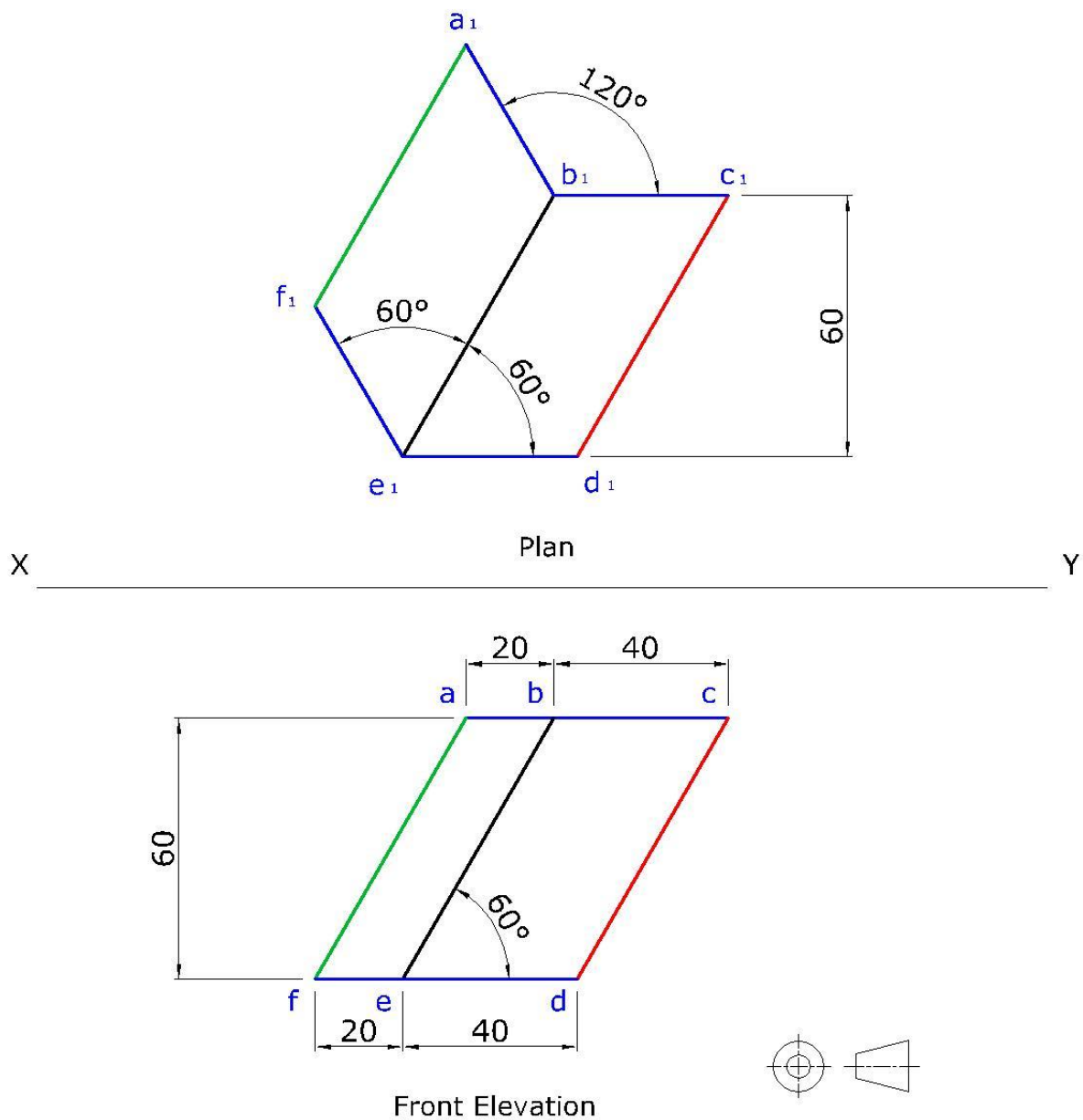


Figure 3b

4. The illustration in Figure 4a shows a transition piece designed to connect a rectangular duct to a cylindrical duct inclined at 30° to the horizontal plane.
 Use the dimensions given in Figure 4b to:
- copy the given views; (4)
 - construct the necessary true lengths; (4)
 - construct the full surface development. (12)

Note: Take X-X as the seam line.

(Total: 20 marks)

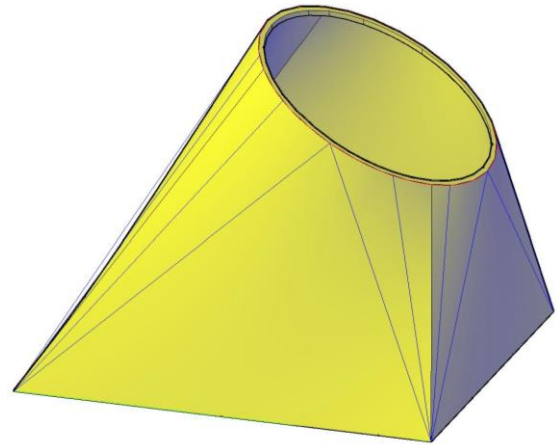
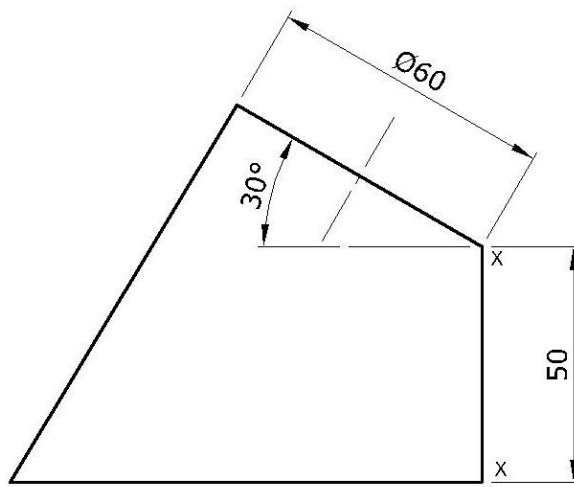


Figure 4a



Front Elevation

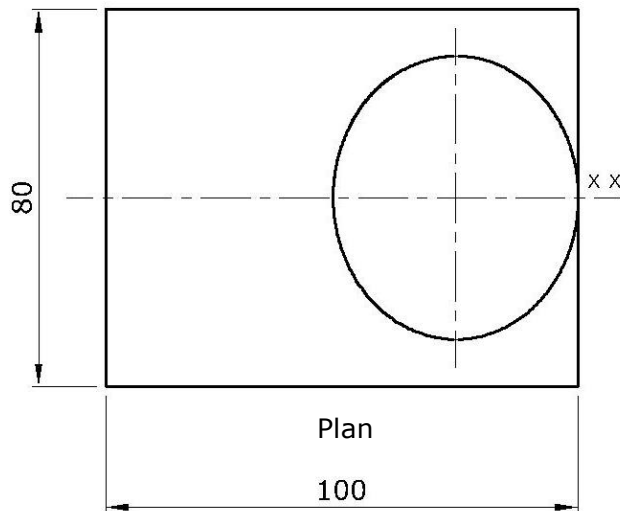


Figure 4b

5. A trophy consists of an inverted octagonal pyramid, partly inserted in a square, chamfered base. The trophy is cut by an oblique plane VTH to complete the final design, as shown in Figure 5a.

You are requested to:

- a. copy faintly the given views; (4)
- b. determine, by projecting an auxiliary view, how the trophy is truncated by the oblique plane; (4)
- c. complete the truncated plan; (4)
- d. complete the truncated front elevation; (4)
- e. project / construct the true shapes of cut of both base and octagonal pyramid. (4)

(Total: 20 marks)

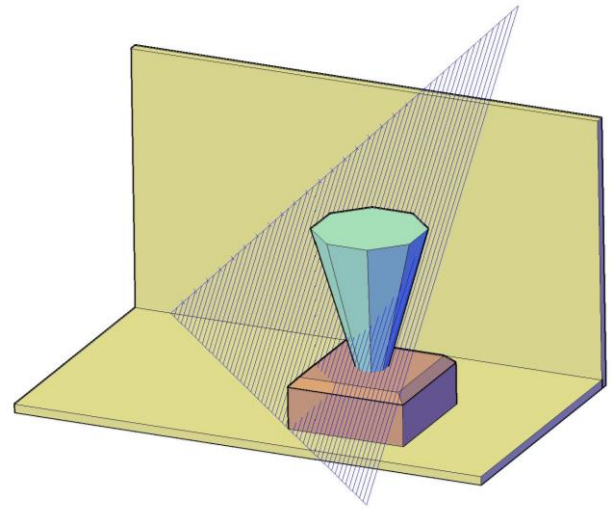


Figure 5a

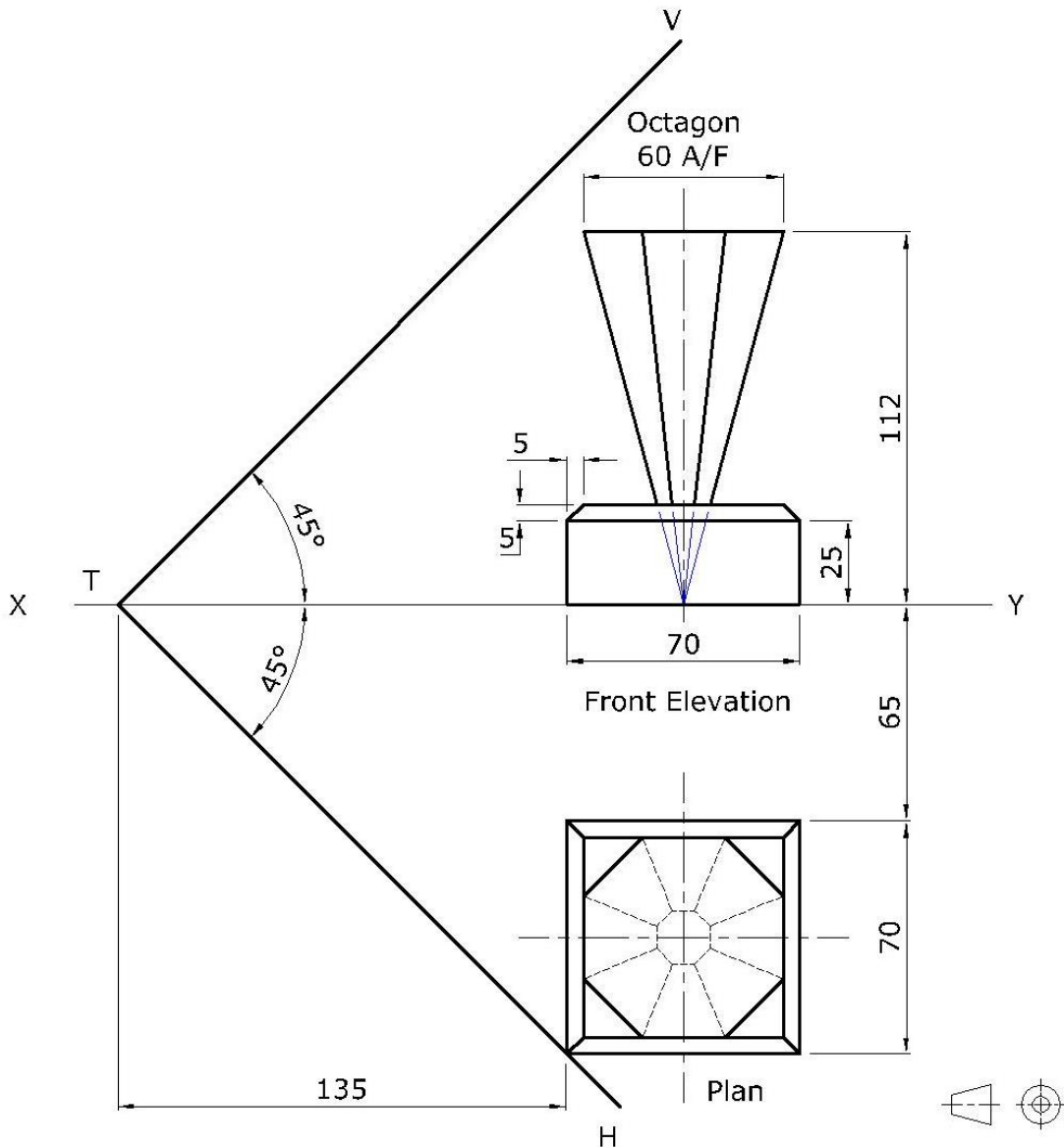


Figure 5b

6. Figure 6 represents the framework of a roof. The framework is supported at both ends, has a span of 3.2 m and is loaded as shown.
- You are required to construct:
 - the space diagram and complete the Bow's notation; (3)
 - the polar diagram, the link polygon and the force diagram; (6)
 - Determine and state the magnitude of the left and right reactions (R_L and R_R). (4)
 - Find, by graphical means, the forces in each member and distinguish between struts and ties. (7)

Notes:

- Use a scale of 50 mm representing 1 m to draw the space diagram.
- Use a scale of 10 mm representing 1 kN to draw the force diagram.
- Neatly tabulate your results.

(Total: 20 marks)

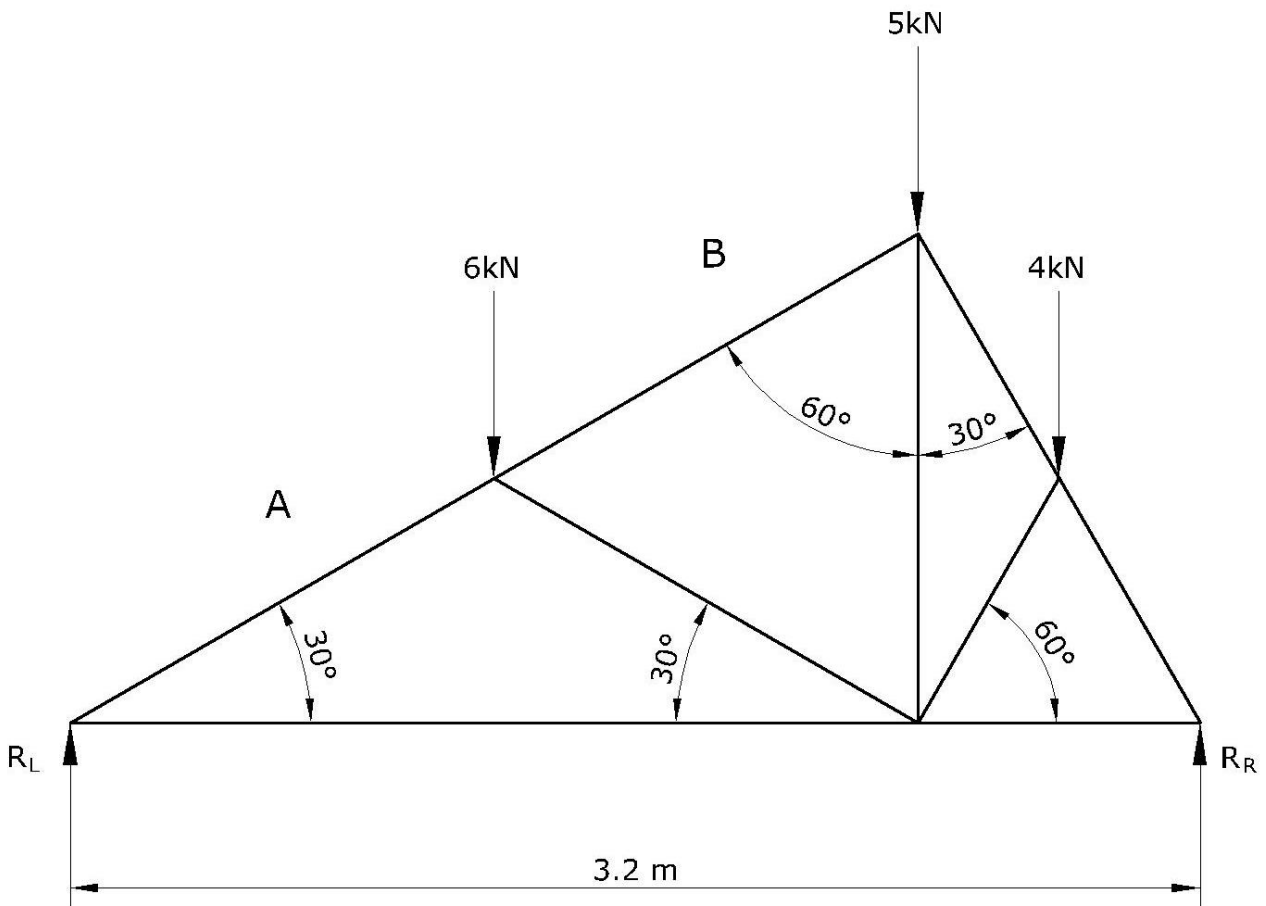


Figure 6



SUBJECT:	Graphical Communication
PAPER NUMBER:	II
DATE:	26 th May 2020
TIME:	4:00 p.m. to 7:05 p.m.

Directions to Candidates

Write your index number where indicated at the top of all drawing sheets.

Attempt **all** questions.

Programmable calculators **cannot** be used.

Unless otherwise stated:

- drawings should conform to B.S. or equivalent (ISO) standards;
- all dimensions are in millimetres;
- answers are to be accurately drawn with instruments;
- all construction lines must be left on each solution;
- drawing aids may be used.

Dimensions not given should be estimated.

Careful layout and presentation are important.

Marks will be awarded for accuracy, clarity and appropriateness of constructions.

Colour/shading should be used where appropriate.

Mark allocations are shown in brackets.

Question 1 carries 34 marks. Questions 2, 3 and 4 carry 22 marks each.

1. A designer has been entrusted with drawing plans for a BBQ area. This designer has submitted three orthographic views of the proposed area as shown in Figure 1a. The proposed area consists of a fixed metal BBQ oven, a utility room, a bordered area with soil, some plants, and a palm tree.

The presented orthographic views detail the proportions of each item listed and how these are to be set within the available area. Details of the utility room and BBQ oven are given in Figure 1b.

Use this information to construct a two-point estimated perspective drawing of the entire area to help the owners of the property visualise the drawing plans in 3D. The viewing direction required is indicated by the arrows in the plan view.

- a. Using **THREE** preliminary sketches, explore alternative positions of the horizon line and identify the one which, in your opinion, best describes the spaciousness of the entire area. (3)
- b. Based on the choice made in part (a), use a suitable scale to produce the required illustration on a single side of an A2 size paper, making the best use of the space available. (26)
- c. Enhance your drawing by colouring small areas of the different items appearing in your illustration. (5)

Notes:

- The BBQ oven is made of metal;
- The utility room is constructed out of limestone;
- The rectangular planter is made from terracotta (reddish-brown) bricks.

(Total: 34 marks)

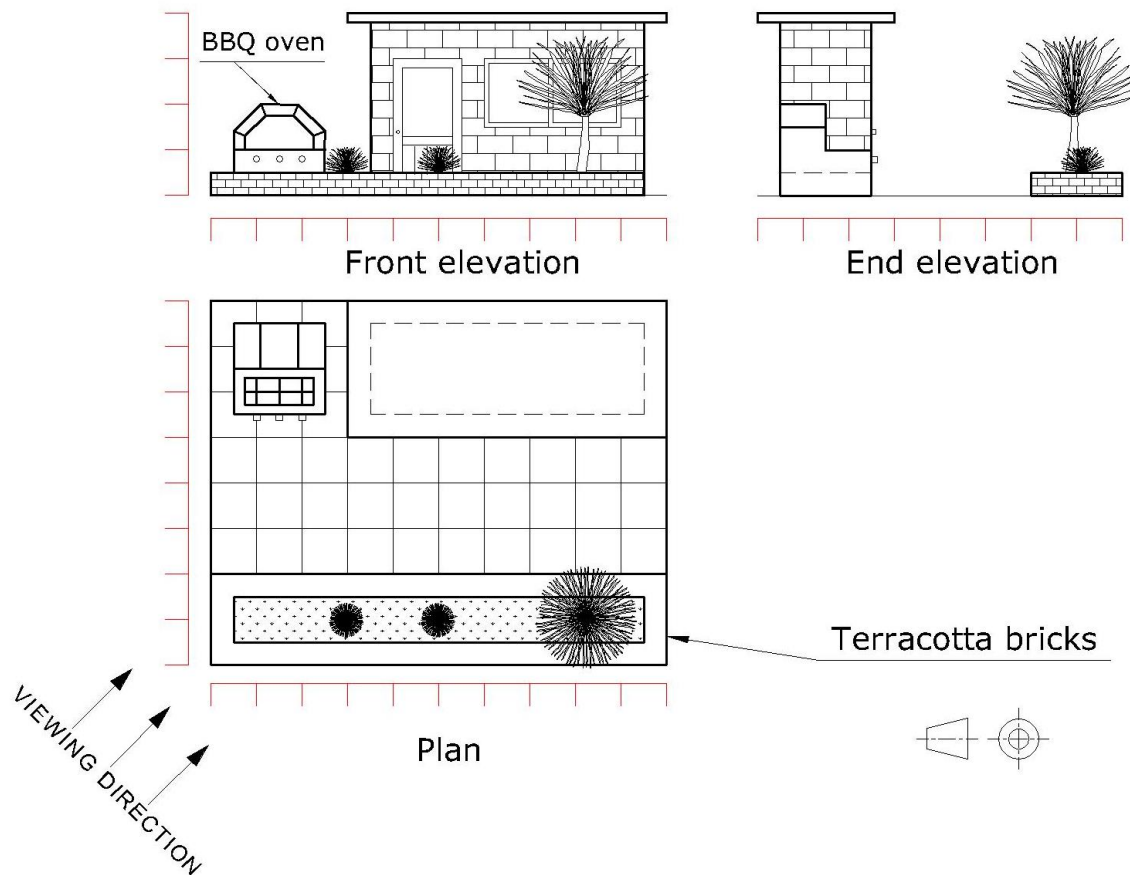
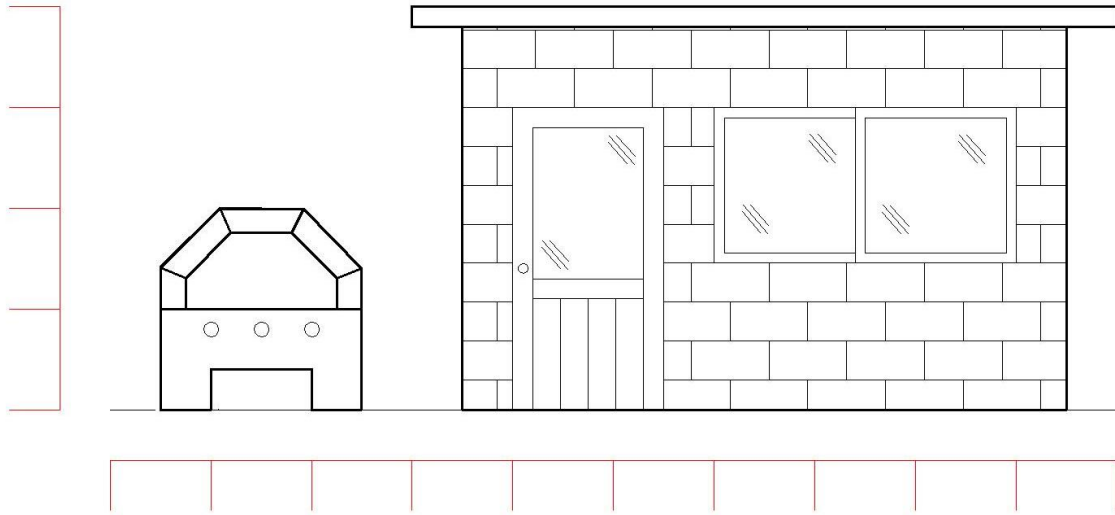


Figure 1a



FRONT ELEVATION

Figure 1b

2. Figure 2 shows four orthographic views of a food blender. The main body of this blender is made of stainless steel while the jug and lid are made of dark translucent glass and durable plastic, respectively.

Both the jug and the lid can be released by an anticlockwise twist. The blender can be operated by rotating the knob on the front in a clockwise direction, increasing its speed while doing so.

You are requested to:

- a) make a well-proportioned freehand isometric drawing of the food blender; (12)
- b) colour and shade your drawing paying attention to the representation of the different materials and textures; (6)
- c) neatly annotate your drawing to indicate the following features:
 - dark translucent jug;
 - durable plastic lid;
 - operation knob;
 - stainless steel body.(2)
- d) draw arrows to illustrate the:
 - release (anticlockwise twist) of both the jug from the body and the lid from the jug;
 - operation (clockwise rotation of knob) of the blender.(2)

(Total: 22 marks)

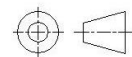
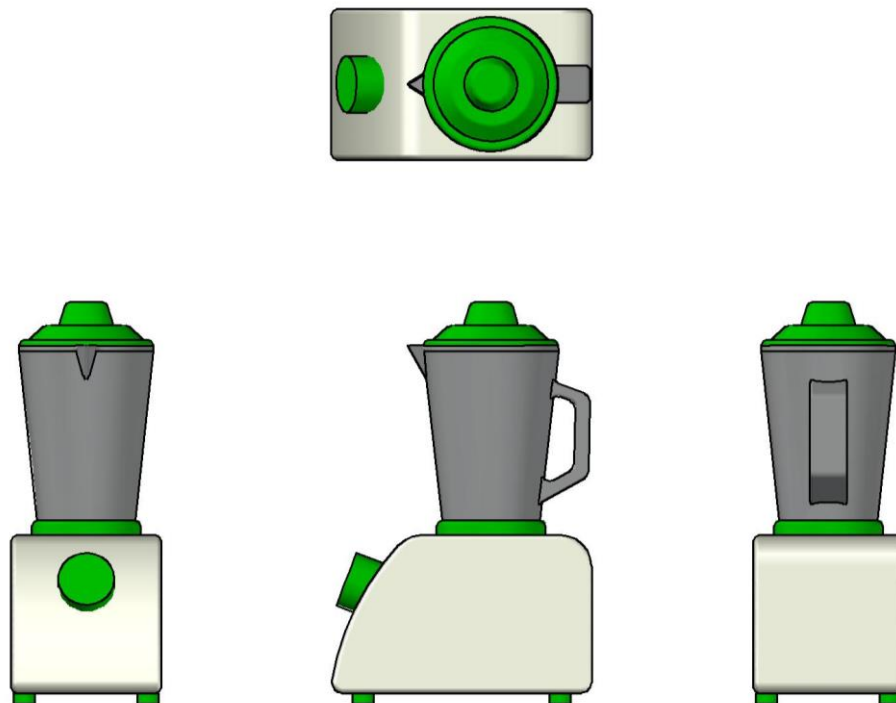


Figure 2

3. A secondary school in Malta conducted a research study about the use of its school library. This study revealed that:

Part A

- Only 45% of students borrow books to read from the library;
- From these, 75% are female students. (6)

This study also mapped, by percentage, the kind of books that are borrowed from the library. These are about:

Part B

- Teen Romance (35%),
- Music (25%),
- Sports (20%),
- Fashion (15%),
- Pets (5%). (6)

The study suggested that the students should be encouraged to read for the reasons listed in the next section.

Part C

BENEFITS OF READING

- Enhanced **knowledge** and **imagination**.
- Improved **vocabulary** and **writing abilities**.
- Improved **memory** and **relaxation**. (6)

You are required to design an infographic poster to illustrate all the above data. The poster should contain text, graphs/charts, and graphic symbols/pictograms. The title of the poster should be **USE OF SCHOOL LIBRARY**. Use suitable typefaces.

Preparatory sketches should be made to help you develop your ideas. It is advisable to divide the poster into sections as shown in Figure 3. (4)

(Total: 22 marks)

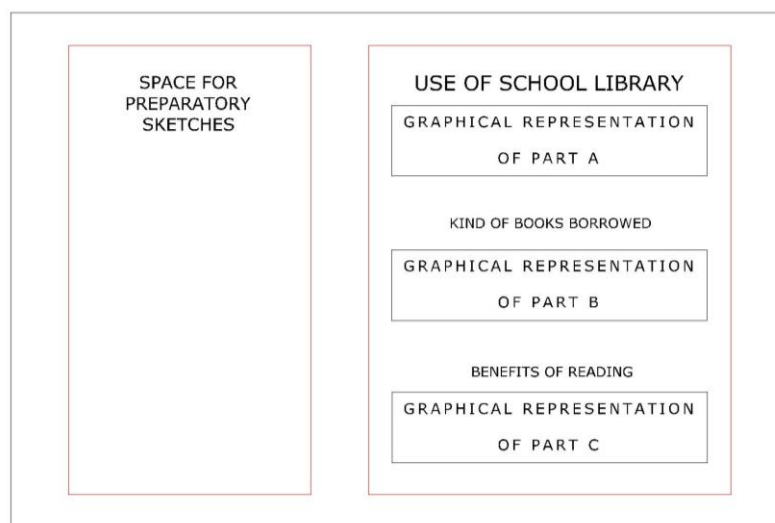


Figure 3

4. A new Barber shop by the name of **Six-21** is opening in town. It will offer services ranging from haircuts to beard shaving and grooming. The owner needs an eye-catching shop sign to place over his shop's entrance. Figure 4a shows a sketch drawn by the owner to give you an idea of where he wants to put his shop sign.

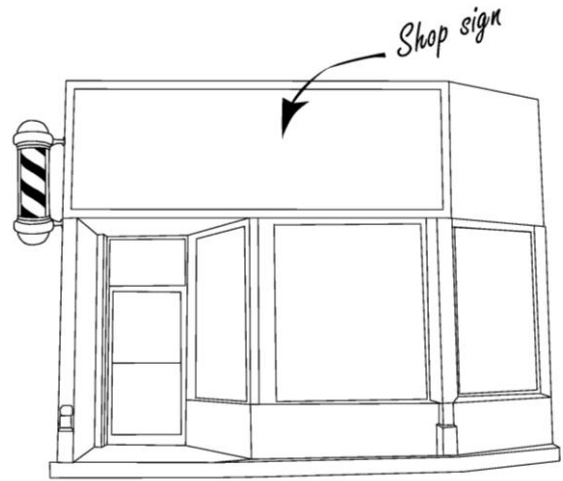


Figure 4a

a. **Written analysis**

Identify, using keywords/short phrases, the main parameters of the design brief. (2)

b. **Graphical analysis**

Based on your response to the written analysis, produce a series of preparatory sketches that illustrate your developing ideas. (4)

c. **Graphical synthesis**

Clearly identify those elements produced in your sketches that you intend to use in your final design. (2)

d. **Final realisation**

Use colour and shading to produce your final realisation in a rectangle as shown in Figure 4b. (14)

Notes:

- Use suitable typefaces for your design;
- Details of the page layout and the shop sign space are also given in Figure 4b.

(Total: 22 marks)

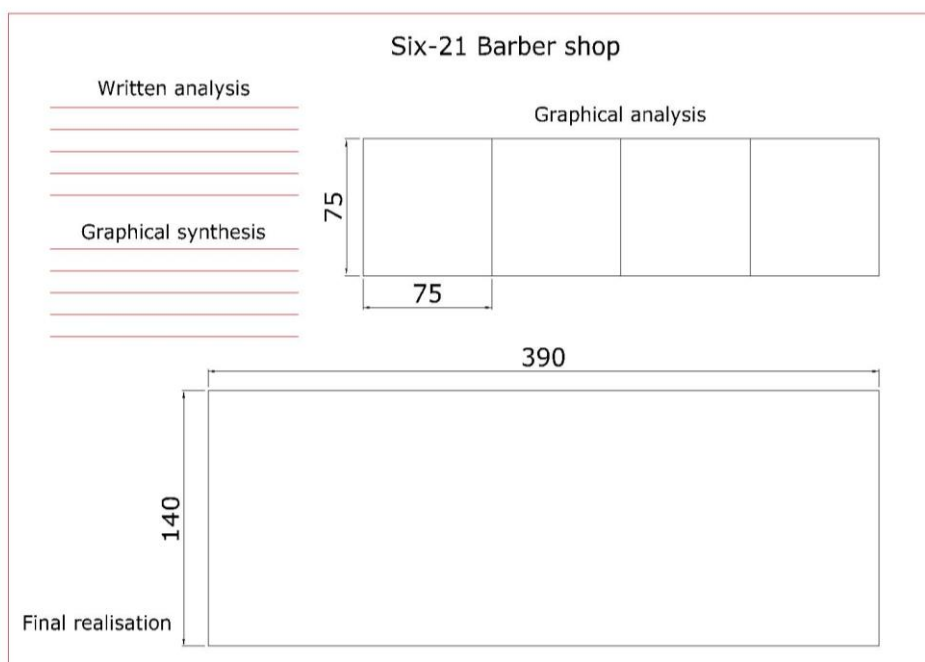


Figure 4b