

29.21 DRAWING AND DESIGN (449)

29.21.1 Drawing and Design Paper 1 (449/1)



SECTION A (40 marks)

*Answer all the questions in this section on the answer sheets provided.*

- 1 (a) Explain why the second angle of projection is not used in orthographic drawing. (1 mark)
- (b) State **two** disadvantages of using tape to hold drawing paper on the drawing board. (1 mark)
- 2 (a) Distinguish between a salary and a wage. (2 marks)
- (b) State:
- (i) the meaning of the term design;
- (ii) **two** factors considered when designing. (2 marks)
- 3 (a) Use sketches to show the difference between a leader line and a projection line. (2 marks)
- (b) Define each of the following properties of materials:
- (i) plasticity;
- (ii) elasticity. (2 marks)
- 4 Sketch to show the following conventions:
- (a)  $\varnothing 10$  c'bore  $\varnothing 15 \times 10$  deep;
- (b)  $\varnothing 10$  s'face  $\varnothing 20$ . (4 marks)

5 Figure 1 shows a component of a pendulum.  
Draw the component.

(4 marks)

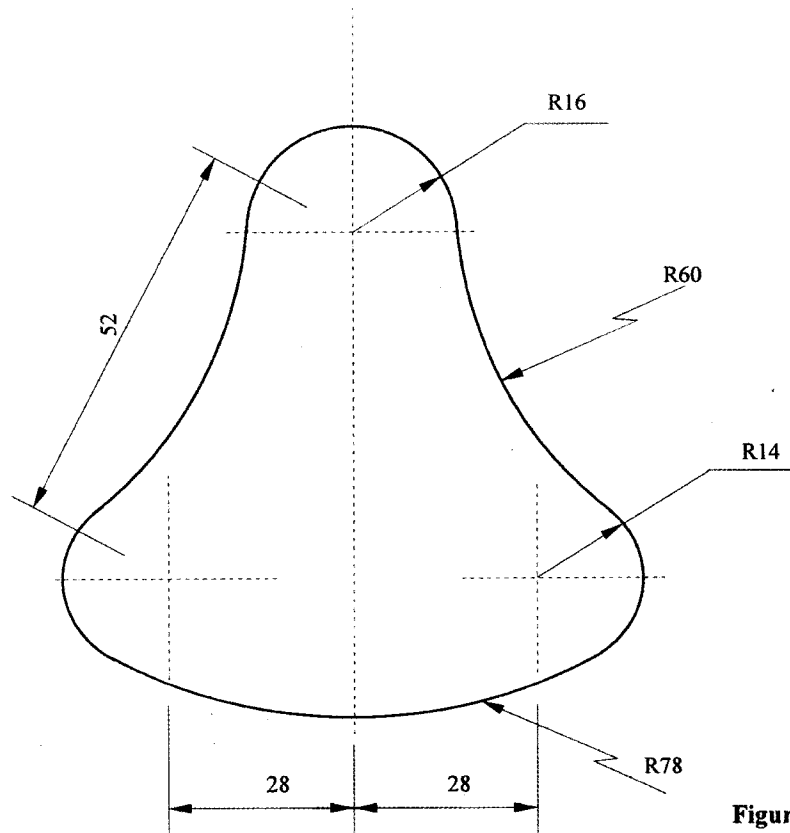


Figure 1

6 (a) Figure 2 shows a diagonal scale of 1:10 to measure to a maximum length of 1.0 m with an accuracy of 0.005 m. Give the following readings:

- (i) A;
- (ii) B;
- (iii) C.

(3 marks)

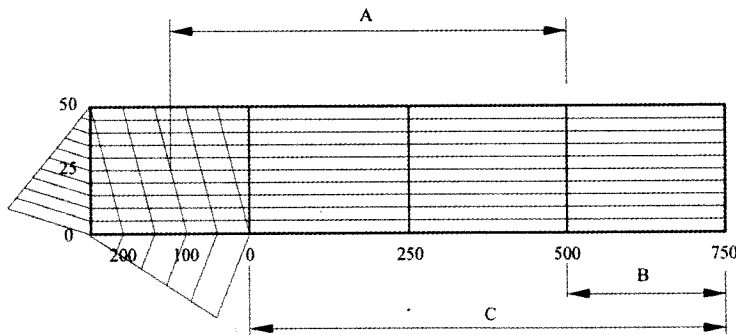


Figure 2

- (b) Figure 3 shows an elevation of part of a hexagonal prism and an incomplete end elevation drawn in first angle projection.

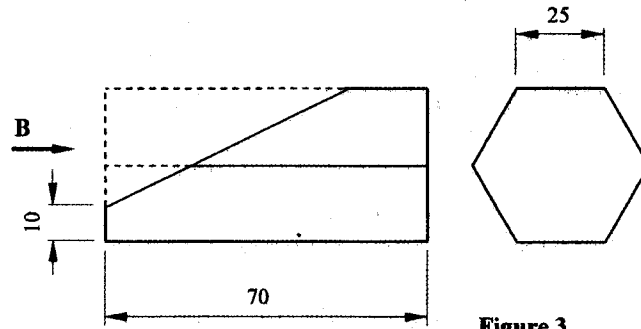


Figure 3

Draw:

- (i) the end elevation in the direction of arrow B;
- (ii) the plan.

(4 marks)

- 7 Figure 4 shows three views of a block drawn in first angle projection.

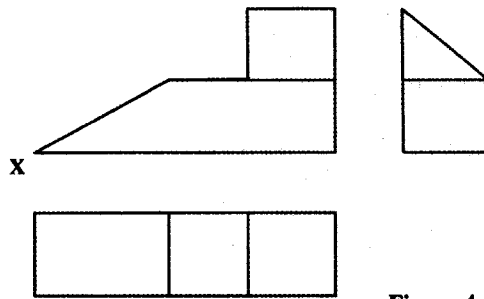


Figure 4

Sketch the isometric view of the block taking X as the lowest point.

(3 marks)

- 8 Figure 5 shows two orthographic views of a block.

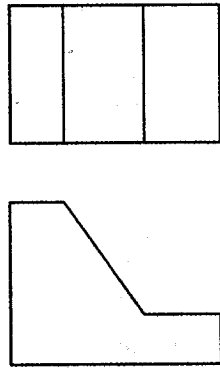


Figure 5

From the two views, sketch the oblique views in:

- (i) cavalier;
  - (ii) cabinet. (3 marks)
- 9 Sketch and show the following features in a one-point perspective drawing:
- (a) picture plane;
  - (b) station point;
  - (c) vanishing point;
  - (d) ground level. (3 marks)
- 10 Figure 6 shows a pictorial view of a block.

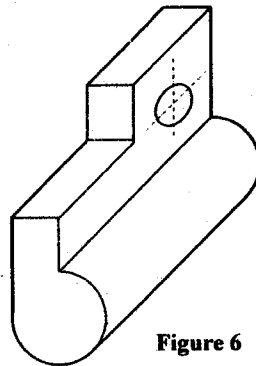


Figure 6

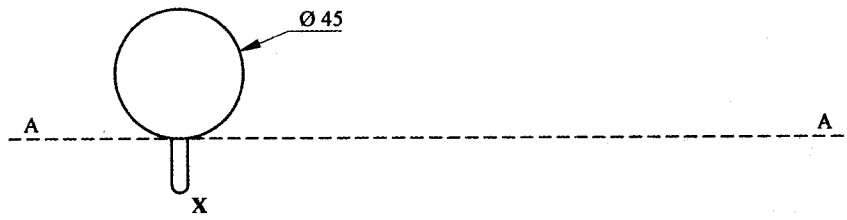
Sketch the three orthographic views of the block in third angle projection. (6 marks)



**SECTION C (30 marks)**

Answer *any two* questions from this section.

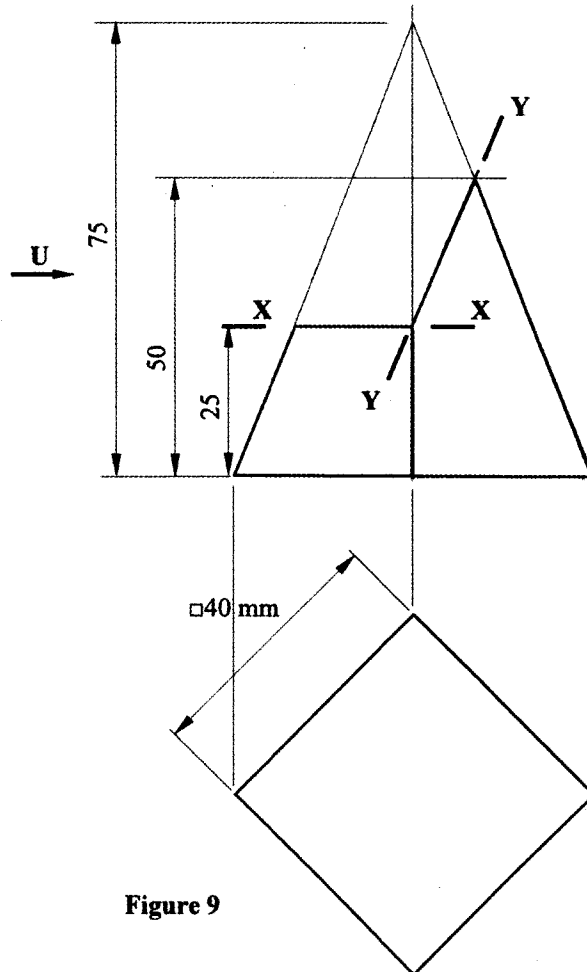
- 12 Figure 8 shows the mouth of a cup having  $\text{Ø } 45 \text{ mm}$  and a handle protruding 10 mm.



**Figure 8**

If the cup is rolled on the surface AA for one complete revolution, construct the locus of point X on the handle. (15 marks)

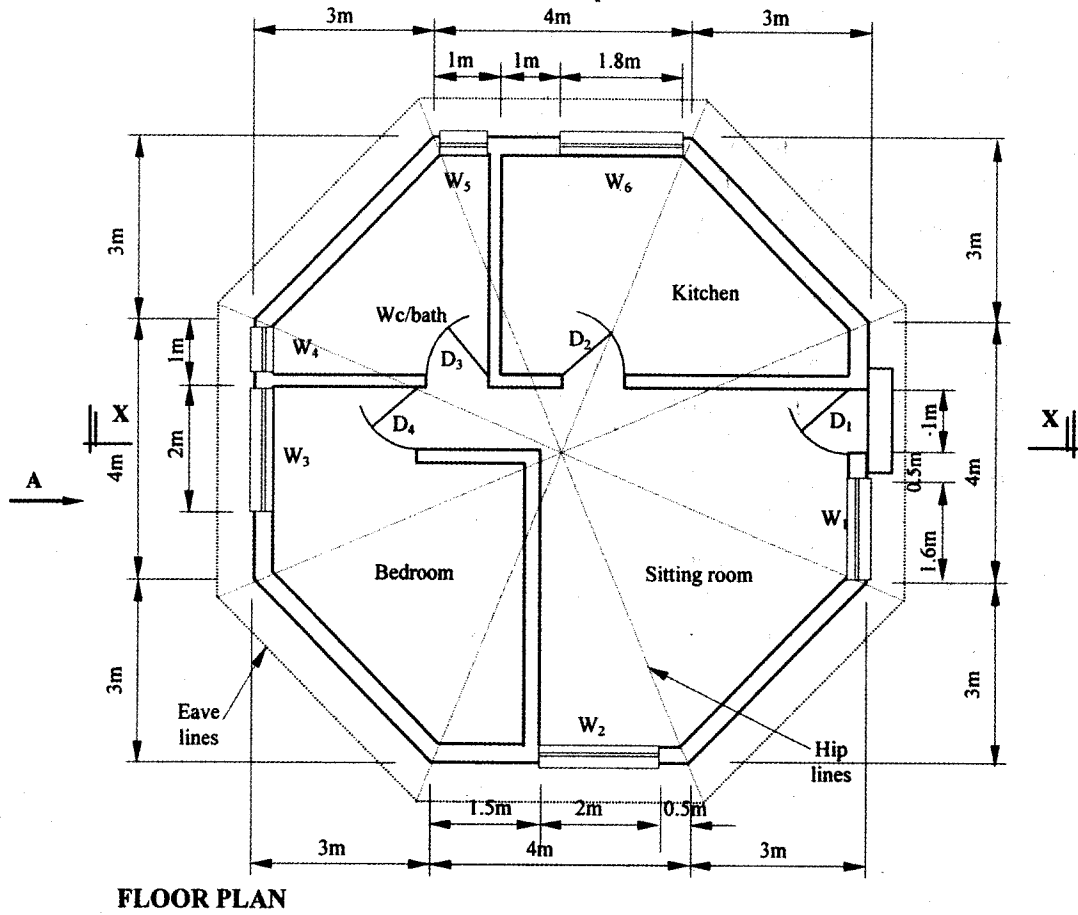
- 13 Figure 9 shows a square pyramid truncated along X-X and Y-Y.



**Figure 9**

Copy the given front elevation, complete the plan and draw the end elevation in the direction of arrow U. (15 marks)

14 Figure 10 shows an octagonal-shaped plan of a tourist cottage.



FLOOR PLAN

Figure 10

Given the following specifications, draw to a scale of 1:10 the following:

- (a) elevation in the direction of arrow A;
- (b) sectional elevation X-X.

(15 marks)

**Specifications:**

**Roof:** octagonal pyramid shaped with 30° pitch  
thatched covering over 50 x 25 battens.

**Walling:** external walls with 200 mm thick blocks  
internal walls with 150 mm thick blocks  
ring beam 400 x 200 concrete.

**Foundation:** concrete strip 600 x 200

**Doors:** D<sub>1</sub> 2100 x 1000 - wooden framed  
D<sub>2</sub>, D<sub>3</sub>, D<sub>4</sub> 2100 x 1000 - flush

**Windows:** W<sub>1</sub> 1800 x 1600 - wooden framed  
W<sub>2</sub> 1800 x 2000 - grazed wooden  
W<sub>3</sub> 1200 x 2000 - grazed wooden  
W<sub>4</sub>, W<sub>5</sub> 750 x 600 - grazed wooden  
W<sub>6</sub> 1000 x 1800 - grazed wooden



## 29.21.2 Drawing and Design Paper 2 (449/2)

### DESIGN PROBLEM (40 marks)

A physically challenged patient with partial walking difficulties requires a device that can assist in walking. The device can also be used as a seat when necessary.

Design the device considering the following:

1. It should be used to assist in walking with ease.
2. It can be used as a seat.
3. It can be adjusted to desired height.
4. It can be folded and stored when not in use.
5. It should have a suitable braking system.

### REQUIREMENTS

- (a) Make freehand sketches of two possible solutions for your design. (6 marks)
- (b) Select one of the designs in (a) above and make a refined labelled pictorial sketch. (14 marks)
- (c) Make detailed sketches of the mechanisms to allow for each of the considerations above. (15 marks)
- (d) List **three** materials used and state one reason for the choice of each. (3 marks)
- (e) State **two** methods of joining the parts and state where each is used. (2 marks)