

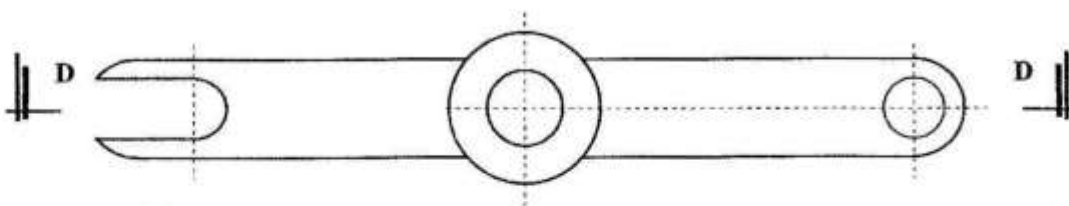
## 4.9 DRAWING AND DESIGN (449)

### 4.9.1 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) State **two** requirements to be observed to avoid confusing the dimension lines with outlines in a drawing. (1 mark)
- (b) Give **two** reasons why care must be taken when storing drawing instruments. (2 marks)
- 2 (a) State what an industrial training centre in Kenya is. (1 mark)
- (b) State **two** factors to consider in order to produce quality drawing. (1 mark)
- 3 (a) State **four** ways through which design ideas are communicated. (2 marks)
- (b) Sketch the convention for each of the following: (2 marks)
- (i) circular tube;
  - (ii) planed timber;
  - (iii) switch;
  - (iv) knurling.
- 4 (a) Give the composition of each of the following alloys: (2 marks)
- (i) brass;
  - (ii) Stainless steel.
- (b) **Figure 1** shows a machine component. (2 marks)



**Figure 1**

Draw the section D-D.

- 5 (a) (i) Explain each of the following scales in relation to the size of the drawing and the actual object.
- (I) 20:1  
 (II) 1:20
- (ii) Give a common example where each of the above scales would be used. (3 marks)
- (b) For the template shown in **Figure 2**.

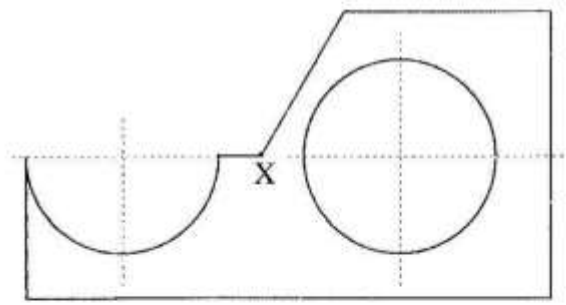


Figure 2

Measure and dimension the following:

- (i) the semi circle;  
 (ii) the angle at point X. (2 marks)

6 Use labelled sketches to differentiate between one-point and two-point perspective drawings. (2 marks)

7 **Figure 3** shows two views of a block drawn in first angle projection.

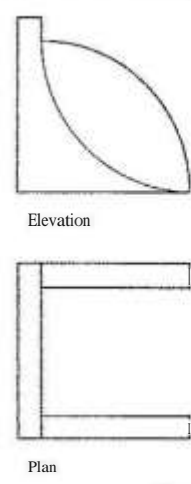
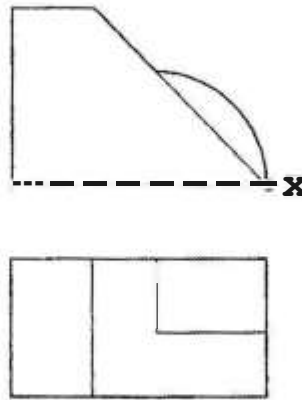


Figure 3

Sketch in good proportion, the oblique view of the block. (3 marks)

8 Construct a triangle whose perimeter is 240 mm and the sides are in the ratios 4.5:6.0:7.5 measure the smallest angle. (4 marks)

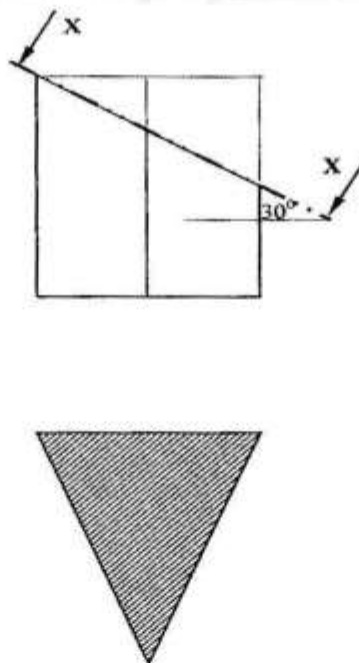
9 (a) **Figure 4** shows two views of a machined bracket drawn in first angle projection.



**Figure 4**

Sketch in good proportion, the isometric view of the block taking **X** as the lowest point. (3 marks)

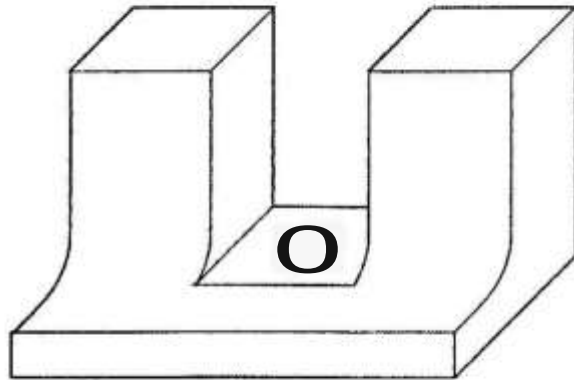
(b) **Figure 5** shows a truncated triangular prism drawn in first angle projection.



**Figure 5**

Draw the end elevation. (4 marks)

- 10 Sketch in third angle projection the three orthographic views of the block shown in **Figure 6**.  
(6 marks)



**Figure 6**

**SECTION B** (30 marks)

*(COMPULSORY)*

*Candidates are advised to spend not more than one hour on this question.*

- 11 **Figure 7** shows part of a coupling bracket drawn in first angle projection.

Assemble the parts and draw FULL SIZE, the following:

- (a) Sectional front elevation along the cutting plane A-A.
- (b) End elevation in the direction of arrow B.  
Do not show the hidden details.

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PART I-BASE

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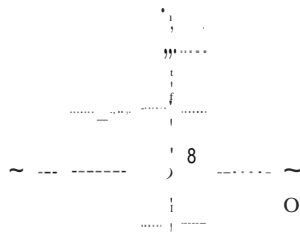
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PART 2-FLANGED COUPLING (2 REQUIRED)

PART 3-SUPPORT BRACKET



PART 4- AXLE

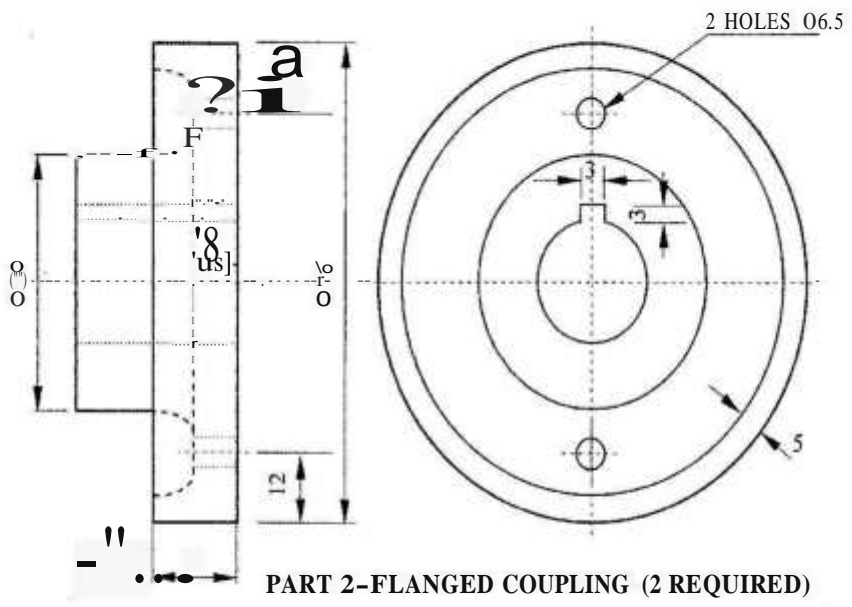
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PART 7-M6 BOLT AND NUT  
22 mm LONG  
(2 REQUIRED)

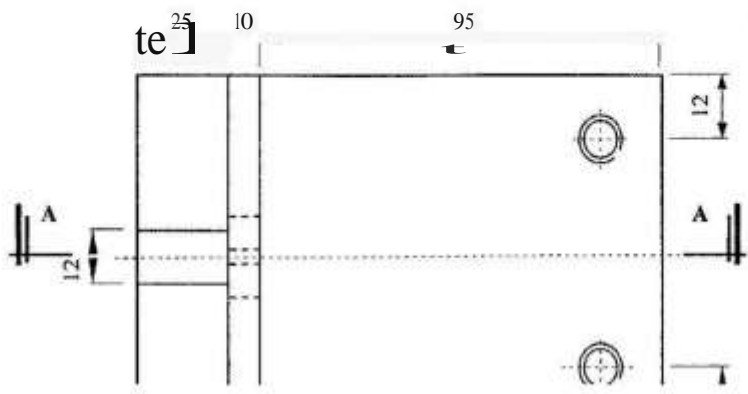
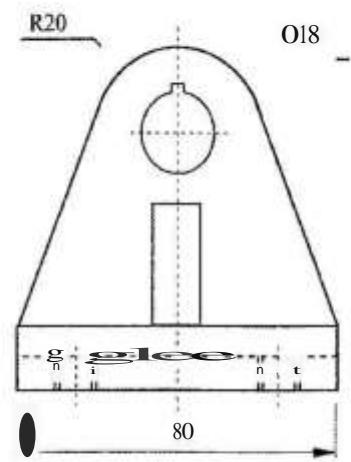
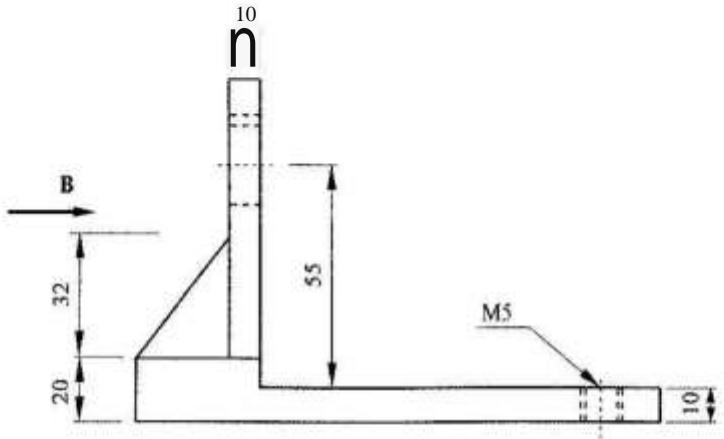
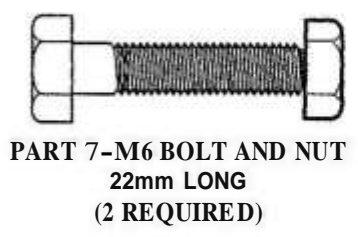
PART 5- KEY

PART 6-M5  
BOLT  
20mm LONG (2  
REQUIRED)

FIGURE 7



**PART 2-FLANGED COUPLING (2 REQUIRED)**

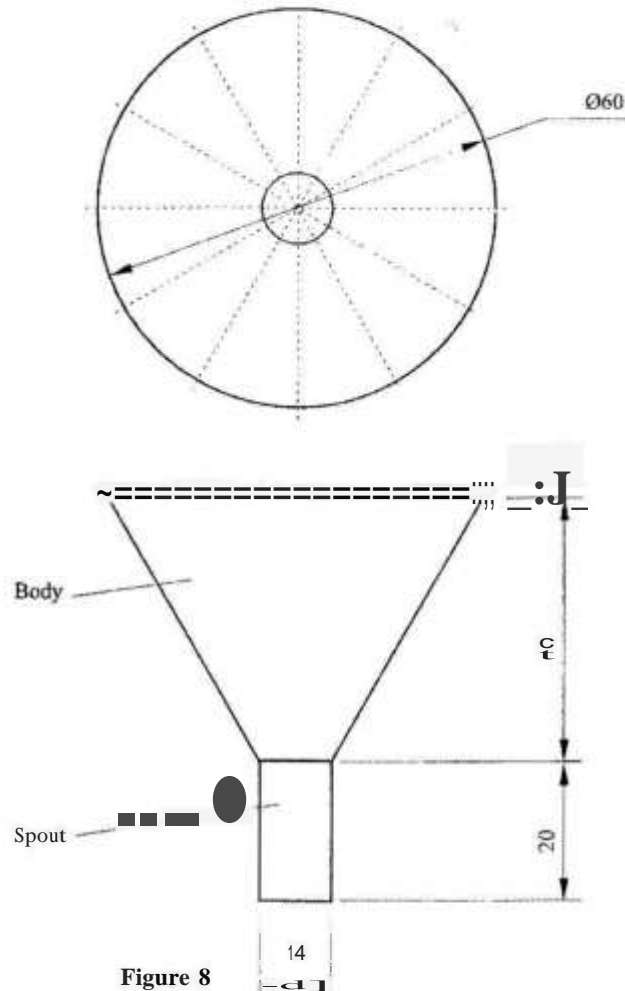


**PART 1-BASE**

**SECTION C (30 marks)**

*Answer any two questions from this section.*

- 12 **Figure 8** shows two views of a funnel drawn in third angle projection. The body of the funnel is conical with a wired edge and a cylindrical spout.

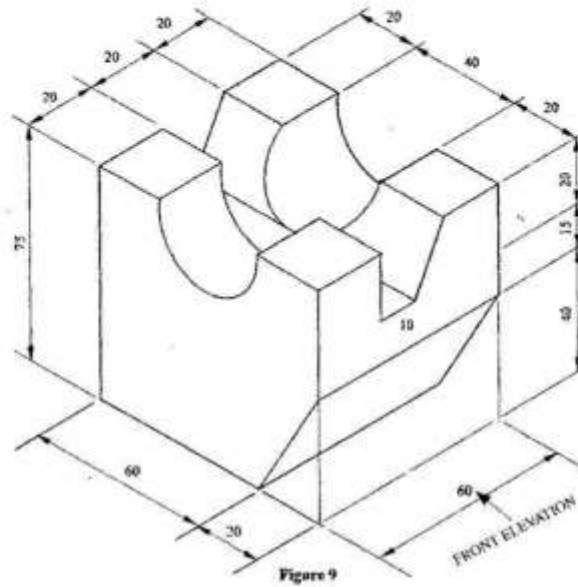


**Figure 8**

Draw the development of:

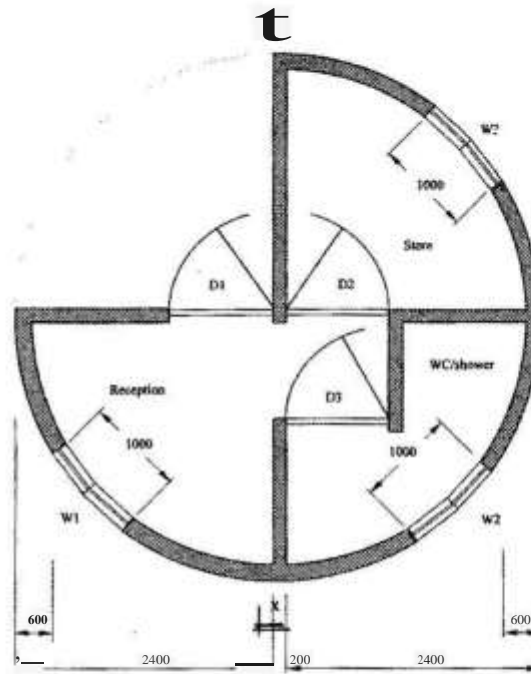
- (a) the body with a 3 mm wire edge;
- (b) the spout (allow 5 mm seam and ignore the thickness of the material). (15 marks)

13 **Figure 9** shows a pictorial view of a machined block.



Draw FULL SIZE in third angle projection, the three orthographic views of the block. (15 marks)

14 **Figure 10** shows a plan of a guard house.



Draw section X-X to a scale of 1:50. (15 marks)



## Specifications

Foundation: Concrete strip 600 x 200  
Walling: 200 mm blockwork  
Flooring: Ring beam 300 x 200  
Flooring: Concrete on hardcore  
Screed on 100 mm concrete  
Roof: Pitch 30° covered with concrete tiles on 50 x 25 battens on 100 x 50 rafters.  
Doors: D1 steel casement 2000 x 900  
D2 and D3 framed timber 2000 x 900  
Windows: W1 steel casement 1600 x 1000  
W2, W3 and W4 1000 x 500